Technical Cooperation TG-3899 "Zero-carbon Energy Paths in the Caribbean"

TERMS OF REFERENCE

REGIONAL/CCB – CARIBBEAN GROUP

ENERGY DIVISION | INE-ENE

Consultancy Services: Caribbean regional decarbonization assessment of the energy sector (I.1)

I. Background and Justification

1.1 The energy sector in the Caribbean faces many challenges. The Caribbean countries, except for Trinidad and Tobago (which is a natural-gas producer) and Suriname (which is an oil producer mainly to supply domestic market), rely heavily on imported liquid fossil fuels for power generation. This dependency puts a severe burden on the commercial balance of most Caribbean countries leaving their economies exposed to price volatility on the global oil markets. Fiscal budgets are drained in countries where electricity tariffs do not allow full cost recovery and/or fuel costs are subsidized. The discovery of oil and associated natural gas in Guyana and Suriname brings new opportunities and challenges for both countries and will influence the energy system in the greater Caribbean

1.2 The condition of the Caribbean countries as Small Island Development States (SIDS) plays an important role in limiting economies of scale in the energy sector. Small remote islands are characterized by modest loads for power generators. The low energy volumes and large distances severely constrain possibility for transporting electric energy between islands and sovereignties. By consequence, island power systems are characterized by larger installed capacities and poorer load factors than interconnected systems, resulting in high energy costs. As a result, energy tariffs in the Caribbean are among the highest in the world, affecting people's purchase capacity and undermining competitiveness of the national economies.

1.3 The Caribbean islands are highly vulnerable to extreme weather events, which are expected to increase in frequency and intensity due to global climate change effects. Tropical storms, hurricanes and floods have caused loss of thousands of human lives in the region, destroyed livelihoods, energy system assets, agricultural and livestock production systems, and weakened critical coastal ecosystems protecting the islands. Hurricanes damage generation and transmission and distribution (T&D) infrastructure and cause economic losses due to defaulted supply to end-users and revenue losses for utilities. The devastation caused by hurricanes in recent years, and global climate trends, have increased the urgency in CARICOM countries to invest in energy resilience.

1.4 Most Caribbean countries do not yet have an Integrated Resource and Resiliency Plan (IRRP) for their energy sectors. Neither are adequate governance frameworks and effective regulation in place for the promotion of sustainable energy (SE) solutions. Most countries are characterized by a vertically integrated, single-utility model and have just started to modernize. Typically, technical know-how, skilled staff, and sector information is concentrated in the utility rather than the Government or an autonomous sector body

1.5 Many of the Caribbean countries' NDC[1] and/or decarbonization plans under the Paris

[1] National Determined Contributions. See: https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx

Agreement present Greenhouse Gases (GHG) reduction targets that require substantial support to materialize. Barbados has pledged a 100% RE and 20% EE target by 2030 and Guyana by 2040. Suriname has committed to maintain its share of RE supply (existing large hydro) above 35% by 2030. Jamaica´s NDC has committed a 20% RE share by 2030 - in 2018 this was increased to 50% by Government. The Bahamas aim at 30% RE in 2030, while Trinidad and Tobago have set a 10% RE goal by 2021 (which has not been updated). The preparation of robust methodologies underpinning such targets and progress monitoring thereof involves a consideration of countries' energy sector conditions and socio-economic prospects including aspects such as: fiscal situation, availability of local energy resources, expected energy demand, existing and planned infrastructure, electricity billing and losses, regulatory framework, among others.

1.6 Coordination and integration of the fragmented island energy markets has been identified as key for obtaining a better bargaining position of the Caribbean countries viz-a-viz technology suppliers and fuel traders, for several reasons. One, collective fuel procurement models would increase contract volumes tenfold or more, compared to individual island transactions. It would trigger sharper price offers and draw competitive global traders into the region who would otherwise ignore this market. Second, RE project scales can be increased by developing a regional portfolio and procure and finance under an umbrella approach. Upscaling may be particularly relevant in a global context in which demand greatly outmatches supply of RE technology. Third, regional integration would assist Caribbean countries to harmonize technical standards, optimize intra-regional logistics, and exploit energy trading and storage options to reduce price volatility exposure, and improve energy security in general.

