

CARIBBEAN DEVELOPMENT BANK

TWO HUNDRED AND EIGHTY-EIGHTH MEETING OF THE BOARD OF DIRECTORS

TO BE HELD IN BARBADOS

DECEMBER 12, 2019

PAPER BD 106/19

**NOTIFICATION OF APPROVAL BY THE PRESIDENT OF A RECONSTRUCTION AND
REHABILITATION GRANT - BARBUDA ENERGY RESILIENCE PROJECT -
ANTIGUA AND BARBUDA**

In accordance with the authority delegated by the Board of Directors at its Two Hundred and Seventieth Meeting (Minute 270.32), the President approved a Grant of two million, eight hundred and fifty thousand pounds sterling (£2,850,000) from the Special Funds Resources of the Caribbean Development Bank (CDB). The Funds were provided by the United Kingdom through the Department for International Development to CDB under the United Kingdom Caribbean Infrastructure Partnership Fund. The purpose of the funds are to assist the Government of Antigua and Barbuda in financing: the undergrounding of approximately 8 km of the electricity network; the provision of backup power for key public buildings; and the provision of a Reconnection Support Programme in Barbuda, on the terms and conditions referred to in the attached Paper.

2. It is a condition that each project approved by the President and the terms and conditions thereof be reported to the Board at its first convenient scheduled Meeting after approval of the project.
3. The Board is therefore asked to note the approval by the President of the abovementioned project and the terms and conditions thereof.

CARIBBEAN DEVELOPMENT BANK

APPRAISAL REPORT

ON

**RECONSTRUCTION AND REHABILITATION GRANT - BARBUDA ENERGY RESILIENCE
PROJECT – ANTIGUA AND BARBUDA**

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Notified at the Two Hundred and Eighty-Eighth Meeting of the Board of Directors on December 12, 2019

Director, Projects Department

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DECEMBER 2019

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CURRENCY EQUIVALENT

[Currency throughout refer to Pounds Sterling (£) unless otherwise stated.]

1	XCD	=	0.29	GBP
1	GBP	=	3.24	XCD
1	USD	=	0.79	GBP
1	GBP	=	1.27	USD
1	USD	=	2.7	XCD

ABBREVIATIONS

ADFD	-	Abu Dhabi Fund for Development
APUA	-	Antigua Public Utilities Authority
BCLO	-	Barbuda Council Liaison Officer
BESS	-	Battery Energy Storage System
CDB	-	Caribbean Development Bank
CO ₂	-	Carbon Dioxide
CPGs	-	Community Participation Groups
C-SEC	-	Canadian Support to the Energy Sector in the Caribbean Fund
CVA	-	Climate Vulnerability Assessment
DFID	-	Department of International Development
DiMSOG	-	Disaster Risk Management Strategy and Operational Guidelines
DOE	-	Department of Environment
DRM	-	Disaster Risk Management
EE	-	Energy Efficiency
EEP	-	Energy Efficiency Programme
EPC	-	Engineering Procurement and Construction
ERR	-	Economic Rate of Return
ESMP	-	Environmental and Social Management Plan
GDP	-	Gross Domestic Product
GOAB	-	Government of Antigua and Barbuda
GRM	-	Grievance Redress Mechanism
HH	-	Household Head
IFRC	-	International Federation of Red Crescent
kW	-	Kilowatt
kWh	-	Kilowatt hour
kWp	-	Kilowatt peak
Masdar	-	Abu Dhabi Future Energy Company
MFED	-	Ministry of Finance and Economic Development
MSMEs	-	Micro, Small and Medium Enterprises
NEMO	-	National Emergency Management Organization
NEP	-	National Energy Policy
ODA	-	Official Development Assistance
OECD	-	Organisation for Economic Development and Development

OEM	-	Original Equipment Manufacturer
OHL	-	Overhead Line
PAO	-	Project Administration Officer
PC	-	Project Coordinator
PE	-	Project Engineer
PIMU	-	Project Implementation Management Unit
PMU	-	Project Management Unit
PSS	-	Procurement Support Specialist
PV	-	Photovoltaic
PWDs	-	Persons with Disabilities
RE	-	Renewable Energy
RMF	-	Results Monitoring Framework
RRG	-	Rehabilitation and Reconstruction Grant
RRL	-	Rehabilitation and Reconstruction Loan
RSP	-	Reconnection Support Programme
SDGs	-	Sustainable Development Goals
SDS	-	Social Development Specialist
SEAP	-	Sustainable Energy Action Plan
SEP	-	Stakeholder Engagement Plan
SFR	-	Special Funds Resources
TOR	-	Terms of Reference
UKCIF	-	United Kingdom Caribbean Infrastructure Partnership
UNFCCC	-	United Nations Framework Convention on Climate Change

MEASURES AND EQUIVALENTS

1 hectre (ha)	=	2.47 acres
1 kilometre (km)	=	0.621 mile (mi)
1 square kilometre (km ²)	=	0.386 square mile (mi ²)
1 metre (m)	=	3.281 (ft)
2 millimeters (mm)	=	0.039 inch (in)
1 square meter (m ²)	=	10.756 square feet (ft ²)

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COUNTRY DATA: ANTIGUA AND BARBUDA

	2014	2015	2016	2017	2018
PER CAPITA GDP (current market prices: US\$)	13,500.0	15,091.5	15,921.5	16,447.4	17,346.7
GROSS DOMESTIC PRODUCT (GDP)					
GDP at Current Market Prices (\$mn)	3,444.1	3,669.8	3954.50	4077.23	4384.27
Sectoral distribution of current GDP (%)					
Agriculture	1.0	1.0	0.9	0.9	0.8
Mining and Quarrying	1.1	0.9	0.9	1.0	1.4
Manufacturing	3.1	3.0	2.8	3.0	2.1
Electricity and Water	3.9	4.8	5.3	4.5	3.7
Construction	10.1	9.9	11.1	12.6	12.5
Transport, Storage and Communications	11.1	11.5	11.3	11.4	10.6
Hotels and Restaurants	12.5	12.0	12.3	10.6	13.7
Wholesale and Retail Trade	14.5	14.0	13.3	13.5	13.2
Financial Intermediation	7.9	8.3	8.3	8.3	8.0
Government Services	9.6	9.4	9.5	9.6	9.1
Other Services	27.0	27.0	22.6	23.2	23.3
Less: Imputed Service Charges	1.8	1.7	1.7	1.5	1.7
GDP at Current Factor Cost (\$mn)	2996.3	3183.9	3435.2	3558.3	3838.4
GDP at Constant 2006 Prices (\$mn)	2949.1	3067.8	3239.3	3337.6	3502.1
Annual rate of growth in GDP (%)	4.7	4.0	5.6	3.0	4.9
MONEY AND PRICES (\$mn)					
Consumer prices (end of period % change)	1.3	0.9	-1.1	2.4	1.6
Money supply (M1; annual % change)	5.9	9.8	14.0	17.0	4.7
Total domestic credit (net)	2,610.9	2,251.1	2,336.7	2,324.5	2,360.6
Private sector credit (net)	2,151.6	1,909.5	1,928.3	1,897.7	1,931.1
	2014	2015	2016	2017	2018
CENTRAL GOVERNMENT FINANCES (\$mn)					
Current Revenues	664.4	782.9	782.2	792.2	766.2
Current Grants	0.0	0.0	0.0	0.0	0.0
Current Expenditures	718.4	738.7	803.5	841.2	879.5
Current Account Surplus/(Deficit)	-54.0	44.2	-21.3	-49.0	-113.3
Capital Revenue and Grants	1.4	87.0	174.1	12.8	51.7
Capital Expenditure and Net Lending	55.1	51.4	153.9	60.7	85.9
Overall Surplus/(Deficit)	-93.9	79.8	-1.1	-96.8	-147.5
BALANCE OF PAYMENTS (\$mn)					
Merchandise Exports (f.o.b)	266.5	182.4	135.2	100.4	102.7
Merchandise Imports (c.i.f)	1437.4	1150.5	1,196.5	1333.5	1630.2

Trade balance	-1170.8	-968.1	-1061.3	-1233.1	-1527.4
Net Balance on service account	1449.1	1411.4	1385.1	1286.0	1626.3
Current Account Balance	9.0	79.2	-94.1	-350.6	-305.6
TOTAL PUBLIC DEBT (\$mn)					
Total Public Debt	3,284.6	3,241.0	3,092.8	3,182.4	3,295.1
Domestic debt outstanding	1,902.2	1,793.1	1,687.1	1,702.4	1,725.0
External debt outstanding	1,382.4	1,447.9	1,405.7	1,480.0	1,570.1
Debt service	341.3	548.8	574.8	522.0	477.0
Total debt service as % of current revenue	42.9	61.6	62.0	57.4	52.2
AVERAGE EXCHANGE RATE					
Dollar(s) per US dollar	2.7	2.7	2.7	2.7	2.7

Sources: ECCB and Ministry of Finance.

	2014	2015	2016	2017	2018
POPULATION					
Mid-year Population (000's) ¹	89.4	90.4	91.7	92.7	93.6
Population Growth Rate (%)	1.5	1.2	1.4	1.0	1.0
Crude Birth Rate ²	16.3	16.2	n.a	n.a	n.a
Crude Death Rate ²	6.1	6.1	n.a	n.a	n.a
Infant Mortality Rate ²	6.1	5.8	n.a	n.a	n.a
INDICATORS OF HUMAN DEVELOPMENT					
Life Expectancy at Birth (years)					
Male	73.54	73.71	n.a	n.a	n.a
Female	78.45	78.61	n.a	n.a	n.a
Dependency Ratio					
Male	45.78	...	n.a	n.a	n.a
Female	43.07	...	n.a	n.a	n.a
Human Development Index (value)	0.78	0.79	0.79	n.a	n.a
Tourism					
Total Stay-Over Visitors ('000)	249.3	250.5	265.2	247.3	268.9
Cruise Ship Visitors	525.3	636.5	594.7	768.8	825.4

Source: Statistics Division, Government of Antigua and Barbuda.

1. Census data indicates the population stood at 88,411 in 2011.

2. World Bank Development Indicators.

PROJECT SUMMARY

Financial Terms and Conditions					
Borrower	Government of Antigua and Barbuda (GOAB)				
Executing Agency	Antigua Public Utilities Authority (APUA)				
Fund	Fund Source	Amount (000's)	Amortisation Period (years)	Grace Period (years)	Interest Rate (%)
OSF-GBP	UK CIF Resources	2,850			
Grant Total:		2,850			
Counterpart Total:		346			
Total Project Cost		3,196			
Office of Risk Management (ORM) Commentary:					
This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.					
Project Summary					
Project Outcome and Description:					
The purpose for which the Grant is being made is to assist the Beneficiary in financing the enhancement of:					
<ol style="list-style-type: none">1. the resilience of the electricity distribution network;2. the supply of electricity to key public buildings in Barbuda; and3. the level of access of Barbudans to modern electricity services.					
The expected outcome of the project is a more resilient electricity system, which will provide more inclusive access to modern electricity services in Barbuda.					
The proposed project consists of the following components:					
<ol style="list-style-type: none">(a) Infrastructure Works(b) Engineering and construction-related services(c) Goods(d) Capacity Building(e) Project Management					
Exceptions to CDB Policies	No exceptions to CDB policies are in place for this Project.				

Gender Marker Summary

Analysis	Design	Implementation	Monitoring & Evaluation	Score	Code
1.0	0.5	1.0	1.0	3.5	Gender Mainstreamed (GM)

1. STRATEGIC CONTEXT AND RATIONALE

REQUEST

1.1 By letter dated March 26, 2019, the Government of Antigua and Barbuda (GOAB) requested financing from CDB for the construction of resilient infrastructure in the energy sector in Barbuda (the Project). This will be achieved via the completion of capital works aimed at increasing the resilience of the distribution network and improving the level of access to modern electricity services for the Barbudan population.

1.2 By letter dated July 26, 2018, the Memorandum of Understanding (MOU) between the Department of International Development (DFID) and CDB for the United Kingdom Caribbean Infrastructure Partnership Fund (UKCIF) was amended to provide for the addition of a reconstruction window to be used to finance projects in accordance with CDB's Disaster Risk Management Strategy and Operational Guidelines (DiMSOG). The reconstruction window was created to respond to emergencies and natural disasters. In light of the devastation caused to Barbuda due to the passage of Hurricane Irma in September 2017, a portion of the reconstruction window was allocated to Antigua and Barbuda to be used for the rebuilding of Barbuda. This Project is being funded from the reconstruction window and is therefore appraised under DiMSOG utilising the guidelines applicable to Reconstruction and Rehabilitation loans.

MACROECONOMIC CONTEXT

1.3 Antigua and Barbuda is a small tourism-dependent economy with an estimated per capita gross domestic product (GDP) of USD17,346 in 2018. Tourism accounts for nearly 60% of GDP and 40% of investment. After the global financial crisis, the economy of Antigua and Barbuda struggled to attain the pre-crisis (2003 to 2007) growth rates of 7.2% on average but has been able to return to buoyant real GDP growth of 4.7% during the period 2016-18. The growth was underpinned largely by a recovery in the tourism sector, new investment in tourism-related infrastructure and other construction activities. Growth was also influenced by increased activity in the wholesale and retail sectors.

1.4 Like many island states, Antigua and Barbuda is highly reliant on imported fossil fuels to meet its energy needs. Petroleum is used extensively, mainly for electricity production and transportation. With no domestic production of primary energy, its fuel import costs as a share of GDP are among the highest in the Caribbean and worldwide. In 2014, oil import costs were equivalent to 15% of GDP, well above the Eastern Caribbean average of 8.6%, but down from its peak of 24.5% in 2008. The dependence on imported fossil fuels makes electrical generation costs susceptible to fluctuating world oil prices and poses a major challenge for the country's energy security. Antigua and Barbuda's energy security is vulnerable to natural disasters as the nation is located in a hurricane-vulnerable area of the Caribbean. Hurricane Irma hit Antigua and Barbuda in September 2017, causing estimated losses and damage equivalent to 15% of GDP. Barbuda sustained the brunt of the hurricane damage (90% of total damage), with catastrophic damage to its productive sectors, private housing stock and physical infrastructure, including roads and electrical, communications and water systems. Hurricane reconstruction efforts are now focused more on building resilient infrastructure, including the increased use of renewable energy in Barbuda's electricity and distribution network.

1.5 Robust economic growth of 4.9% is estimated for 2019, similar to the real GDP growth recorded in 2018. The performance is being driven by accelerated infrastructural projects in Antigua and the Hurricane Reconstruction Programme on the island of Barbuda. However, key downside risks remain. Subdued trading partner growth, the volatility in commodity prices (international oil prices) and natural disasters or extreme weather events can derail the country's growth prospects and worsen public debt (see Appendix 1.1.1).

SOCIAL CONTEXT

1.6 Antigua and Barbuda has a 2019 population estimate of 96,453, of which 46,180 are males and 50,273 females (Statistics Division 2019). A 2011 census population of 1,634 persons resided in Barbuda before the passage of Hurricane Irma (861 males and 773 females). Following mandatory evacuation, approximately 1,000 persons have returned to the island (as of July 2019). The average pre-storm household size on Barbuda is 3.3, with female headed-households representing 35%. Although Antigua and Barbuda ranks as a country of high human development, 18% of the population is poor and 10% vulnerable to poverty in the event of a major economic shock or natural hazard (Country Poverty Assessment, CPA 2006). The catastrophic impact of the hurricane exacerbated this vulnerability, compounded by the country's existing level of inequality. Indeed, the richest 20% of the population accounts for 56% of total consumption of goods and services, compared with less than 5% by the poorest 20% (CPA 2006).

1.7 Vulnerable children, youth, women, persons with disabilities (PWDs) and social assistance Board of Guardians' beneficiaries bear the brunt of socioeconomic hardships. PWDs estimated to represent 5.1% of the population, face poorer socioeconomic outcomes, especially in education, employment and social participation (Census 2011). The high youth unemployment rate being 2.4 times that of the total population of Antigua and Barbuda, underscores further economic vulnerability (33.9% versus 13.7% in 2018). Comparatively, 12.9% of males, and 14.5% of females were unemployed in Antigua and Barbuda (Labour Force Survey 2018). Although the data is not disaggregated by fulltime versus part-time employment, it importantly shows that almost half (48%) of the female labour force in Barbuda was employed in occupations that fell within the lowest pay category. The labour market status of women thus misaligns with higher pass rates from secondary schools than male counterparts. Accordingly, women contend with labour market segregation, reinforcing gender-based stereotypes linked to caregiving and domestic work.

1.8 The recovery efforts in Barbuda is ongoing but understandably more difficult for the stated vulnerable groups. Notwithstanding some progress evident, the housing stock, livelihoods, access to basic services such as education, health, social protection, water, sanitation and electricity remain significantly impaired. The availability of resilient electricity infrastructure is a basic good necessary for the socioeconomic progress of households, private enterprise and the public sector. 263 customers remain without permanent connections, 108 have temporary connections and 155 remain unconnected. Affordability is major contributor to noncompliance with standards and failure to make an application. Attention to improving access to resilient electricity infrastructure which affects consumption and productivity of public service providers, households and businesses, especially micro, small and medium

enterprises (MSMEs), is imperative. Such provisions are critical to facilitate return to normalcy in the shortest possible time, and overall quality of life for the Barbudan citizenry.

SECTOR ISSUES

1.9 **The overhead line (OHL) network in Barbuda is highly vulnerable to high winds.** Over the last 30-years the Barbuda electricity system has been exposed to a tropical storm event strong enough to cause damage once every 2-3 years. The consequences of these storms range in severity. However, Barbuda is still recovering from the impact of Category 5 Hurricane Irma in 2017, which damaged or destroyed approximately 95% of the island's electricity distribution network. The vulnerability remains following reconstruction of the network using the OHL topology with minimal resiliency measures incorporated (e.g. slightly stronger poles were installed, see Appendix 4.1.1).

1.10 **Reconstruction of the OHL network was protracted following the impact of Hurricane Irma:** GOAB and the Barbuda Council report that the network was reconstructed to a pre-storm level approximately 18-months after Hurricane Irma. This represents a significant period of time with no electricity for residents and businesses despite the urgency from both GOAB and APUA to try to restore power as expeditiously as possible. There were a number of reasons for the slow recovery. First, was the significant logistical challenge faced by APUA in transporting bucket-trucks, poles, equipment and linesman to Barbuda from Antigua. The second challenge faced by APUA is that the extensive damage to housing meant that practically all customers had to undergo a reconnection process – this included processing of an application for reconnection and the inspection of their behind the meter electrical circuits to ensure they were safe. Another factor that must also be noted is that there was a three to six month period following Irma where the entire Barbudan population was evacuated to Antigua; however, some residents began returning as soon as a few months post-storm and relied on back-up diesel generation. Given the above it is worth reflecting that the decision to not invest in more resiliency was due to the perceived delay it would cause to recovery, however it appears that delays were incurred regardless and the decision to remain with a OHL design means the fundamental vulnerability and recovery capability remain essentially the same as before Irma.

1.11 **Customer levels on Barbuda have remained well below pre-storm levels:** This is due in part to the wide-scale loss of residential housing, the migration of residents to Antigua, the failure of households to apply for re-connection and the failure of some applicants to meet the required household wiring standards. Anecdotal evidence suggests the cost of meeting the wiring standards (that may not have been in place when the customer first connected to the network) and the cost of undertaking an application to reconnect have served as disincentives for customers who remain unconnected. APUA estimate the cost of reconnection is an average of USD300 although this varies depending on whether work is required on the internal wiring or additional lengths of network need to be constructed to connect with the customer's property. As of July 2019, APUA estimate that there are still approximately 263 customers without permanent connections - 155 who have connection requests being processed and 108 with only temporary connections; however, even with these customers connected, customer connections will remain well below pre-storm levels in-line with the reduction of the population on Barbuda.

1.12 **Barbuda is completely reliant on fossil-fuel energy:** the island is completely reliant on diesel fuel trans-shipped from Antigua and three of APUA's high-speed diesel units located at the existing power station in Codrington for its electricity supply. APUA estimates island load is currently estimated to be 1,863 GWh annually and expected to reach an annual instantaneous peak by 2020 of 330kW, with a daytime peak of 250kW. The fuel cost is estimated to be XCD0.94/kWh, which is among the highest within the region.

1.13 **Investment planned for New Power Station (NPS) development will not enhance network resilience:** APUA and the GOAB have secured funding from the Abu Dhabi Fund for Development (ADFD) and the Government of New Zealand to implement a NPS comprising two 330kW diesel units, 719kWp Solar PV and 862kWh Battery Energy Storage System (BESS) on Barbuda. The NPS will incorporate elements of climate resilience including framed modules for higher wind-resistance, increased height of the solar PV foundations to reduce risk from localised flooding during heavy rain. The NPS configuration is expected to offset approximately 500 gallons of diesel per day. Selection of the EPC contractor is underway and with a contract expected to be signed by January 2020. In addition, APUA and GOAB have identified other potential renewable energy projects, including a potential wind farm (identified in a 2011 wind study) and the introduction of an additional 400kWh BESS to further decrease diesel consumption. However, these centralised generation plants will be solely reliant on the OHL network to transport electricity to customers.

COUNTRY SECTOR STRATEGY

1.14 The National Energy Policy (NEP) of Antigua and Barbuda was approved in 2011 and elaborates the government's strategy to enable access to affordable, efficient, socially responsible and reliable forms of energy. It also articulates the government's target to reduce energy consumption of public facilities by 30% by 2025. This direction has been established in the Sustainable Energy Action Plan (SEAP), 2013.

1.15 The project is aligned with two of the priorities of the Country Document for Disaster Risk Reduction in Antigua and Barbuda 2016: (1) Investing in disaster risk reduction for resilience; and (2) Enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction.

1.16 The project will also take into account outputs from the CDB funded TA (beginning in January 2020) for the development of a Reconstruction and Redevelopment plan for the island of Barbuda. This TA aims to (1) inform appropriate reconstruction and redevelopment of lands in Barbuda in an environmentally sound manner to ensure the creation of sustainable human resettlement; and (2) formulate policies and development standards to guide the implementation of the redevelopment plan. The redevelopment plan will identify recommended improvements to the above ground public infrastructure, specifically (energy, wastewater treatment, roads, telecommunications, potable water supply, drainage and solid waste), the estimated cost of these improvements and their priority in sufficient detail to facilitate the preparation of an overarching implementation strategy.

**LINKAGE OF PROJECT TO CDB'S COUNTRY AND SECTOR STRATEGY
AND POVERTY GOALS**

1.17 The Project is consistent with the overall objective of UKCIF, that is to provide critical economic infrastructure in the eight ODA eligible countries and one UK Overseas Territory in the Caribbean, to set the foundations for growth and prosperity, reducing poverty and increasing resilience to climate change. This will be achieved by the delivery of high priority infrastructure projects that deliver the following outcomes:

- laying the foundation for enhanced and sustained economic growth; and
- improved critical infrastructure which spurs increased trade, tourism and private investment.

1.17 The outputs to be delivered include:

- key critical infrastructure built in the eligible countries and territory; and best practice models of infrastructure developed and replicated across the region

1.18 This project is consistent with the following of CDB's strategic objectives:

- Supporting Inclusive and Sustainable Growth and Development
- Promoting Good Governance

1.19 This project is consistent with the following of CDB's corporate priorities:

- Improved Economic, Fiscal and Debt Management
- Promote Environmental Sustainability (Climate Change Resilience, Environmental Management and DRM)
- Strengthen/Modernise Social and Economic Infrastructure

1.20 This project is expected to contribute to the following Sustainable Development Goals:

- SDG 7. Affordable and clean energy
- SDG 11. Sustainable cities and communities

1.21 This Project is consistent with the following of CDB's Sector and Thematic Policies:

- Disaster Management Strategy and Operational Guidelines
- Energy Sector Policy and Strategy
- Climate Resilience Strategy

RATIONALE

1.22 The Barbudan electricity system is vulnerable to severe damage from high-wind events. This vulnerability and the inability to recover quickly from shocks means that the island of Barbuda has a high risk of economic shocks caused by large storms, a risk that is expected to increase as the frequency of strong hurricanes increases due to Climate Change.

1.23 Barbuda's ability to cope following the destruction or damage of the electricity network relies heavily on the ability to access equipment, materials and imported fuel from Antigua. In addition, back-up generation for essential services such as emergency shelters, hospitals and Government offices is either non-existent or wholly dependent on fuel imports, making them vulnerable to delays in the fuel supply chain.

1.24 Furthermore, despite the existing investment in reconstruction of the electricity system in Barbuda, a significant proportion of customers remain without access to electricity. The Antigua Public Utilities Authority (APUA) has received only 599 applications from a total of 1,099 pre-hurricane electricity customers. A total of 263 customers do not have a permanent connection, 108 have temporary connections and some 155 applicants remain unconnected to the grid. Temporary connections and those unconnected represent applicants that need to meet regulatory installation standards. Anecdotal evidence suggests this is due to a combination of factors that include the cost of applying for connection and cost of meeting the electrical safety requirements for connection. Determining and then addressing the exact barriers to access is important if the population of Barbuda is to return to normalcy in the shortest possible time and access the full benefits of a more resilient system.

1.26 The Project aims to address vulnerabilities of the overhead lines in the distribution system, the lack of sustainable emergency back-up supply requirements for key public buildings and improve the access of Barbudan population to modern electricity. The design of the project implementation means that the project will address the resilience of the network in Codrington first while making provision to underground the connection to the proposed New Power Station once construction begins.