1.7 In fact, recent technological progress translates into opportunities to transform energy systems in the Caribbean. Sustainable energy (SE) investments are becoming feasible due to the fast drop in capital costs of solar photovoltaic (PV), wind and battery storage technologies, while technical performance, technological maturity and conversion efficiencies continue to improve. As a result, the supply side for delivering SE solutions for the Caribbean has greatly improved. However, a range of barriers at the demand side prevent the uptake of SE technologies to enable a decarbonization of the power in alignment with the NDCs. Alongside climate change mitigation, there is a general awareness now that energy systems in the Caribbean need to be redesigned to increase resilience to the impacts of extreme natural events, including frequent hurricanes and flooding - which are exacerbated by global climate change.

1.8 Caribbean countries also exhibit opportunities for improvement in energy use by energy conservation (EC) and energy efficiency (EE) technologies. The regional average energy intensity is 4,618 BTU/US$ of GDP, which is higher than the average for the entire LAC region 4,003 BTU/US$ of GDP. A large range of EE options has been identified as technical and financially feasible in industry, residential sector, and power sector. Previous studies have identified barriers to the implementation of EE mechanisms in the Caribbean such as: subsidies for conventional forms of energy, high capital costs and financing risks and uncertainties.

II. Objective

2.1 The specific objective of this Consultancy is (i) to develop a regional assessment into decarbonization of the energy sector; and (ii) to identify recommended low-carbon energy investments and interventions, including but not limited to renewable energy, energy efficiency, digitalization.

2.2 The regional assessment shall evaluate: (i) alternatives for the physical integration of the electricity systems of the islands, and proposals for the development of resilient, sustainable and energy-independent islands, (ii) alternatives for the integration of the fuel sectors, emphasizing the potential of green energy resources, (iii) alternatives for the policy and regulatory standardization of the electricity and fuel sectors, (iv) scenarios evaluating the impact

of EE and EC policies and interventions; (v) recommendations and an indicative timeline for the implementation of mentioned alternatives and interventions, (vi) estimations of the potential emission reductions and benefits of the decarbonization to the energy security of countries, (vii) recommended verification mechanism to monitor the decarbonization process, (viii) a value chain analysis for the energy transition to build supply and O&M ecosystems, promote local partnerships, local jobs, and gender equity; and (ix) an assessment of measures to increase electricity system resilience.

2.3 Key aspects for the assessment include, but are not limited to: (i) energy security and resilience (adaptation to the impacts of climate change); (ii) business models that consider private sector participation; (iii) digitalization and innovation; (iv) energy planning and regulation in the regional context; (v) opportunities for regional economic integration; (vi) integration of renewable energies (RE); (vi) market development for cleaner fuels and energy storage; (vii) adoption of energy efficiency (EE) technologies and energy conservation (EC) measures; and (viii) gender equity and social inclusion.

2.4 The identification of recommended energy interventions shall produce a ranking in terms of maturity and bankability, timeline towards implementation, barriers and conditions for success, scale and capital expenditure (CAPEX), expected benefits in terms of energy production, GHG reductions, socio-economic benefits, etcetera. Interventions can be investment-related such as power generation and clean fuel production and distribution, digitalization of grid control and management systems, concepts for bidirectional and smart grids, intelligent fuel logistics and trading concepts, and more.

III. Scope of Services

3.1 The activities requested from the Consultant include the following:

3.2 Work in close coordination with the IDB INE/ENE team that will execute this TC under the supervision of its coordinator for the Caribbean region. The Consultant shall engage with INE/ENE sector specialists and other staff, under guidance of the supervisor. If requested by the supervisor, the Consultant shall participate in online meetings and webinars with external stakeholders.