2. PROJECT DESCRIPTION

PROJECT OUTCOME

2.1 The purpose for which the Grant is being made is to assist the Beneficiary in financing the enhancement of:

1. the resilience of the electricity distribution network;
2. the supply of electricity to key public buildings in Barbuda; and
3. the level of access of Barbudans to modern electricity services.

2.2 The expected outcome of the project is a more resilient electricity system, which will provide more inclusive access to modern electricity services in Barbuda.

PROJECT COMPONENTS

2.3 The proposed project consists of five components (listed below and detailed in Appendix 2.1). The Components consist of two design and supervision consultancies and contracts for works and/or goods to deliver the RSP, undergrounding of the network and the procurement and installation of the solar PV hybrid back-up systems. Note, no land will need to be purchased to implement the proposed project as all works will occur within the right-of-way where the existing network is constructed.

1. **Infrastructure Works:** This includes: (a) civil works for the Undergrounding of identified sections of the distribution network; and (b) Electrical works for the Re-connection Support Programme
2. **Engineering and Construction-Related Services:** Consultancy services for engineering design, supervision and monitoring of the undergrounding and solar hybrid components of the project, TOR at Appendix 2.2.1.
3. **Goods:** The goods contracts will include the following: (a) Goods for the Undergrounding of identified sections of the distribution network; and (b) Design and Installation of the Hybrid Solar Systems on Key Public Buildings on Barbuda.
4. **Capacity Building:** Consultancy service for the preparation and monitoring of the Reconnection Support Programme (RSP), TOR at Appendix 2.2.2.
5. **Project Management:** A Project Coordinator (PC) assigned from APUA (Barbuda); A Project Engineer (PE) assigned from APUA (Barbuda); a Barbuda Council Liaison Officer (BCLO) assigned by the Barbuda Council; and a Project Administration Officer (PAO) assigned from GOAB.

RESULTS FRAMEWORK

Project Impact:
Inclusive and resilient electricity services in Barbuda.

Outcome	Indicator	Baseline	Target	Data Sources, Reporting Mechanisms and Report Frequency
I. Increase resilience of the disbursement network to hurricanes.	1.1 Average electricity outage time at key Public Buildings post natural hazard events (days) (#) (#).	365	0	APUA Post Disaster Report, CDB Post Disaster Supervision Report.
	1.2 APUA post hurricane electricity outage time (days) (#) (#).	365	7	APUA Post Disaster Report, CDB Post Disaster Supervision Report.
2. Operational back- up generation supplying renewable energy.	2.1 Energy Savings as a result of EE/RE interventions (MWh).	0	219	CDB Supervision Report.
3. Restore electricity connections for all hurricane affected APUA customers.	3.1 Number of customers reconnected to the grid (disaggregated by sex of household head and Board of Guardian Status) (#) (#).	0	23	APUA Customer Summary Report.

Assumptions for Achieving Outcomes:
Baseline number of electricity consumers does not decline due to negative migration.

Outputs	Indicator	Baseline Target		Data Sources, Reporting Mechanisms and Report Frequency
		Baseline	Target	
1.Engineering Supervision and Monitoring completed	1.1Design Report and associated procurement Documents completed. (Yes/No)	No	Yes	Project Coordinator's Reports, Consultant's Design Report and Tender Documents.
2.Hybrid Solar Systems installed on key Public Buildings.	2.1 Number of public facilities with renewable back-up generation (#) (#).	0	11	Engineering Supervision Reports.
	2.2 Conventional or renewable power generation capacity installed (kW)	0	100	Engineering Supervision Reports.
3.Reconnection Support Programme Design and Supervision completed.	3.1Number of participants trained (by Agency-AUPA, Barbuda Council, contractors and project-related workers) (#)	0	25	Training Report; Project Coordinator's Reports.
	3.2 Percentage of trainees rating of the content of the training of valuable /committing to incorporating the training in future projects or policies (#).	0	75	Training Plan; Training Evaluation Report.
	3.3 Number of household electrical assessments completed (disaggregated by sex of household head and Board Guardian Status) (#) (#)	0	23	Project Coordinator's Reports.
	3.4Gender and Social Inclusion Training Design completed (Yes/No).	No	Yes	Consultants Reports; Project Coordinator's Report.
	3.5RSP Design Report and associated documents delivered (Yes/No)	No	Yes	Consultants Reports; Project Coordinator's Report.

Outputs	Indicator	Baseline	Target	Data Sources, Reporting Mechanisms and Report Frequency
4. Undergrounding of Codrington distribution, New Power Station Feeder.	4.1 Supply lines installed or upgraded (Km)	0	8	Engineering Supervision Reports.

Assumptions for Achieving Outputs:

There are no major disruptions due to natural hazard events.

LESSONSLEARNT

Description	Project Response
<p>The Importance of strengthening community participation in project design and monitoring and employing preventative strategies to mitigate social and gender risks.</p>	<p>Development and implement of a participatory Stakeholder Engagement Plan; and delivery of capacity-building training in Gender Equality and Social Inclusion Guidelines for Implementing Infrastructure Projects for the APUA, the Barbuda Council, contractors and project-related workers.</p>
<p>The destruction of APUA's 150KWp solar PV plant indicates that better construction standards are needed for Solar PV installations.</p>	<p>The project will utilise Preliminary Technical Guidelines for the Installation of Resilient Solar PV Plants that have been developed by a CDB-funded consultancy. These technical guidelines were developed following the 2017 hurricane season. They provide guidance on the standards for PV systems that are most likely to withstand severe hurricanes, similar to those experienced in the Caribbean in 2017, and expected to occur within the lifetime of a typical Solar PV installation in the Region.</p>
<p>Lack of interest for implementing Gender and Social Inclusion Guidelines from project stakeholders in Antigua and Barbuda.</p>	<p>The Project provides for a Social Development Specialist (SDS) as part of the capacity-building component. The SDS will prepare the RSP and deliver tailored capacity-building training in Gender Equality and Social Inclusion Guidelines for Implementing Infrastructure Projects for the AUPA, the Barbuda Council, contractors and project-related workers.</p>

3. FINANCING PLAN

FINANCING STRUCTURE AND COSTS

3.1 In March 2016, CDB signed a Memorandum of Understanding with the Government of the United Kingdom, acting through the Department of International Development (DFID), for the purpose of financing the United Kingdom Caribbean Infrastructure Partnership Fund programme in an amount of up to three hundred million pounds sterling (£300 mn) by way of a grant. Per a letter of amendment dated July 26, 2018, this amount was increased to three hundred and thirty million pounds sterling (£330 mn). The programme's main activity is the establishment of a fund that will provide grants to build economic infrastructure in DFID's Official Development Administration-eligible countries in the Caribbean, such as Antigua and Barbuda.

3.2 The project is estimated to cost £3.196 mn, which will be financed with resources from the UKCIF managed by CDB, as well as resources from GOAB and APUA. The project's cost estimates were developed by APUA. Physical contingencies of 10% were applied to the infrastructure works, engineering and construction-related services, goods and capacity building. The cost estimates and corresponding contingencies were also reviewed by CDB staff and were found to be acceptable (see Appendix 3.1).

3.3 The proposed project will be financed by:

- a grant to GOAB from CDB's SFR comprising an amount not exceeding £2.85 mn allocated from United Kingdom Caribbean Infrastructure Fund (UKCIF) resources, representing 89% of the project cost;
- counterpart funding from GOAB of an amount of not less than £0.047 mn (XCD0.159 mn), representing 2% of the project costs for installation support, local transportation, administrative support and project management; and
- counterpart funding from APUA of an amount of not less than £0.299 mn (XCD1.021 mn), representing 9% of the project costs for installation support, local transportation, administrative support and project management.

3.4 The cost estimates are based on exchange rates prevailing on November 10, 2019.

TABLE 3.1: SUMMARY OF PROJECT COSTS AND FINANCING

Components	TOTALS				
	OSF-GBP	Total	COUNTERPART		Total
	UK CIF Resources		GOAB	APUA	
1. Infrastructure Works	925,000	925,000	-	237,000	1,162,000
2. Engineering and Construction-related Services	157,000	157,000	7,900	7,900	172,800
3. Goods	1,397,818	1,397,818	16,154	8,245	1,422,217
4. Project Management	10,000	10,000	11,850	11,850	33,700
6. Capacity Building	102,000	102,000	7,900	7,900	117,800
Base Cost	2,591,818	2,591,818	43,804	272,895	2,908,517
5. Physical Contingency	258,182	258,182	3,196	26,105	287,483
Total Project Cost	2,850,000	2,850,000	47,000	299,000	3,196,000
Total Financing	2,850,000	2,850,000	47,000	299,000	3,196,000
Percentage Financing	89%	89%	1%	9%	100%

4. PROJECT VIABILITY

TECHNICAL ANALYSIS

4.1 Technical analysis has focused on ‘resiliency’ as opposed to the ‘reliability’ of the network. A reliable network can have elements of resilience but the two terms are not interchangeable. There is currently no internationally accepted standard measure for resiliency in energy systems so the Project has utilized the World Bank’s *Integrated Framework to Enhance Resilience of Energy System to Adverse Weather & Climate Change Impacts* (see Appendix 4.1.1) to identify the components for enhancing the resilience of the Barbuda electricity system and therefore minimize disruption of electricity supply to Barbudans.

4.2 **The primary resilience measure is the undergrounding of the main OHL in Codrington.** Barbuda’s electricity network is characterized by approximately 16km of 11kV main lines that emanate in a classic radial topology from the existing power station in Codrington. The weakness of this topology is the inherent number of single-points of failure, these are network elements whose failure mean a loss of power to all customers until the repair or replacement of that element. The NPS expected to be completed in 2020 to the North of Codrington (see Appendix 4.1.2) while reducing the risk of storm-surge, will exacerbate the weakness of this topology as any failure to the OHL from the NPS to Codrington (see South Feeder, North Feeder and Proposed Feeder, Appendix 4.1.1, Figure 2) will mean the loss of power to all APUA customers until the reconstruction of the OHLs. Therefore, undergrounding of approximately 4km of main-lines within Codrington including the existing power station but with a provision to underground a further 4km of mainlines along the route from the NPS (see Appendix 4.1.1, Figure 2) is recommended as it presents the highest risk mitigation against hurricane events. Furthermore, reducing the repair time significantly benefits the ability of APUA to cope following a disaster by freeing up crews to focus on the lower voltage distribution lines and customer-level reconnection.

4.3 **A secondary resilience measure is the provision of localized back-up power.** There are a number of key buildings that provide emergency services, act as storm shelters or that are utilised in the aftermath of a disaster (see Appendix 4.1.1, Table 1). Several of these buildings, such as the Barbuda hospital, are not located on the proposed undergrounding routes and/or require electricity during a storm when the grid will be switched- off. The Project proposes the installation of a grid-connected solar PV with battery storage (hybrid) system that provides renewable energy to the grid during normal operation but is able to act as a back-up source of power during blackouts and emergency situations. All Solar PV installations will meet the CDB’s *Recommended Technical Guidelines for the Installation of Resilient Solar PV Plants*, which identifies the standards to enhance the likelihood of PV systems surviving an Irma-scale event.

4.4 **Improving the number of people who will benefit from a more resilient grid through a targeted Re-connection Support Programme (RSP).** The RSP will support customers meeting the APUA regulation, ensuring all electrical works are undertaken by electricians licensed to work in Antigua and Barbuda.

4.5 **A combined design and supervision approach for the engineering aspects of the project is proposed.** The small-scale of the works and the remoteness of Barbuda mean a single consultancy covering both the site specific investigation and then the monitoring and evaluation of works has been preferred over two separate consultancies. The technical specifications of the cable will need to meet APUA’s electrical requirements and be rated to 15kV to allow for load growth over the cables expected 40-year

Lifespan. All underground cables will need to meet IEC60502-2 and IS1255 Code of practice for Installation and maintenance of power cables.

MACROECONOMIC IMPACT

4.6 Energy is an essential factor of production and continuous supplies of energy are needed to maintain existing levels of economic activity as well as to grow and develop the economy. Renewable energy is beneficial in terms of its added value in the production process and the facilitation of factor accumulation via the capital and employment channels. The project has the potential to deliver macroeconomic benefits both in the short term and long run.

4.7 In the short run, the project will contribute to economic activity in Barbuda via the employment channel during the construction and rehabilitation phase. The construction, operation, and maintenance of tools, machines, and businesses require a flow of construction materials and energy. Similarly, the labour that manages and deploys physical capital consume energy. Further, Barbudan ancillary services associated with the construction activity will also benefit positively. The real sector data on Antigua and Barbuda show that electricity use and GDP tend to go hand-in-hand and is likely to be an important enabler of economic growth.

4.8 In the long term, the project is expected to accelerate the electrification of businesses and households thereby addressing the current imbalance of electricity supply not catching up with demand. Through the provision of a stable source of power, it will also contribute to poverty reduction on the island of Barbuda and help the country lower its dependence on fossil fuels. From an environmental perspective, Antigua and Barbuda's energy mix will be further diversified by adding renewable energy capacity, thereby contributing to the country target of 15% of primary energy coming from renewable energy by 2030.

SOCIAL AND GENDER IMPACT ASSESSMENT

4.9 The hurricane-induced losses and damages sustained by the people of Barbuda have impinged on productivity in both private and public spheres of life. The limited access to insurance and credit has slowed recovery efforts particularly for households, and MSMEs. The project will therefore have positive social and gender impacts through improved and resilient electricity infrastructure, a basic good necessary for socioeconomic development. The provision of hybrid renewable energy sources such as solar systems will afford emergency backup generation for important public infrastructure. This will contribute to reducing the Government's diesel consumption and attendant economic benefits.

4.10 The Project's reconnection support programme (RSP) component removes a major affordability barrier to connecting to electricity grid by assisting households with electrical assessments and subsidising safe rewiring/reconnection costs to meet regulatory standards. The RSP selection criteria will prioritise the most vulnerable households with Board of Guardians social protection status with characteristics of single female headship, and high dependency ratios with PWDs, children, youth and elderly. The selection criteria will be developed in keeping with the TOR in Appendix 2.2.2, and require CDB's No Objection for both design and implementation of the RSP. The RSP intervention will directly

benefit 108 APUA applicants with temporary connections, and 155 applicants unconnected to the grid (as of July 2019). Another 500 potential customers may also benefit from the project (that is, 45% of 1,099 pre-hurricane electricity customers). The RSP will also include energy efficiency awareness programming to contribute to reducing household consumption and avail disposable income for other expenditure. The interventions will also enhance public safety and contribute to reduction of time use burden of households, particularly for women charged with reproductive and domestic responsibilities.

4.11 Although the project affords short-term employment opportunities, an increased number of male workers in small communities may pose challenges associated with transactional sex, alcohol and drug use, sexually transmitted diseases, and managing gender-based conflicts on work sites in a male dominated sector. The Project thus affords an entry point for addressing social inclusion and gender sensitisation training of the APUA, contractors and other workers to strengthen social relations among both sexes, and participation of vulnerable groups in key growth sectors of the economy. The GOAB approved *Gender Equality and Social Inclusion Guidelines for Implementing Infrastructure Projects* financed under the UKCIF Road Rehabilitation Project will provide the basis for the training.

4.12 A Social Development Specialist (SDS) will be hired under the consultancy to prepare and supervise the RSP (Appendix 2.2.2). The Specialist will support APUA’s Project Team and be responsible for: a) mainstreaming of social and gender safeguards into the Project and promote equal access to project benefits by vulnerable groups such as women, youth, and PWDs; b) delivering sensitization training to APUA, contractors and other workers; c) assessing, implementing and monitoring the RSP including energy efficiency awareness components; and d) developing and implementing a participatory Stakeholder Engagement Plan (SEP). The SEP will build on existing formal and informal infrastructure for communication and decision-making including *inter alia*, APUA, central Government, local Government (the Barbuda Council), non-governmental organisations, international development partners and the Barbudan citizenry. The SEP will identify a project-wide Grievance Redress Mechanism as part of a draft Environmental and Social Management Plan (ESMP) prepared in keeping with the TORs in Appendices 2.2.1 and 2.2.2. The ESMP will be finalised and monitored by the engineering and supervision firm contracted. The Project is therefore gender mainstreamed, with a score of 3.5 on the Gender Marker, having potential to contribute significantly to gender equality (Appendix 4.2).

GENDER MARKER SCORE

Analysis	Design	Implementation	Monitoring & Evaluation	Score	Code
1.0	0.5	1.0	1.0	3.5	Gender Mainstreamed (GM)

ENVIRONMENTAL ASSESSMENT

4.13 The Project is categorized “B” based on CDB’s Environmental and Social Review Procedures. The feeder and distribution cables will be connected to the existing power plant with provision to connect to the NPS (non-CDB financed). The power plant will be constructed on a greenfield site of approximately 1.5 hectares and located two miles northeast of the town of Codrington. The site is covered in short shrubs and small trees, which will need to be cleared prior to construction. The plant is not located in close proximity to any environmentally sensitive areas. Project works associated with both the feeder and distribution cables will be within the existing footprint of the road network.

4.14 The project has the potential for limited adverse environmental impacts, during construction, which are site specific and for which best construction practices and effective mitigation measures are known and can be readily implemented. Construction impacts will result from vegetation clearing; trenching of approximately 8km of road and laying of transmission cables to a depth of approximately 1m underground; and spreading and compaction of fill material.

4.15 Construction activities may expose the community to health and safety risks associated with improper construction site management. Potential impacts include elevated dust and noise levels, impaired air quality near the project site, and disruption of traffic along affected routes, which may cause disturbance to residents and businesses. Mitigation measures will include, dust suppression and noise control; adequate storage of construction materials and disposal of construction waste; use of safety signage; and control of vehicular traffic. Construction workers will be exposed to safety risks associated with working in open trenches, working at height, and working with heavy equipment. These can be managed through the use of personal protective equipment; and implementation of the necessary precautions and controls for excavation works and for working at height.

4.16 A draft ESMP was developed for the Project and is summarised at Appendix 4.3.1. The contractor will be required to reflect the appropriate actions of the draft ESMP prior to commencement of construction, for approval by the supervising engineering consultant. Monitoring of the contractor’s compliance with requirements of the ESMP will be undertaken by the supervising engineering consultant, APUA and CDB supervision staff. Environmental monitoring and supervision reports are required for submission to CDB in keeping with the reporting requirements for the project detailed at paragraph 6.11.

4.17 As a condition precedent to commencement of civil works, APUA is required to submit to CDB evidence of planning permission for the project.

4.18 Given that this is APUA’s first battery storage plant, the project makes provisions for training of APUA employees in remote operations and system diagnostics of the new plant. This training will be provided by the supplier contractor installing the new power station.

4.19 Operational health and safety concerns include the safe disposal of damaged or discarded panels from the solar PV hybrid systems and spent batteries, given the latter’s hazardous elements (mercury, lead, cadmium and nickel) and the implications for community health and safety.

RENEWABLE ENERGY & ENERGY EFFICIENCY ASSESSMENT

4.20 This project prioritises Disaster Risk Management (DRM) benefits as its key objective. Through the availability of electrical power stored in the battery of the hybrid system the buildings targeted under the project will be equipped to provide uninterrupted services in the event that they are put into use during a disaster event and or the main electrical supply becomes unavailable. However, the Solar PV hybrid

systems will contribute to the reduction in fuel consumption of an estimated 14,600 imperial gallons annually and reduction in CO₂ emissions of 107 tonnes annually over the 20-year life of the project.

CLIMATE CHANGE VULNERABILITY ASSESSMENT (CCVA)

4.21 The islands of Antigua and Barbuda is vulnerable to multiple climate-related hazards, including sea level rise, storm surges, intense rainfall and hurricanes. GOAB has pledged to implement initiatives for mainstreaming climate change into its national development processes. The country's Nationally Determined Contribution (NDC) includes a conditional commitment to achieve, by 2030, an energy matrix with 50 MW of electricity from renewable sources both on and off-grid in the public and private sectors. The NDC also states that by 2030, 100% of electricity demand in the water sector and other essential services, including health and emergency services, will be met through off-grid renewable sources. Installation of the solar panels on buildings including public health facilities, under this Project, is in alignment with these renewable energy commitments. Positive impacts of the Project include avoided CO₂ emissions of 107 tonnes per year.

4.22 Climate risk screening for the Project indicated that the primary climate variables which could impact the Project include: sea level rise, storm surges, intense rainfall and hurricanes. Given Barbuda's exposure to these variables, climate resilience measures have been built into the Project's design. These include: (i) burying the distribution and feeder cables to decrease the exposure to extreme weather conditions including extreme hydro-meteorological events; and (ii) design specifications for the solar PV panels and supporting infrastructure foundations to withstand extreme hydro-metrological events. The project's design will incorporate CDB's Guidelines and Technical requirements for Resilient Solar PV Systems.

4.23 A detailed Climate Risk Vulnerability Assessment will be conducted to refine detailed engineering designs.

PAS GENERAL COMMENTARY

4.24 The composite performance rating based on CDB's Performance Assessment System (PAS) has been estimated as highly satisfactory, which suggests that there is a good probability that the Project will achieve its objectives. The details of PAS are presented in the below table.

PAS TABLE

Criteria	Score	Justification
Relevance	Highly Satisfactory	The social and economic development of Barbuda is dependent on the availability of a secure and reliable electricity supply. The Project supports the Government of Antigua and Barbuda's developmental objectives by increasing the level of access of Barbudans to modern electricity services, while enhancing the resilience of the supply of low-carbon electricity, thus reducing the country's reliance on imported fossil fuels for electricity generation. The Project is also consistent with (1) CDB's strategic objective of promoting broad-based economic growth and inclusive and sustainable social

		development, as well as (2) its Energy Sector Policy and Strategy and (3) its Climate Resilience Strategy.
Effectiveness	Highly Satisfactory	The Project is designed to increase the availability of a secure and reliable electricity supply and to improve the resilience of the supply and distribution of low-carbon electricity within Barbuda. Once completed, the Project is expected to achieve its stated objectives.
Efficiency	Satisfactory	The various components of the Project serve to reduce the susceptibility of the country's electricity network to the risks associated with natural disasters, while boosting foreign exchange savings, thus supporting the economic development of Barbuda.
Sustainability	Highly Satisfactory	Some of the key benefits of the project include: (i) increased access to electricity services for the people of Barbuda; (ii) economic co-benefits by offsetting the GOAB's energy costs on government buildings; (iii) a resilient electricity network for the town of Codrington; and (iv) low-carbon back-up generation capacity for essential community services. One of the project's components is the burying of transmission lines. This will require minimal maintenance and costs associated with it will be significantly lower compared to overhead cables. Given Barbuda's geographic location, buried transmission lines are less susceptible to climate change related events, which creates some resiliency. With the installation of the solar PV panels on government buildings as a source of renewable energy, this will allow for avoided CO2 emissions of 107 tonnes per year.
Overall Score	Highly Satisfactory	

5. RISK ASSESSMENT AND MITIGATION

RISK JUSTIFICATION

5.01 The major Project risks and proposed mitigation measures are summarised in the Table 5.1 below.

TABLE 5.1: SUMMARY OF RISKS ASSESSMENT AND MITIGATION MEASURES

Risk Category	Risk Type	Description of Risk	Mitigation Measures
Developmental	Disaster Risk/Adverse Events	Adverse weather conditions could delay Project implementation, especially during trenching for the feeder cable, Codrington distribution and during the foundation works associated with the new power station.	Major infrastructure works will be scheduled outside of the hurricane season.
Operational	Sustainability	APUA may have limited experience to the new technology associated with the solar PV and the battery energy storage systems.	Training programmes will be conducted to ensure that APUA personnel have the required capacity to maintain and operate these complex systems at all times.
Financial	Budgetary/Local counterpart funds	Antigua and Barbuda is likely going to graduate from Official development assistance (ODA) eligibility in January 2021. Antigua and Barbuda exceeded the high-income threshold in 2015 and 2016, In accordance with the The Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) rules for revision	Disbursement of the UKCIF funds will need to occur while Antigua and Barbuda is eligible for ODA funding. The Project proposes to utilise the DiMSOG's fast-track procedure for procurement and the project is structured so a number of components can be implemented concurrently.

Risk Category	Risk Type	Description of Risk	Mitigation Measures
		of the ODA eligibility List, if they remains a high income country until 2019, they will be proposed for graduation from the List in the 2020 review.	

6. IMPLEMENTATION AND PROJECT MANAGEMENT

BORROWER

6.1 The Beneficiary is GOAB.

EXECUTING AGENCY ANALYSIS

6.2 APUA is a statutory corporation established under the Public Utilities Act, CAP. 359 of the Laws of Antigua and Barbuda (the PUA Act). According to Section 3 of the PUA Act, APUA is a body corporate with perpetual succession and a common seal with power to purchase, take, hold and dispose of land and other property, to enter into contracts, to sue and be sued in its said name and to do all things necessary for the purposes of the PUA Act. When the PUA Act came into operation on July 4, 1973, certain property, rights and liabilities of GOAB became vested in APUA. Pursuant to the PUA Act, APUA has the exclusive right to generate, distribute, supply and sell electricity within Antigua and Barbuda and to perform services incidental thereto. APUA also has the exclusive right to provide telephone services and supply water within Antigua and Barbuda.