3.3 Review the literature of the sector associated with this assignment, including but not limited to: (1) electricity and fuel sector statistics, market trends, policy frameworks and regulation for the indicated six (6) countries; (2) regional energy policy frameworks and professional, technical, and sector associations and entities; (3) earlier plans and studies into the integration of regional cleaner fuel markets and national electricity grid systems; (4) energy and transportation sector demand forecasts, electricity sector Integrated Resilience and Resource Planning (IRRP) exercises; (5) renewable energy resource mapping; (6) project initiatives concerning RE systems and battery energy storage (utility-scale and distributed generation); (7) status and capacities for digitalization of the energy system; (8) studies and initiatives for cleaner fuels projects; (9) national GHG mitigation policies and commitments under the UNFCCC including (updated) NDCs; and: (10) national policies and plans to adapt to the impacts of global climate change, specifically for increasing resilience of the energy supply and distribution systems. The IDB team will provide a repository of information sources to the Consultant.

3.4 Prepare a detailed work plan for approval by the IDB (deliverable 1).

3.5 Analyze collected sector information from various perspectives including: (i) sector performance criteria such as cost-effectiveness, service coverage, service reliability, utility efficiency; (ii) environmental impact including GHG intensity; (iii) effect of SIDS circumstances on energy supply systems, including market limitations, technological constraints, qualified personnel,

transaction costs, grid quality and load factors; (iv) resilience of energy supply systems to extreme natural events and climate change impacts, concerning protection of infrastructure and assets, supply security, and functioning of critical services (e.g. public health, civil protection) in case of a major event; (v) preparedness of fuel and electricity sectors to decarbonize and meet established GHG mitigation targets; (vi) fairness of energy supply in terms of geographic coverage, social inclusiveness, gender equity, and affordability; (vii) sector preparedness for adoption of current global technological trends including digitalization, smart grids, distributed generation and storage; and (viii) baseline situation and potential for adoption of EE and EC in power sector, transformative industries, mobility, and commercial and residential sectors; (vii).

3.6 Based on the previous analysis and inputs received, prepare the draft regional decarbonization assessment for the energy sector (deliverable 2). The document shall identify policy, legal and regulatory, finance, capacity and technological challenges, and regional ambitions, such as based on country commitments as reflected in the (updated) NDCs. It shall trigger reflection about the future energy landscape in the Caribbean and critical aspects for decarbonization of the energy sector. It will further serve as a point of departure for discussing integration of the energy sector in the Caribbean basin.

3.7 Propose methodologies for the evaluation of alternatives towards a zero-carbon energy path (such as LCOE, MCA, SWOT)[2] including a discussion of their merits and limitations Assess and consolidate cost figures for economic analysis of policy scenarios, interventions and investments. Duly document the methodologies and input data used for the assessment, as well as other annexes relevant for a meaningful review.

3.8 Following IDB instructions, engage in meetings with the IDB team and other invited stakeholders to discuss the draft document, exchange viewpoints and suggestions, and collect comments from all stakeholders. Finalize the regional decarbonization assessment for the energy sector for IDB approval, incorporating all comments and recommendations issued by the IDB team (deliverable 3).

3.9 Identify recommended energy interventions in the region and produce an indicative ranking in terms of maturity and bankability, timeline towards implementation, barriers and conditions for success, scale and capital expenditure (CAPEX), expected benefits in terms of energy production, GHG reductions, socio-economic merits, etcetera. An interactive process under guidance of the IDB supervisor is envisaged to set priorities and zoom into specific aspects and challenges. This approach is expected to translate into a more robust implementation timeline for identified interventions in the regional energy sector (deliverable 4).

3.10 Be available to the IDB INE/ENE team for advice on technical, policy, and other relevant topics using teleconference systems, as requested.

3.11 Prepare a final report (deliverable 5) describing a summary of all activities deployed, a listing of all reports and files submitted, and general findings and recommendations.

IV. Expected Outcome and Deliverables

4.1 The following five (5) deliverables are expected reflecting the Consultant´s duties and activities:

1) First deliverable: Work plan including detailed planning, required engagement (workshops and interviews with country partners) and identification of all relevant sources of information.
2) Second deliverable: Report with draft regional decarbonization assessment for the

[2] LCOE = Levelized Cost of Energy; MCA = Multi-Criteria Analysis; SWOT = Strengths, Weaknesses, Opportunities and Threats.

energy sector, including input data, methodologies and annexes relevant for review;

3) Third deliverable: Final regional decarbonization assessment for the energy sector for IDB approval.
4) Fourth deliverable: Report with recommended energy investments, timeline towards implementation and ranking in terms of feasibility, bankability and merits.
5) Final report describing summary of activities, findings and recommendations, and listing of all reports and files submitted.