6.3 APUA has substantial experience in the implementation of electricity distribution projects in both Antigua and Barbuda. It is currently implementing one CDB-funded capital project to replace streetlighting on both islands. APUA is familiar with CDB processes, and has the requisite project management, monitoring and evaluation capacity to execute the project successfully. Further support to APUA for the initial procurement of consultants has been provided under the project in the form of a Procurement Support Specialist (see paragraph 6.05).

PROJECT MANAGEMENT

6.4 Implementation of the project will be the responsibility of the Project Coordinator (PC), whose services will be paid for by APUA. The PC will be supported by a Project Engineer (PE), who will also be paid for by APUA. As a condition precedent to first disbursement of the loan, APUA shall have assigned as PC and PE, a person whose qualifications and experience are acceptable to CDB. No change shall be made to the appointment of PC without the prior approval, in writing, of CDB. The PC will be responsible for coordinating and monitoring all aspects of the project, in accordance with the Duties at Appendix 6.4.1. The PE will be responsible for supporting the PC, in accordance with the Duties at Appendix 6.4.2 and Organisation Chart at Appendix 6.4.3.

6.5 The PC will be supported further by two officers: first on Barbuda by a Barbuda Council Liaison Officer (BCLO) assigned by the Barbuda Council to ensure coordination between the local Government and APUA works in accordance with the Duties at Appendix 6.4.4; second the PC will be supported on Antigua by a designated Project Administration Officer (PAO) assigned from GOAB in accordance with the Duties at Appendix 6.4.5.

6.6 The PC will also be supported by a Procurement Support Specialist (PSS) consultant in accordance with the TOR at Appendix 6.4.6.

IMPLEMENTATION

6.7 The project is expected to be implemented over a period of 12 months commencing from Board approval. Installation works are estimated to take two months, commencing by August 2020. The proposed Project Implementation Schedule is presented in Appendix 6.1.1.

6.8 A two-phased approach is recommended for the implementation of the project. The first phase involves the design, options analysis and development of bid documents by a consultancy firm. The second phase is the implementation phase, involving the purchase of goods and the delivery of works, and implementation supervision and monitoring by the same consultant that undertook the design. This approach is recommended for a number of reasons. First, the project area is small which significantly simplifies the area and clearly defines the possible beneficiaries that will be impacted. Second, the project is upgrading an existing network. It is not developing new network routes, but is rather moving existing networks underground to operate along the same utility corridor as the existing overhead network. This significantly simplifies the design requirements and cost benefit analysis required. For example, surveying new routes and determining the cost-benefit between them is not required in this case. Third, this approach allows the project to begin the undergrounding of the Corington network while making provision for connecting the NPS once/if it is completed. In addition, a two-phased approach allows technical assistance to be provided to supplement the capacity of APUA to prepare designs, undertake environmental and social impact assessments and assess community engagement and management plans.

PARTICIPATION OF BENEFICIARIES AND STAKEHOLDERS

6.9 An ESMP will be developed by the Supervision Consultant after extensive consultations with key stakeholders including, but not limited to, the Barbuda Council, inhabitants of Codrington who wish to connect to the APUA network, APUA, Department of Environment (DOE) and National Emergency Management Organization (NEMO). APUA's Customer Service and Engineering Department will post Project information on its website as well as on other media to inform stakeholders of Project progress and also use its existing customer complaints mechanism in Barbuda to deal with grievances related to the Project. GOAB has been proactive in using its public information systems to promote EE and RE, and will utilise this same medium to keep the general public and key civil society organisations informed about the project.

DISBURSEMENT

6.10 Disbursement of the Grant will be made in accordance with Disbursement Guidelines for CDB-Financed Projects (January 2019). It is expected that the first disbursement of the Grant will be made by December 31, 2019. The Grant is expected to be fully disbursed by December 31, 2020. The Grant is expected to be fully disbursed by December 31, 2020. The estimated Disbursement Schedule is provided at Appendix 6.2.

PROCUREMENT

6.11 Procurement shall be in accordance with the Procurement Policy for Projects Financed by CDB and the Procurement Procedures for Projects Financed by CDB (November, 2019). However, a waiver shall be sought to permit the procurement exceptions to the aforementioned procurement policy and procedures allowed for on Rehabilitation and Reconstruction Loans (RRLs) under DIMSOG (2009). A Procurement Plan for the project is attached in Appendix 6.3 and CDB's no objection shall be required for any amendments to the plan.

MONITORING AND REPORTING

6.12 The PC is required to submit detailed progress reports on a quarterly basis and brief programme updates at the end of every month. Monthly updates should: (1) provide comments on the progress of the programme, including disbursements and major setbacks; (2) discuss any new emerging risks/issues; and (3) attach the monthly reports from the contractor and supervising consultants. The results of the project will be measured in accordance with the indicators set out in the Design and Monitoring Framework at Table 2.1. It will be a condition of the Loan that APUA shall furnish or cause to be furnished to CDB, the Reports listed in the form described in Appendix 6.9.1 in such form or forms as CDB may require, not later than the times specified therein for so doing.

TERMS AND CONDITIONS OF THE GRANT

No	Subject	Terms and Conditions of the Grant
1.	Parties	<p><u>Bank</u>: Caribbean Development Bank</p> <p><u>Beneficiary</u>: Government of Antigua and Barbuda</p> <p><u>Executing Agency</u>: Antigua Public Utilities Authority</p>
2.	Amount of Grant	<p>The Bank agrees to make available to the Beneficiary by way of grant an amount not exceeding: the equivalent of two million eight hundred and fifty thousand Pounds Sterling (GBP2,850,000) (the Grant) comprising:</p> <p><u>Special Funds Resources (SFR)</u>:</p> <p>GBP2,850,000 UKCIF Resources</p>
3.	Purpose	<p>The purpose for which the Grant is being made is to assist the Beneficiary in financing the enhancement of:</p> <ul style="list-style-type: none"> (a) the resilience of the electricity distribution network; (b) the supply of electricity to key public buildings in Barbuda; and (c) the level of access of Barbudans to modern electricity services.
4.	Payment of Grant	<p>Except as CDB may otherwise agree, disbursement of the Grant shall be used to finance the components of the Project allocated for financing by CDB as shown in the Project Cost Phasing and Financing Plan for the Project up to the respective limits specified therein.</p> <p>Except as the Bank may otherwise agree, total disbursements shall not exceed in the aggregate eighty-nine per cent (89%) of the cost of the Project.</p> <p>The Grant shall not be used to finance, directly or indirectly, any part of the cost of the Project which consists of identifiable taxes imposed under the laws of the Project Country.</p>
5.	Disbursement	<p>The first payment of the Grant shall be made by January 31, 2020 and the Grant shall be fully disbursed by December 31, 2020 or such later dates as the Bank may specify in writing.</p> <p>The Beneficiary shall comply with the Bank’s “Disbursement Guidelines for CDB-Financed Projects” published in January 2019.</p>
6.	Procurement	<p>Except as provided below, procurement of works, goods and services to be financed from the Grant shall be in accordance with the following procedures as modified by the application of paragraphs 4.45 and 4.46 of the Bank’s Disaster Management Strategy and Operational Guidelines or such other procedures as the Bank may from time to time specify in writing:</p>

No	Subject	Terms and Conditions of the Grant
		<p><i>The Bank's "Procurement Policy for Projects Financed by CDB" (November 2019)</i></p> <p>The Beneficiary shall comply with the procurement requirements set out in the Procurement Plan. Any revisions to the Procurement Plan shall require the Bank's prior approval in writing.</p>
7.	Conditions Precedent to First Disbursement	<p>The Beneficiary shall, by the 60th day after the date of the Grant Agreement, or such later date as the Bank may agree, furnish or cause to be furnished to the Bank, evidence acceptable to the Bank, that the following conditions have been satisfied:</p> <p>PC shall have been assigned.</p> <p>PE shall have been assigned.</p>
8.	Condition Precedent in respect of Civil Works	<p>The Bank shall not be obliged to disburse any amount in respect of the Civil Works until the Beneficiary has furnished or caused to be furnished to the Bank, evidence acceptable to the Bank that the following conditions have been satisfied:</p> <p>The Executing Agency has received all requisite statutory, planning, building and environmental permits, licenses and/or other approvals in respect of the Civil Works.</p> <p>The Engineering Supervision Consultant has been engaged.</p>
9.	Project Implementation	<p>Except as the Bank may otherwise agree, the Beneficiary shall: (a) execute the Project through the Executing Agency; (b) make the proceeds of the Grant available to the Executing Agency for the purpose of executing the Project; and (c) take all necessary steps to facilitate and ensure the performance of the Executing Agency of its obligations set out and referred to in the Grant Agreement.</p> <p>As a condition of making the Grant available to the Executing Agency, the Executing Agency hereby undertakes to observe and perform the obligations on its part to be observed and performed as set out and referred to in the Grant Agreement.</p> <p>The Executing Agency shall: (a) ensure that the proceeds of the Grant are used exclusively for the Project; (b) carry out the Project at all times with due diligence and efficiency, with management personnel whose qualifications and experience are acceptable to the Bank and in accordance with sound technical, environmental, administrative, financial and managerial standards and practices; and (c) institute and</p>

No	Subject	Terms and Conditions of the Grant
		<p>maintain organisational, administrative, accounting and auditing arrangements for the Project, acceptable to the Bank.</p> <p>The Beneficiary and the Executing Agency shall obtain all such approvals, permits and licenses as may be required for the implementation of the Project.</p>
10.	Project Management	<p>The Executing Agency shall, for the duration of the Project, assign as PC, a member of its staff with qualifications and experience acceptable to the Bank, who shall have the duties and responsibilities set out in the Duties of the Project Coordinator. The qualifications and experience of any person(s) subsequently appointed as PC shall be acceptable to the Bank.</p> <p>The Executing Agency shall, for the duration of the Project, assign as PE, a member of its staff with qualifications and experience acceptable to the Bank, who shall have the duties and responsibilities set out in the Duties of the Project Engineer. The qualifications and experience of any person(s) subsequently appointed as PC shall be acceptable to the Bank.</p> <p>The Beneficiary shall, by March 31, 2020, assign as Barbuda Council Liaison Officer, a member of the Barbuda Council, who shall have the duties and responsibilities set out in the Duties of the Barbuda Council Liaison Officer.</p> <p>The Executing Agency shall, by March 31, 2020, assign as Project Administration Officer, a member of its staff with qualifications and experience acceptable to the Bank, who shall have the duties and responsibilities set out in the Duties of the Project Administration Officer.</p>
11.	Engagement of Consultants	<p>The Executing Agency shall, in accordance with the procurement procedures applicable to the Grant, select and engage consultant(s) to provide the following consultancy services and shall, within a timeframe acceptable to the Bank, implement such recommendations arising out of the following consultancy/ies, as may be acceptable to the Bank:</p> <p>Engineering Supervision</p> <p>Preparation and Monitoring of Reconnection Support Programme</p> <p>Procurement Support Specialist</p>
12.	Engagement of Contractors	<p>The Executing Agency shall, in accordance with the procurement procedures applicable to the Grant, select and engage contractors to carry out the works to be financed by the Grant.</p>

No	Subject	Terms and Conditions of the Grant
13.	UK CIF Conditions	<p>The Beneficiary and the Executing Agency shall permit the Bank or DFID, or any person appointed thereby, to audit the expenditures financed by the Grant, and to provide the Bank and DFID, or the appointed person with all reasonably required assistance, documents and information.</p> <p>The Beneficiary and the Executing Agency shall ensure that the contracts under the Project provide for the acknowledgement of, and that each deliverable produced under the Project, contains a visibility statement acknowledging that the resources of the Grant have been provided by DFID through UK CIF, and that the UKaid logo is utilised in accordance with DFID standards for use of the UKaid logo.</p> <p>The Beneficiary and the Executing Agency shall facilitate and permit, during implementation of the Project, and up to five (5) years after the end of UK CIF, any authorised representative of the Bank or DFID to conduct investigations of credible suspicion of or actual fraud, corruption or any other financial irregularity, impropriety or wrong doing and if necessary provide an appropriate refund in accordance with the refund provisions in the Grant Agreement.</p>
14.	Maintenance	<p>The Beneficiary and the Executing Agency shall keep the infrastructure financed from the Grant, or cause the same to be kept, in good repair and condition and shall provide the financial and other resources required to adequately maintain the infrastructure financed from the Grant.</p>
15.	Reports and Information	<p>Except as the Bank may otherwise agree, the Beneficiary shall furnish or cause to be furnished to the Bank the reports and other information set out in the Reporting Requirements in the form specified therein, or in such form or forms as the Bank may require, not later than the times specified therein for so doing.</p>
16.	Other Conditions	<p>The Beneficiary shall maintain in force all legislation, rights of way or use or easements and all permits necessary for the execution of the Project.</p>

No	Subject	Terms and Conditions of the Grant
17.	Contribution of the Beneficiary and the Executing Agency to the Project	<p>Except as the Bank may otherwise agree, the Beneficiary shall meet or cause to be met: (a) the cost of the items designated for financing by the Beneficiary in the Project Cost Phasing and Financing Plan; (b) any amount by which the cost of the components of the Project to be financed from the Grant exceeds the amount set out in the Project Cost Phasing and Financing Plan; and (c) the cost of any other items needed for the purpose of, or in connection with, the components of the Project to be financed from the Grant.</p> <p>Except as the Bank may otherwise agree, the Executing Agency shall meet or cause to be met the cost of the items designated for financing by the Executing Agency in the Project Cost Phasing and Financing Plan.</p> <p>Except as the Bank may otherwise agree, the contribution which the Executing Agency is required to make to the Project shall be expended by the Executing Agency in a timely manner on the components of the Project allocated for financing by the Executing Agency as shown in the Project Cost Phasing and Financing Plan, up to the respective limits set out therein.</p> <p>Except as the Bank may otherwise agree, the Beneficiary and the Executing Agency shall provide or cause to be provided, all other inputs required for the punctual and efficient carrying out of the Project not being financed by the Bank.</p>
18.	Suspension, Cancellation and Refund	<p>The Bank shall be entitled to suspend, cancel or require a refund of the Grant, or any part thereof, if the UK CIF resources or any part thereof is suspended, cancelled or required to be refunded, except that the Beneficiary or the Executing Agency shall not be required to refund any amount of the Grant already expended by the Beneficiary or the Executing Agency on the components of the Project to be financed from the Grant and not recoverable by the Beneficiary or the Executing Agency, unless that amount already expended was misappropriated due to a proven fraudulent, unethical or other activity of wrongdoing.</p>

8. **LOANS COMMITTEE RECOMMENDATION**

8.1 The Loans Committee considered this proposal on November 25, 2019 and agreed to recommend it for the approval of the President.

9. **APPROVAL**

9.1 The abovementioned Grant is approved.

Signed: W^m Warren Smith, PhD
President

Date: December 3, 2019

APPENDICES TO CHAPTER 1 - STRATEGIC CONTEXT AND RATIONALE

APPENDIX 1.1 MACROECONOMIC CONTEXT DETAILS

APPENDIX 1.1.1

ANTIGUA AND BARBUDA MACROECONOMIC DEVELOPMENTS 2018

1. OVERVIEW

1.1 Buoyant economic activity continued in the first half of 2019 following real GDP growth of 4.2% in 2018. Construction and Tourism performed strongly proxied by the increase in construction materials and stay-over arrivals. The performance coincides with accelerated infrastructural projects in Antigua and the Hurricane Reconstruction Programme on the island of Barbuda. On current trends, real GDP growth would remain above its long-term average. Moderate inflation level and improved labour market conditions also contributed to macroeconomic stability. Domestic demand was constrained by deteriorating fiscal operations. The fiscal deficit widened, against a backdrop of high public debt and increasing gross financing needs.

1.2 Building macroeconomic resilience remains a significant challenge. CDB expects robust economic growth 2019, with key downside risks in the short term. The country's vulnerability to global economic shocks and adverse weather conditions pose significant risk to medium term prospects. As a result, the authorities are encouraged to build in resilience planning in their budget and economic development initiatives.

2. KEY DEVELOPMENTS

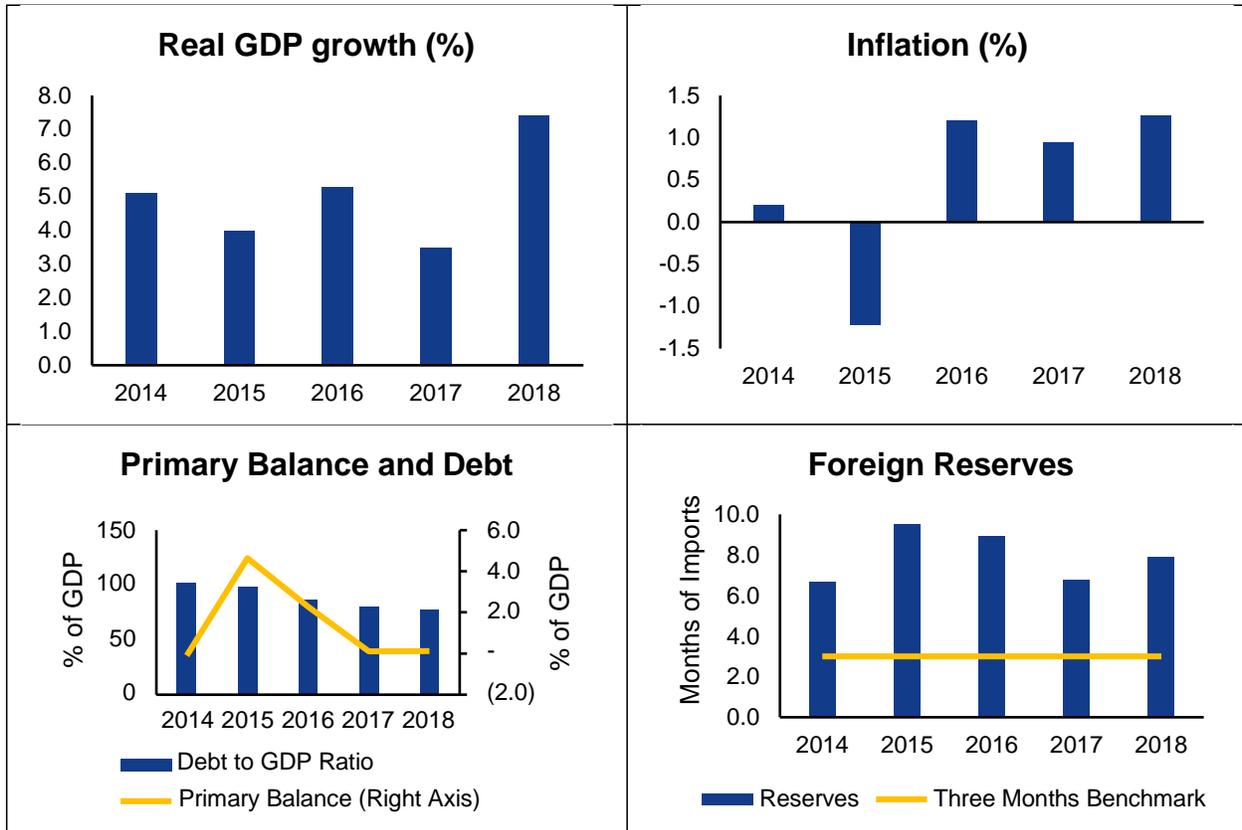
2.1 Real gross domestic product (GDP) grew at an accelerated pace of 7.4% in 2018, compared to real GDP growth of 3.2% for 2017. The accelerated growth greater than anticipated activity in construction; hotels and restaurants; wholesale and retail trade; and transport, storage and communications. According to the Caribbean Tourism Organisation, stay-over arrivals, grew by 8.7% to 268,949 in 2018. The increase in stay-over arrivals was recorded in key source markets – Canada (83.0%) and the United States (7.6 %) both benefiting from an increase in strategic marketing and airlift, such as the addition of Sunwing out of Canada. Conversely, visitors from Europe fell (2.7%) reflecting major competition from other destinations, the uncertainty surrounding BREXIT and volatility of the British Pound.

2.2 Similarly, cruise ship passenger arrivals grew marginally by 0.2% to 794,604 in 2018 adding to the tourism industry performance. The growth in the cruise tourism category was due in part to earlier investments in port infrastructure, allowing for the accommodation of larger cruise ships. Activity in the construction sector is estimated to have increased in 2018, as indicated by increased imports of construction materials - particularly cement imports, a major indicator of construction activity; hotel developments; the reconstruction efforts in Barbuda; and major road rehabilitation and expansion works. Ancillary sectors such as wholesale and retail; transport, storage and communications also recorded positive growth, evidenced by an expansion in the importation of general cargo and an increase in vehicle importation.

2.3 Inflation grew by 0.12% as at end-December 2018. Overall price increases were registered in the food, housing and utilities, household and furniture equipment indices. The unemployment rate declined in 2018. Official unemployment data indicated a rate of 13.7% as at December 2015, of which 14.5% of female unemployed to 12.9% for male. Youth unemployment rate of 33.9% more than doubled the national rate. Anecdotal evidence, from Antigua and Barbuda's Social Security Board (ASSB) statistics suggest

moderate increase in active employment coinciding with the increased economic activity and demand for labour in 2018.

FIGURE 1: ANTIGUA AND BARBUDA KEY MACROECONOMIC INDICATORS



Source: Government of Antigua and Barbuda, Eastern Caribbean Central Bank, IMF and CDB staff estimates.

2.4 Antigua and Barbuda’s fiscal position worsen, prompting an urgency toward consolidation. A primary deficit of 4.2% of GDP is estimated for 2018, due in large part to an increase in recurrent expenditure, capital spending and a reduction in non-tax revenue collection. Recurrent expenditure grew a gradual pace of 1.7% due to increases in personal emoluments and interest payments. Similarly, Capital expenditure grew by 26.7% mainly to support the government’s road rehabilitation and expansion programme, and affordable housing project. Current revenue grew 2% in 2018 associated with higher turnover from taxes on income and profits, taxes on domestic goods and services, and international trade. However, the growth in revenue was tempered by the 11.2% fall in non-tax revenue collection on account of a deceleration in citizenship by investment programme (CIP) receipts.

2.5 Government fiscal operations have led to an aggravation of the public sector debt, which remains burdensome. According to the International Monetary Fund (IMF), the public debt-to-GDP ratio is estimated at 89.5% in 2018, compared to 90.6% in 2017. Over the past five years debt servicing (interest and amortisation) has accounted for an average of 53% of revenue collected on an annual basis, with interest payments alone accounting for roughly 12%. The Government of Antigua and Barbuda (GOAB) may need to find ways to raise revenue and manage expenditure in order to ensure fiscal and debt sustainability.

2.6 Money supply grew by 6.0% in 2018, consistent with the increase in economic activity. Private sector credit, the largest share of domestic credit, grew by 2.0% to \$1,931.0 mn reflecting growth in loans and advances to both businesses (distributive trades and tourism) and households (durable goods and other personal loans). The resilience of the banking system improved in 2018 with improvements in commercial banks' asset quality and profitability. The banking system's ratio of gross nonperforming loans to total loans fell to 7.0% at end-September 2018; and banks, with a Capital Adequacy Ratio of 37.1%, were well capitalised. Gross international reserves exceeded the 3 months of imports international benchmark. International reserves grew to an estimated 7.8 months of import cover as at December 2018.

2.7 The current account deficit is projected to widen, due in part to an increase in imports some of which was related to the post-hurricane relief effort. The merchandise trade deficit grew by 24% to \$1,791.0 mn in 2018, on account of greater imports of food, fuels, manufactured goods, machinery and transport equipment. The growth in tourism receipts associated with improved stay-over visitors, partially offset the current account deficit.

3. OUTLOOK

3.1 Robust economic growth of 4.9% is estimated for 2019, similar to the real GDP growth recorded in 2018. The performance is being driven by accelerated infrastructural projects in Antigua and the Hurricane Reconstruction Programme on the island of Barbuda. Up to September 2019, there have been increases in imports of construction materials and stay-over arrivals that point to growth in the construction and tourism sectors. However, key downside risks remain. Subdued trading partner growth (the United States, Canada and United Kingdom) and the volatility in commodity prices (international oil prices) possibly linked to the intensification of geopolitical tensions could cause a drag on economic activity in the domestic economy. Similarly, natural disasters and extreme weather events are also significant sources of risk to Antigua and Barbuda. For example, if a natural disaster shock to the magnitude of hurricane Irma (damage and losses equivalent to 15% of GDP) was to occur in 2020 affecting both islands, it can derail the country's growth prospects and worsen public debt.

APPENDICES TO CHAPTER 2 - PROJECT DESCRIPTION

APPENDIX 2.1 COMPONENT DETAILED DESCRIPTION

Infrastructure Works

- The works contracts will include the following:
 1. Civil works for the Undergrounding of Codrington distribution system and the new power station distribution feeder; and
 2. Electrical works for the Reconnection Support Programme.

Engineering and construction-related services

- Consultancy services for: the preparatory Engineering including site specific surveys, and Climate Vulnerability Assessment (CVA) for the; 8km of Underground network; and Solar Photovoltaic (PV) Hybrid systems on up to 11 Government building; the consultant will also be responsible for the supervision and monitoring support for the bid evaluation process, performance inspection, certification of works and amounts due for payment related to the works and design-supply-install contracts for the undergrounding and solar PV hybrid components (See Appendix 2.3).

Goods

- The goods contracts will include the following:
 1. A contract for grid accessories including transformers, switches, conductors and conduits for the Undergrounding of Codrington distribution and the new power station feeder;
 2. A contract for the preparation of final designs, supply and installation of Hybrid Solar Systems on Key Public Buildings on Barbuda.