V. Project Schedule, Milestones and Reporting Requirements

5.1 The duration of execution of these ToR will be 12 months (365 days) from the date of signature of the contract. The assignment will be carried out from the Consultant´s office. Missions to the beneficiary countries are not foreseen but frequent meetings with IDB INE/ENE staff will be scheduled through video-conference platforms. All stakeholder meetings will be initiated and convoked by the IDB.

5.2 The submission of the first, second, third and fourth deliverable will be considered as milestones to measure progress of the consultancy.

5.3 The Consultant shall submit all documents and spreadsheets used in editable format. Each report must be submitted to the Bank in electronic file. Reports shall include cover, main document, and all annexes. Files in Zip format will not accepted as final reports according to Bank regulation.

VI. Acceptance Criteria

6.1 The IDB will submit a written approval once each deliverable is submitted with all comments duly addressed.

VII. Supervision and Reporting

7.1 The coordination of this consultancy will be led by Roberto Aiello (INE/ENE): raiello@IADB.ORG .

VIII. Schedule of Payments

8.1 Payments will be specified in the contract based on the concept of lump sum and in correspondence to the submitted deliverables once received and approved to the satisfaction of IDB, as follows:

- First payment (10%) corresponding to deliverable 1 (Work plan);
- Second payment (30%), corresponding to deliverable 2 (Draft regional energy sector decarbonization assessment and relevant annexes);
- Third payment (25%), corresponding to deliverable 3 (Finalized regional energy sector decarbonization assessment and annexes);
- Fourth payment (25%) corresponding to deliverable 4 (Report with ranking of recommended energy interventions and implementation timeline);
- Fifth payment (10%) corresponding to deliverable 5 (Final report Consultant´s activities).

IX. Qualifications

9.1 The Consultant will be an international consultancy firm or consortium, with extensive proven experience and knowledge of technical, policy, finance, and environmental aspects of the energy sector, including low-carbon technologies and strategies towards resilience of infrastructure and adaptation to climate change impacts. Experience in the Caribbean will be an asset; previous experience working with IDB procurement policies will be an advantage. The team provided by the Consultant will consist of at least four qualified individuals: (1) project

manager; (2) regulatory expert; (3) economic expert; (4) renewable energy expert, and (5) energy efficiency expert. See Annex I for the minimum qualifications of the key team members. No changes to the team will be allowed without prior communication to the IDB and formally and in writing acceptance of such changes by the Bank.

9.2 Balance in gender composition of the teams is desirable.

9.3 The working language will be English.

X. Consanguinity

10.1 Pursuant to applicable Bank policy, candidates with relatives (including the fourth degree of consanguinity and the second degree of affinity, including spouse) working for the Bank as staff members or Complementary Workforce contractual, will not be eligible to provide services for the Bank.

XI. Diversity

11.1 The Bank is committed to diversity and inclusion and to providing equal opportunities to all candidates. We embrace diversity on the basis of gender, age, education, national origin, ethnic origin, race, disability, sexual orientation, religion, and HIV/AIDS status. We encourage women, Afro-descendants and persons of indigenous origins to apply.

Annex I Consultancy Team Key Member Qualifications

Key team members shall meet at least the following qualifications and competences:

Project Manager

- Advanced university degree in industrial, electrical or mechanical engineering, economics, business management, or similar. Demonstrated knowledge of energy sector aspects including technology, economics, and environmental aspects.
- Proven experience (at least 10 years) in energy sector consultancy services, including energy policy advice, energy sector regulation, energy planning.
- Proven experience (at least 5 years) with renewable energy technologies, climate change aspects of energy policy and sector strategies, energy efficiency and energy conservation.
- Demonstrated track record with management and execution of energy sector consultancy services (at least 3 references in last 5 years).
- Professional experience with energy consultancy services in the Caribbean or other Small Island Development States (SIDS) regions will be valued.
- Ability to engage effectively with a variety of stakeholders across at all levels.
- Team player with excellent abilities to effectively manage and participate in technical teams.
- Excellent command of English language.
- Strong drafting, presentation, reporting and communication skills.