Capacity Building

- Consultancy service for the preparation and monitoring of the Reconnection Support Programme (RSP). The consultant will conduct Household Assessment of Socioeconomic Data (quantitative and qualitative) and develop a stakeholder engagement guidelines to inform RSP project design for APUA. Using the results of this analysis monitor the implementation of the RSP that supports greatest impact on universal access and develops the capacity of APUA and local stakeholders to continue to reconnect customers beyond the completion of the project (see Appendix 2.2).

Project Management

1. A Project Coordinator (PC) assigned from APUA (Barbuda) with qualifications acceptable to CDB will be appointed to the project management team;
2. a Barbuda Council Liaison Officer (BCLO) assigned by the Barbuda Council;
3. a Project Administration Officer (PAO) assigned from GOAB to assist with claims processing and coordination with Antigua based stakeholders; and
4. a Procurement Support Specialist (PSS) a Consultant selected to assist the PC with the preparation of RFP's and evaluation of proposals for the Engineering Services and Capacity Building Technical Assistance components.

APPENDIX 2.2 **CHAPTER 2 - ADDITIONAL APPENDICES**

APPENDIX 2.2.1

DRAFT TERMS OF REFERENCE
CONSULTANCY SERVICES
ENGINEERING DESIGN AND SUPERVISION CONSULTANT

1. INTRODUCTION

1.1 Barbuda and its electricity system were extensively damaged during Hurricane Irma which served a censual population of 1,634 persons, before the hurricane’s passage. On September 6, 2017, 257km/h winds and storm surges from Category 5 Hurricane Irma damaged or destroyed approximately 95% of the structures on Barbuda (see Figure 1). The entire power system was damaged by the Hurricane, including: the Antigua Public Utilities Authority (APUA) power station, 150kWp solar PV plant, and approximately 95% of island’s distribution network was either damaged or destroyed.

1.2 APUA is the sole generation, transmission and distribution utility in Antigua and Barbuda. APUA owns transmission, sub-transmission and distribution facilities on both islands of Antigua and Barbuda. On Barbuda the distribution system voltages range from 6.6 kV to 11 kV with customers supplied by an overhead line network reconstructed following the 2017 hurricane.

1.3 Barbuda is currently completely reliant on expensive fossil fuel for electricity generation. The destruction of a 150kWp solar PV plant in Barbuda before it was energised means the island is solely reliant on APUA’s three operational high-speed diesel units (see Table 1 below) and diesel fuel trans-shipped from Antigua for its electricity supply. APUA reports the fuel cost is estimated to be XCD0.9422/kWh, which is among the highest within the region. Instantaneous peak demand on Barbuda prior to the hurricane was around 500kW, with an average daytime load of around 380kW. The installed capacity was 2.15 MW (1.35 running and 0.8 back up). Total annual electricity required on Barbuda was approximately 3.3GWh, generated by APUA entirely from diesel generation. Post-hurricane, according to APUA estimates, island load is expected to reach an annual instantaneous peak of 330kW, with 250kW during typical daytime sunlight hours.

TABLE 1: APUA INSTALLED GENERATION OPERATING STATUS.

Generator Type	Rating (kW)	Status	Generator Type	Rating (kW)	Status
CAT C-15	400	Operational	Perkins	660	Not operational
CAT 3508	650	Operational	CAT C-27	700	Not operational
CAT 3512	1500	Operational	CAT 3412	850	Not operational

1.4 Following mandatory evacuation, approximately 1,000 persons have returned to the island. Despite the existing investment in reconstruction of the electricity system in Barbuda, a significant proportion of customers remain without access to electricity and the electricity network remains vulnerable to high-winds and storm surge. The vulnerability will become more important as additional grid tied solar PV and battery storage come online, which will still rely on the vulnerable overhead line network to serve the people of Barbuda.

1.5 The proposed project aims to support and complement the ongoing investment in grid reconstruction and renewable energy generation by addressing the remaining issues with regard to customer reconnection delays, vulnerabilities of the overhead lines in the distribution system, and the lack of sustainable emergency

back-up supply requirements of the Barbuda Council. The project will also identify the feasibility of incorporating additional renewable energy sources, like wind, into a more resilient grid.

1.6 The benefits of the project approach are: (1) increased access to electricity services for the people of Barbuda; (2) Economic co-benefits by off-setting Government's energy budget from the energy consumption on Government buildings, (3) resilient electricity network for the wider Codrington area; and (4) low-carbon back-up generation capacity for essential community services.

2. OBJECTIVE

2.1 The objectives of the consultancy are twofold: first, to design specifications for an environmentally sound, climate resilient, socially-inclusive¹ and sustainable electricity system; and second to provide supervision and monitoring support to the executing agency during the procurement and implementation phase. These objectives include:

- (a) Undertaking site specific investigations and climate risk assessment, in-order to inform the detailed technical performance specifications and preparation of tender documents for the following project components;
 - (i) Approximately 8km of Underground network.
 - (ii) Solar PV Hybrid systems on approximately 11 Government building.
- (b) Supervision and monitoring support to the executing bid evaluation process, performance inspection, certification of works and amounts due for payment related to the works and design-supply-install contracts.

3. SCOPE OF SERVICES

3.1 The services shall be carried out in accordance with generally accepted standards of professional practice, following recognised and management principles and practices. The consultants' scope of work is understood to cover all activities necessary to accomplish the stated objectives of these services, while adhering to the aforementioned principles and practices, whether or not a specific activity is cited in these TORs.

Phase 1 - Design Phase

3.2 The consultants shall:

- (a) Review relevant information from the records of APUA and other available reports on the power sector, Barbuda network maps, demand forecasts and previous similar work; and verify that such information, and that supplied by any other agencies, is consistent and adequate to inform the various aspects of the current work.
- (b) Communicate and coordinate work with the consultants for the Preparation and Supervision of a Reconnection Support Programme for Barbuda to avoid duplication of

¹ Social inclusion is the process of improving the terms on which individuals and groups take part in society - improving the ability, opportunity, and dignity of those disadvantaged on the basis of their identity (<http://www.worldbank.org/en/topic/socialdevelopment/brief/social-inclusion>). This process includes those who are traditionally excluded due to inequalities associated with, *inter alia*, gender, poverty, disability, age cohort, geographic location (urban/rural/peri-urban), ethnicity, race and indigenous peoples' identity. The exclusion experienced may be evident in stereotypes, stigmas, and superstitions based on group identity and intersection of multiple identities.

efforts and forge synergy during preparation and supervision, including inter alia, efficient and effective coordination of the Environmental and Social Management Plan (ESMP) and delivery of capacity-building training in use of GOAB's approved *Gender Equality and Social Inclusion Guidelines for implementing Infrastructure Projects* for APUA, Barbuda Council, contractors and project-related workers to strengthen their ability to deliver socially inclusive and gender-responsive activities that minimise the negative social and gender effects of infrastructure projects, and promote participation of vulnerable groups in key growth sectors of the economy.

- (c) Undertake multicriteria analysis of the proposed cable route and 11 Government building identifying a preferred cable route and Hybrid Solar PV design that minimises the potential negative impacts taking into account the following:
- (i) ESMP: Develop ESMP to be implemented during installation works. The ESMP will describe and prioritise the actions, commensurate with the potential risks identified, that will need to be implemented for project-wide mitigation measures, corrective actions and monitoring measures to manage the impacts during pre-construction, construction and operations, to comply with national environment, occupational health and safety, and social legislation, regulatory requirements as well as CDB's Environment and Social Procedures. It should include recommendations for appropriate environmental and social monitoring indicators and reporting requirements, including public disclosure implementation processes, and an overall participatory Stakeholder Engagement Plan (SEP) for the project overall. The SEP will build on existing formal and informal infrastructure for communication and decision-making. The SEP will identify a project-wide Grievance Redress Mechanism (GRM) to facilitate communication with affected people. The consultant will be responsible for:
 - (aa) identifying project stakeholders and specific Project issues that would impact different groups of stakeholders such as APUA, central Government, local Government (the Barbuda Council), non-governmental organisations, international development partners and the Barbudan citizenry;
 - (bb) developing and maintaining constructive stakeholders relationships including determining appropriate engagement levels, techniques and duration to provide timely and responsive support;
 - (cc) encouraging the participation of all stakeholder groups amongst the population of Barbuda including women, men, youth, elderly and PWDs in non-traditional dialogue spaces and trades;
 - (dd) coordinating the establishment and effective functioning of formal community participation consisting of a cross-section of residents, entrepreneurs, Micro, Small and Medium Enterprises (MSMEs), and the Barbuda Council. The objectives include: (a) keeping community members informed on matters related to implementation including unexpected disruptions; (b) anticipating and preparing for any inconveniences that could emerge; and (c) facilitating the reporting to the APUA on matters of concern to residents and the business community; and

- (ee) The GRM should consider the following indicators: (i) number and type of grievances received in total, disaggregated by sex, age cohort, disability, sector, country of origin, if applicable; (ii) average time to resolve grievances, by category of grievance; (iii) reasons for non-resolution of grievances disaggregated by sex, age, disability, sector, country of origin, if applicable; and (iv) trend analysis related to grievances received disaggregated by sex, age, disability, country of origin of origin, if applicable.
- (ii) **Geotechnical analysis of the route:** Determine soil types and recommended trenching methods and equipment. The analysis should include the analysis of heat dissipation of the soil at the proposed cable burial depth and recommend backfill techniques and material that will ensure the thermal stability of the cable over its lifetime.
- (iii) **Climate Vulnerability Assessment of the route:** Assess the climate risks that are likely to have significant consequences on the project goals and activities. Assess the climate variables that are expected to experience significant changes in the project's geographic area.
- (iv) **Multi-criteria analysis and preferred technical options:** Undertake load flow assessments, technical construction practicality assessments, environmental and social factors; climate vulnerability and economic assessments to compare cable and route designs.
- (v) Prepare designs of the preferred technical solution following the multi-criteria analysis. This work will include preparation of preliminary construction cost estimates and construction schedule; and preparation of a final design report (including preliminary design drawings).

Phase 2 – Procurement Phase

3.3 The consultants shall:

- (a) Produce standard bidding documents for
 - (i) A Works Contract for approximately 8km of Underground network, including ESMP requirements.
 - (ii) A Goods Contract for approximately 8km of Underground network, including ESMP requirements.
 - (iii) A Goods Contract for Solar PV Hybrid systems on approximately 11 Government building, including ESMP requirements.
- (b) The contracts will allow APUA to solicit bids from international, regional and local contractors or joint ventures of local/regional/international contractors. In this regard, the Consultants are referred to CDB's Standard Bidding Documents for Procurement of Goods and Works. The bid documentation will contain the following:
 - (i) Instructions to Bidders;

- (ii) General and Special Conditions of Contract;
 - (iii) Bid Drawings;
 - (iv) Technical Specifications (general and specifications peculiar to local conditions);
 - (v) Bills of Quantities;
 - (vi) Form of Contract; and
 - (vii) Forms of Securities.
- (c) Procurement arrangements will be developed to ensure;
- (i) adherence to CDB's procurement guidelines; and
 - (ii) compliance with local laws and standards.
- (d) Provide Technical advice and support to APUA for the clarification of queries raised by tenderers (EPC contractors) during tendering stage.
- (e) Provide Technical evaluation of received bids and preparation of Technical evaluation report.
- (f) Provide Commercial Evaluation of received bids and preparation of commercial evaluation report and final recommendations.
- (g) Support APUA in tender negotiations and assistance in contract award.
- (h) Support APUA preparation of respective draft contract documents.

Phase 3 – Supervision of Works

3.4 The consultants shall:

- (a) provide support the Project Coordinator with the supervision of project implementation (including but not limited to overall project management, schedule controlling, monitoring, interface management and controlling, etc) for each contract package;
- (b) site supervision of site construction activities, testing and witnessing the tests by contractor on all equipment during and after the construction;
- (c) supervision of and reporting on the ESMP requirements.
- (d) supervision of the commissioning and subsequent warranty period services of all civil, electromechanical and other works comprising transformers, Power Cables, OHLs, excavation, and Hybrid Solar PV systems, and confirmation of compliance with the EPC contracts as applicable to each consultancy package;
- (e) review and approval of contractor's As-Built Drawings; and

- (f) monitor the implementation of ESMP including SEP and GRM covering all project components. Monitoring requires the production of relevant ESMP reports in keeping with approved reporting templates and timeframe with the APUA.

4. SITE VISITS

4.1 The consultants shall be required to travel to both islands of Antigua and Barbuda at the commencement of the assignment for the purpose of collecting information and holding discussions with officials of APUA, DOE, Government of Antigua and Barbuda (GOAB), Barbuda Council (BC) and other relevant stakeholders about the assignment. The consultants may also visit Barbuda during the various stages of the assignment to ensure efficient execution of the services but shall be required to visit to discuss the draft Report and its recommendations with the relevant officials.