Regulatory Expert

- Advanced university degree in law, economics, political sciences, or similar. Specialization or demonstrated knowledge of energy sector aspects including economics, legal, regulatory and environmental aspects.
- Proven experience (at least 10 years) in international energy sector consultancy services, including energy policy advice and energy sector regulation.
- Up-to-date knowledge of current trends in the power and fuel sector, including embedding of renewable energy technologies, energy storage, smart grid solutions, clean fuel developments, business trends and policy and regulatory frameworks adopted globally.
- Demonstrated track record providing energy sector consultancy services to governments and international agencies (at least 3 references in last 5 years).
- Demonstrated knowledge of the political and socio-economic context of the Caribbean island states. Professional experience with energy consultancy services in the Caribbean or other Small Island Development States (SIDS) regions will be valued.
- Excellent abilities to engage with government stakeholders to translate requirements into conceptual frameworks for ongoing dialogue and detailing.
- Demonstrated ability to perform in a complex and multicultural environment.
- Excellent command of English language.
- Strong drafting, presentation, reporting and communication skills

Economic Expert

- Advanced university degree in economics and finance, or similar. Demonstrated knowledge of energy sector aspects including economics, legal, regulatory and environmental aspects, including GHG emission reduction mechanisms.
- Proven experience (at least 5 years) in energy sector consultancy services, including energy policy advice and economic analysis.
- Up-to-date knowledge of current trends in the power and fuel sector, including embedding of renewable energy technologies, energy storage, smart grid solutions, clean fuel developments, business trends and policy and regulatory frameworks adopted globally.

- Demonstrated track record providing consultancy services concerning energy economics and finance for governments and international agencies (at least 3 references in last 5 years).
- Demonstrated knowledge of the political and socio-economic context of the Caribbean island states. Professional experience with energy consultancy services in the Caribbean or other Small Island Development States (SIDS) regions will be valued.
- Excellent analytical skills and proficiency with economic modelling tools for the energy sector.
- Demonstrated ability to perform in a complex and multicultural environment.
- Excellent command of English language.
- Strong drafting, presentation, reporting and communication skills

Renewable Energy Expert

- Advanced university degree in industrial, electrical or mechanical engineering, economics, business management, or similar. Demonstrated knowledge of energy sector aspects including technology, economics, and environmental aspects.
- Proven experience (at least 10 years) in energy sector consultancy services, including clean energy project development. Specific knowledge of clean energy technologies in the context of Small Island Development States.
- Proven track-record (at least 3 references in last 5 years) assisting countries to build local eco-systems in support of clean energy technology implementation and financing thereof.
- Up-to-date knowledge of current trends in the power and fuel sector, including embedding of renewable energy technologies, energy storage, smart grid solutions, clean fuel developments, business trends and policy and regulatory frameworks adopted globally.
- Awareness of the political and socio-economic context of the Caribbean island states. Professional experience with energy consultancy services in the Caribbean will be valued.
- Demonstrated ability to perform in a complex and multicultural environment.
- Excellent command of English language.
- Strong drafting, presentation, reporting and communication skills

Energy Efficiency Expert

- Advanced university degree in industrial, electrical or mechanical engineering, economics, business management, or similar. Demonstrated knowledge of energy sector aspects including technology, economics, and environmental aspects with experience in Energy Efficiency.
- Proven experience (at least 10 years) in energy sector consultancy services, including energy efficiency programs at city or national scale. Specific knowledge of clean energy technologies in the context of Small Island Development States.
- Proven track-record (at least 3 references in last 5 years) assisting countries to build local eco-systems in support of energy efficiency implementation and financing.
- Up-to-date knowledge of current trends in the power and fuel sector, including embedding of renewable energy technologies, energy storage, smart grid solutions, clean fuel developments, business trends and policy and regulatory frameworks adopted globally.
- Awareness of the political and socio-economic context of the Caribbean island states. Professional experience with energy consultancy services in the Caribbean will be valued.
- Demonstrated ability to perform in a complex and multicultural environment.
- Excellent command of English language.
- Strong drafting, presentation, reporting and communication skills.

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REGIONAL/CCB – CARIBBEAN GROUP

ENERGY DIVISION | INE-ENE

Specific Studies for the decarbonization of the energy sector

I. Background and Justification

1.1 The energy sector in the Caribbean faces many challenges. The Caribbean countries, except for Trinidad and Tobago (which is a natural-gas producer) and Suriname (which is an oil producer mainly to supply domestic market), rely heavily on imported liquid fossil fuels for power generation. This dependency puts a severe burden on the commercial balance of most Caribbean countries leaving their economies exposed to price volatility on the global oil markets. Fiscal budgets are drained in countries where electricity tariffs do not allow full cost recovery and/or fuel costs are subsidized. The discovery of oil and associated natural gas in Guyana and Suriname brings new opportunities and challenges for both countries and will influence the energy system in the greater Caribbean

1.2 The condition of the Caribbean countries as Small Island Development States (SIDS) plays an important role in limiting economies of scale in the energy sector. Small remote islands are characterized by modest loads for power generators. The low energy volumes and large distances severely constrain possibility for transporting electric energy between islands and sovereignties. By consequence, island power systems are characterized by larger installed capacities and poorer load factors than interconnected systems, resulting in high energy costs. As a result, energy tariffs in the Caribbean are among the highest in the world, affecting people's purchase capacity and undermining competitiveness of the national economies.

1.3 The Caribbean islands are highly vulnerable to extreme weather events, which are expected to increase in frequency and intensity due to global climate change effects. Tropical storms, hurricanes and floods have caused loss of thousands of human lives in the region, destroyed livelihoods, energy system assets, agricultural and livestock production systems, and weakened critical coastal ecosystems protecting the islands. Hurricanes damage generation and transmission and distribution (T&D) infrastructure and cause economic losses due to defaulted supply to end-users and revenue losses for utilities. The devastation caused by hurricanes in recent years, and global climate trends, have increased the urgency in CARICOM countries to invest in energy resilience.

1.4 Most Caribbean countries do not yet have an Integrated Resource and Resiliency Plan (IRRP) for their energy sectors. Neither are adequate governance frameworks and effective regulation in place for the promotion of sustainable energy (SE) solutions. Most countries are characterized by a vertically integrated, single-utility model and have just started to modernize. Typically, technical know-how, skilled staff, and sector information is concentrated in the utility rather than the Government or an autonomous sector body

1.5 Many of the Caribbean countries' NDC[3] and/or decarbonization plans under the Paris Agreement present Greenhouse Gases (GHG) reduction targets that require substantial support to materialize. Barbados has pledged a 100% RE and 20% EE target by 2030 and Guyana by 2040. Suriname has committed to maintain its share of RE supply (existing large hydro) above 35% by 2030. Jamaica´s NDC has committed a 20% RE share by 2030 - in 2018

[3] National Determined Contributions. See: https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx

this was increased to 50% by Government. The Bahamas aim at 30% RE in 2030, while Trinidad and Tobago have set a 10% RE goal by 2021 (which has not been updated). The preparation of robust methodologies underpinning such targets and progress monitoring thereof involves a consideration of countries' energy sector conditions and socio-economic prospects including aspects such as: fiscal situation, availability of local energy resources, expected energy demand, existing and planned infrastructure, electricity billing and losses, regulatory framework, among others.

1.6 Coordination and integration of the fragmented island energy markets has been identified as key for obtaining a better bargaining position of the Caribbean countries viz-a-viz technology suppliers and fuel traders, for several reasons. One, collective fuel procurement models would increase contract volumes tenfold or more, compared to individual island transactions. It would trigger sharper price offers and draw competitive global traders into the region who would otherwise ignore this market. Second, RE project scales can be increased by developing a regional portfolio and procure and finance under an umbrella approach. Upscaling may be particularly relevant in a global context in which demand greatly outmatches supply of RE technology. Third, regional integration would assist Caribbean countries to harmonize technical standards, optimize intra-regional logistics, and exploit energy trading and storage options to reduce price volatility exposure, and improve energy security in general.

1.7 In fact, recent technological progress translates into opportunities to transform energy systems in the Caribbean. Sustainable energy (SE) investments are becoming feasible due to the fast drop in capital costs of solar photovoltaic (PV), wind and battery storage technologies, while technical performance, technological maturity and conversion efficiencies continue to improve. As a result, the supply side for delivering SE solutions for the Caribbean has greatly improved. However, a range of barriers at the demand side prevent the uptake of SE technologies to enable a decarbonization of the power in alignment with the NDCs. Alongside climate change mitigation, there is a general awareness now that energy systems in the Caribbean need to be redesigned to increase resilience to the impacts of extreme natural events, including frequent hurricanes and flooding - which are exacerbated by global climate change.

1.8 Caribbean countries also exhibit opportunities for improvement in energy use by energy conservation (EC) and energy efficiency (EE) technologies. The regional average energy intensity is 4,618 BTU/US$ of GDP, which is higher than the average for the entire LAC region 4,003 BTU/US$ of GDP. A large range of EE options has been identified as technical and financially feasible in industry, residential sector, and power sector. Previous studies have identified barriers to the implementation of EE mechanisms in the Caribbean such as: subsidies for conventional forms of energy, high capital costs and financing risks and uncertainties.

II. Objective

2.1 The specific objective of this Consultancy is (i) to develop specific studies for the energy sector in the Caribbean as determined and prioritized by the regional assessment for the decarbonization of the energy secto.

2.2 The regional assessment shall evaluate: (i) alternatives for the physical integration of the electricity systems of the islands, and proposals for the development of resilient, sustainable and energy-independent islands, (ii) alternatives for the integration of the fuel sectors, emphasizing the potential of green energy resources, (iii) alternatives for the policy and regulatory standardization of the electricity and fuel sectors, (iv) scenarios evaluating the impact of EE and EC policies and interventions; (v) recommendations and an indicative timeline for the implementation of mentioned alternatives and interventions, (vi) estimations of the potential emission reductions and benefits of the decarbonization to the energy security of countries, (vii) recommended verification mechanism to monitor the decarbonization process, (viii) a value chain analysis for the energy transition to build supply and O&M ecosystems, promote local

partnerships, local jobs, and gender equity; and (ix) an assessment of measures to increase electricity system resilience.

2.3 Field of work can be drawn for the following, non-exhaustive list: Key aspects for the assessment include, but are not limited to: (a) investment plans to increase resilience of T&D infrastructure by undergrounding; (b) in-depth analysis to strengthen the energy-gender nexus; (c) evaluation of technical and commercial potential of battery energy storage systems (BESS); (d) detailed analysis of relations between primary energy supplies and energy end-uses; and (e) gap assessment into innovations and digital technologies that may prove relevant for building an efficient, transparent, resilient and low-carbon energy sector in Caribbean countries.

III. Scope of Services

3.1 The scope of services will be updated based on the Field of Work as determined by the product of consultancy I.1 “Caribbean regional decarbonization assessment of the energy sector”

3.2 The activities requested from the Consultant include the following:

3.3 Work in close coordination with the IDB INE/ENE team that will execute this TC under the supervision of its coordinator for the Caribbean region. The Consultant shall engage with INE/ENE sector specialists and other staff, under guidance of the supervisor. If requested by the supervisor, the Consultant shall participate in online meetings and webinars with external stakeholders.

3.4 Review the literature of the sector associated with this assignment

3.5 Prepare a detailed work plan for approval by the IDB (deliverable 1).

3.6 Analyze collected sector information

3.7 Based on the previous analysis and inputs received, prepare the draft study assessment for the energy sector (deliverable 2).

3.8 Following IDB instructions, engage in meetings with the IDB team and other invited stakeholders to discuss the draft document, exchange viewpoints and suggestions, and collect comments from all stakeholders. Finalize the regional decarbonization assessment for the energy sector for IDB approval, incorporating all comments and recommendations issued by the IDB team (deliverable 3).

3.9 Identify recommended energy interventions in the region. This approach is expected to translate into a more robust implementation timeline for identified interventions in the regional energy sector (deliverable 4).

3.10 Be available to the IDB INE/ENE team for advice on technical, policy, and other relevant topics using teleconference systems, as requested.

3.11 Prepare a final report (deliverable 5) describing a summary of all activities deployed, a listing of all reports and files submitted, and general findings and recommendations.

IV. Expected Outcome and Deliverables

4.1 The following five (5) deliverables are expected reflecting the Consultant´s duties and activities:

6) First deliverable: Work plan including detailed planning, required engagement (workshops and interviews with country partners) and identification of all relevant sources of information.
7) Second deliverable: Report with draft regional decarbonization assessment for the energy sector, including input data, methodologies and annexes relevant for review;
8) Third deliverable: Final regional decarbonization assessment for the energy sector for IDB approval.
9) Fourth deliverable: Report with recommended energy investments, timeline towards implementation and ranking in terms of feasibility, bankability and merits.
10) Final report describing summary of activities, findings and recommendations, and listing of all reports and files submitted.

V. Project Schedule, Milestones and Reporting Requirements

5.1 The duration of execution of these ToR will be 12 months (365 days) from the date of signature of the contract. The assignment will be carried out from the Consultant´s office. Missions to the beneficiary countries are not foreseen but frequent meetings with IDB INE/ENE staff will be scheduled through video-conference platforms. All stakeholder meetings will be initiated and convoked by the IDB.

5.2 The submission of the first, second, third and fourth deliverable will be considered as milestones to measure progress of the consultancy.

5.3 The Consultant shall submit all documents and spreadsheets used in editable format. Each report must be submitted to the Bank in electronic file. Reports shall include cover, main document, and all annexes. Files in Zip format will not accepted as final reports according to Bank regulation.

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VII. Supervision and Reporting

7.1 The coordination of this consultancy will be led by Roberto Aiello (INE/ENE): raiello@IADB.ORG .

VIII. Schedule of Payments

8.1 Payments will be specified in the contract based on the concept of lump sum and in correspondence to the submitted deliverables once received and approved to the satisfaction of IDB, as follows:

- First payment (10%) corresponding to deliverable 1 (Work plan);
- Second payment (30%), corresponding to deliverable 2 (Draft regional energy sector decarbonization assessment and relevant annexes);
- Third payment (25%), corresponding to deliverable 3 (Finalized regional energy sector decarbonization assessment and annexes);
- Fourth payment (25%) corresponding to deliverable 4 (Report with ranking of recommended energy interventions and implementation timeline);
- Fifth payment (10%) corresponding to deliverable 5 (Final report Consultant´s activities).

IX. Qualifications

9.1 The Consultant will be an international consultancy firm or consortium, with extensive proven experience and knowledge of technical, policy, finance, and environmental aspects of the

energy sector, including low-carbon technologies and strategies towards resilience of infrastructure and adaptation to climate change impacts. Experience in the Caribbean will be an asset; previous experience working with IDB procurement policies will be an advantage. The team provided by the Consultant will consist of at least four qualified individuals: (1) project manager; (2) regulatory expert; (3) economic expert; (4) renewable energy expert, and (5) energy efficiency expert. See Annex I for the minimum qualifications of the key team members. No changes to the team will be allowed without prior communication to the IDB and formally and in writing acceptance of such changes by the Bank.

9.2 Balance in gender composition of the teams is desirable.

9.3 The working language will be English.

X. Consanguinity

10.1 Pursuant to applicable Bank policy, candidates with relatives (including the fourth degree of consanguinity and the second degree of affinity, including spouse) working for the Bank as staff members or Complementary Workforce contractual, will not be eligible to provide services for the Bank.

XI. Diversity

11.1 The Bank is committed to diversity and inclusion and to providing equal opportunities to all candidates. We embrace diversity on the basis of gender, age, education, national origin, ethnic origin, race, disability, sexual orientation, religion, and HIV/AIDS status. We encourage women, Afro-descendants and persons of indigenous origins to apply.