5. SUPERVISION OF CONSULTANTS

5.1 Direct supervision of the consultants will be carried out by APUA. A Project Coordinator (PC) will be assigned from within APUA and will have day-to-day responsibility for project coordination, coordinating all meetings of the consultants with the various stakeholders, monitoring adherence to the implementation schedule, monitoring performance criteria and generally ensuring compliance with the various conditions associated with the funding. Delay or changes in scheduling and overall scope of work must be brought to the attention of PC as soon as reasonably practical. Where approval is required, a written request must be made by the Consultants and approval obtained, prior to the commencement of any related action. All consultants' reports will be submitted to the PC for the necessary distribution to the various stakeholders for review.

6. REPORTS AND TIME SCHEDULES

6.1 The consultants shall commence field work within four weeks of the effective date of the contract and shall submit the following number of reports to APUA and CDB within the time periods indicated.

Phase 1

- (a) Inception Report, within two (2) weeks after commencement of work. The Inception Report shall provide details of the revised work programme, the nature and intended timing of each component of all activities to be undertaken in accordance with TOR, the initial findings and preliminary recommendations, if any. APUA and CDB will provide comments on this report within two (2) weeks of receipt for the purpose of clarification of methodology, verification of data and agreement on approach. The Consultants will adjust the ongoing work according to the comments received and agreed upon.
- (b) Draft Final Reports (DFR) within eight (6) weeks of commencement of work. DFR should include, *inter alia*, a description of the current situation on the Barbuda power system and the initial outputs from the services described at paragraphs 3.02. APUA and CDB will provide comments on DFR within four weeks of receipt. Discussion of the comments on DFR shall be undertaken among officials of APUA, DOE, BC, CDB, relevant stakeholders and the Consultants at a meeting to be held in Belize. The Consultants will adjust DFR according to the comments received and agreed upon.
- (c) Final Reports (FR) within four (4) weeks of the meeting referred to at paragraph 6.01 (b) above. FR shall incorporate all revisions and comments on DFR, as required and agreed upon by APUA and CDB.

Phase 2

- (a) Bidding Documents within four (3) weeks of the acceptance of the FR and should include all the contracts referred to at paragraph 3.04.
- (b) Technical Evaluation Report and Financial Evaluation Report for all contracts within two (2) weeks of bid opening.
- (c) Final Contract Award within eight (8) weeks of bid opening

Phase 3

- (a) Monthly supervision report on the performance of the contractor against implementation plan.
- (b) Site Supervision reports of specific contract milestones (frequency to be determined by contractors work schedule).
- (c) Certification of the practical completion of works.

7. CONSULTANTS' REQUIREMENTS.

7.1 The consultants must have formal qualifications and experience in the following areas of expertise:

- (a) electrical engineering/power system planning and be familiar with the technical operation of a power grid;
- (b) financial and economic analysis of power projects; and
- (c) Social, gender and environmental management and providing oversight of supervising ESMPs for capital projects in developing countries and/or environments similar to Antigua and Barbuda.

7.2 The Consultants shall have at least ten years of experience in working on projects of similar nature. Experience working the Caribbean or in developing countries with similar conditions would be an asset. Evidence of qualification, experience and references must be included in the proposal. Excellent spoken and written English is essential. The team should include a Social Development Specialist with Masters degree in sociology, social policy, gender and development studies, or other related field; ten (10) years' relevant practical programming experience encompassing stakeholder engagement practice, poverty/social/gender assessment, community development, and behaviour change modification; three (3) years' experience conducting intersectionality work or research in gender, disability, youth, labour, and other social inclusion issues; excellent written and verbal communication skills in English; proven capacity to a multi-disciplinary team and experience in Antigua and Barbuda and/or the Caribbean Region.

7.3 A team leader shall be appointed by the Consultants to coordinate with all relevant officials from APUA, DOE, GOAB and stakeholders in general to ensure smooth execution of activities to inform the study.

7.4 Any computer model(s) utilised shall be made available to APUA along with all the data generated on BEL's systems operations.

8. MANPOWER SCHEDULING AND COSTS

8.1 The consultants are to support the proposal with the provision of, *inter alia*, the following information:

- (a) the methodology to be used in the assignment;
- (b) the names, experience, qualifications and standing in the firm of the Principal Staff who will be assigned to the project;
- (c) a Gantt Chart showing the input of each staff member with respect to the assignment indicating the overall length of time required for each stage of the Project and the man-weeks of each staff member; and
- (d) full submission of costs for the services with detailed breakdown as follows:
 - (i) consultant fees (disaggregated by area of expertise);
 - (ii) support staff services;
 - (iii) communication costs;
 - (iv) report reproduction cost;
 - (v) contract documentation production costs; and
 - (vi) travel expenses and per diem requirements.

9. PROVISION OF INFORMATION AND ASSISTANCE TO CONSULTANTS

9.1 The Consultants should indicate prior to the field work, on the basis of their experience with similar studies, what operational support is expected from APUA to facilitate the collection of relevant information. APUA shall provide, within reasonable time, all available relevant data that may be reasonably requested by the Consultants, to expedite the completion of the assignment.

9.2 APUA shall provide office facilities and support to the Consultants while working on this assignment in Barbuda, including communications originating in Barbuda that may be required in connection with the performance of the consultancy services. The Consultants shall make their own arrangements for local transportation, personal computers and other facilities for the production of reports.

10. COMMENTS BY THE CONSULTANTS

10.1 The consultants are invited to make comments on, and suggestion for, improvement to these TORs. The financial implications, if any, of these recommendations should be indicated separately in the financial proposal.

BUDGET
(USD)

	CDB	APUA	Total
<u>Consultants</u>			
Fees		-	
Per Diem	177,800	-	177,800
Travel		-	
Equipment Rental, Incidentals	22,199.8	-	22,199.8
Contingencies		-	
<u>Documents and General Support</u>			
Office Accommodation/Communication		3,000	3,000
Administrative Support		3,000	3,000
Local Transport		4,000	4,000
Total	200,000	10,000	210,000

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

APPENDIX 2.2.2

DRAFT TERMS OF REFERENCE PREPARATION AND SUPERVISION OF A RECONNECTION SUPPORT PROGRAMME FOR BARBUDA

1. BACKGROUND

1.1 Antigua and Barbuda has a 2019 population estimate of 96,453, of which 46,180 are males and 50,273 females. A censal population of 1,634 persons¹ resided in Barbuda before the passage of category 5 Hurricane Irma on September 6, 2017. Following mandatory evacuation, approximately 1,000 persons have returned to the island. The average household size on Barbuda is 3.3, with female headed-households representing 35%. Although Antigua and Barbuda ranks as a country of high human development, 18% of the population is poor and 10% vulnerable to poverty in the event of a major economic shock or natural hazard. The catastrophic impact of the hurricane exacerbated this vulnerability, compounded by the country's existing level of inequality. Indeed, the richest 20% of the population accounts for 56% of total consumption of goods and services, compared with less than 5% by the poorest 20%.

1.2 The total damage to Antigua and Barbuda was estimated at \$136.12 mn and the estimated recovery cost at USD226.27 mn (Post Disaster Needs Assessment 2017). The majority of the damage was sustained in the productive sector (44%), followed by the social sector (40%), the infrastructure sector (15%) and cross cutting sectors (1%). Vulnerable children, youth, women, persons with disabilities (PWDs) and social assistance Board of Guardians' beneficiaries disproportionately bear the brunt of socioeconomic hardships. PWDs estimated to represent 5.1% of the population, face poorer socioeconomic outcomes, especially in education, employment and social participation. The youth unemployment rate being 2.4 times that of the total population of the country, underscores further economic vulnerability (33.9% versus 13.7%). Comparatively, 12.9% of males, and 14.5% of females were unemployed in Antigua and Barbuda. The data is however not disaggregated by full-time versus part-time employment, but importantly shows that almost half (48%) of the female labour force in Barbuda was employed in occupations that fell within the lowest pay category. The labour market status of women thus misaligns with higher pass rates from secondary schools than male counterparts. Accordingly, women contend with labour market segregation, reinforcing gender stereotypes linked to caregiving and domestic work.

1.3 The recovery efforts in Barbuda are ongoing but understandably more difficult for the stated vulnerable groups. Notwithstanding some progress evident, the housing stock, livelihoods, access to basic services such as education, health, social protection, water, sanitation and electricity remain significantly impaired. The availability of resilient electricity infrastructure is a basic good necessary for the socioeconomic progress of households, private enterprise and the public sector. The Antigua Public Utilities Authority (APUA) has received only 599 applications from a total of 1,099 pre-hurricane electricity customers. Of the applicants, only 444 have access to electricity, 108 of which are temporary connections. Some 155 applicants remain unconnected to the grid. Temporary connections and those unconnected represent applicants that need to meet regulatory installation standards. Affordability is major contributor to noncompliance with standards and failure to make an application. Attention to improving access to resilient electricity infrastructure which affects consumption and productivity of public service providers, households and businesses, especially micro, small and medium enterprises (MSMEs), is imperative. Such provisions are critical to facilitate return to normalcy in the shortest possible time, and overall quality of life for the Barbudan citizenry.

¹ The population consisted of 861 males and 773 females.

1.4 The Government of Antigua and Barbuda (GOAB) seeks to procure the services of consultancy firm to undertake the preparation and supervision of a Re-connection Support Programme for (RSP) for Barbuda. The Consultant will support APUA's Project Coordinator (PC) of the Barbuda Energy Resilience Project, financed by the United Kingdom Caribbean Infrastructure Fund (UKCIF) and administered by the Caribbean Development Bank (CDB).

2. METHODOLOGY

2.1 The services of the Consultants are to be conducted in accordance with generally accepted international standards and professional practices acceptable to GOAB. 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 (TOR). A participatory and consultative approach is to be encouraged in the conduct of the services. Specifically, the Consultant will provide the following services:

- (a) conduct review secondary quantitative and qualitative data/reports; and
- (b) collect and analyse primary data through household surveys and qualitative research such as focus groups and elite interviews.

2.2 The consultants shall be required to travel to both islands of Antigua and Barbuda at the commencement of the assignment for the purpose of collecting information and holding discussions with officials of APUA, DOE, Government of Antigua and Barbuda (GOAB), Barbuda Council (BC) and other relevant stakeholders about the assignment. The consultants will primarily visit Barbuda during the various stages of the assignment to ensure efficient execution of the services but shall be required to visit to discuss the draft Report and its recommendations with the relevant officials.

3. SCOPE OF SERVICES

3.1 The services of the Consultants are to be conducted in accordance with generally accepted international standards and professional practices acceptable to GOAB. 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 (TOR). A participatory and consultative approach is to be encouraged in the conduct of the services. Specifically, the Consultant will provide the following services:

Preparatory Phase – Design of Barbuda Reconnection Support Programme

- (a) Provide advisory and Project Management Support, as a collaborative member of the PIMU and other partners. The SDS shall liaise with partners including: Barbuda Council, Ministries and Departments of the GOAB including, but not limited to: Ministry of Finance, Ministry of Social Transformation and Human Resource Development (MSTHRD); Ministry of Education Science & Technology (MOEST), Ministry of Works and Housing (MWH), Ministry of Justice, Legal Affairs, Public Safety and Labour (MOJLAPBL); Engineering Works Design and Supervision Consultant; Private sector, NGOs, FBOs and CBOs; and Residents of Barbuda. MSTHRD's Departments including, but not limited to, the Department of Gender Affairs (DOGA), MSTHRD's Youth Affairs, Disability Affairs and Family Services departments.
- (b) Communicate and coordinate work with the project's Engineering Design and Supervision Consultant to avoid duplication of efforts and forge synergy during preparation and supervision, including inter alia, efficient and effective coordination of the Environmental and Social Management Plan (ESMP), and delivery of capacity-building training in use of

GOAB's approved *Gender Equality and Social Inclusion Guidelines for Implementing Infrastructure Projects* of APUA, Barbuda Council, contractors and project-related workers to strengthen their ability to deliver socially inclusive and gender-responsive activities that minimise the negative social and gender effects of infrastructure projects, and promote participation of vulnerable groups in key growth sectors of the economy.

- (c) Conduct and triangulate secondary and primary quantitative and qualitative data to inform the development, implementation and monitoring of the Reconnection Support Programme (RSP) and Energy Efficiency Programme (EEP) in Barbuda. The consultants will review available secondary data, including the Post-Disaster Needs Assessment, MOAF and International Federation of Red Crescent (IFRC) Reports, and other reports, studies, gender analytical reports, poverty assessments, relevant strategic sector plans, policy and legal documents and data from the census and Labour Force Surveys. The SDS will collect primary data through household surveys and qualitative research such as focus groups to gather information such as pre-hurricane and post-hurricane data regarding:
 - (i) Proportion of commercial versus non-commercial APUA customers.
 - (ii) Review status of electrical assessments
 - (iii) Determine compliance with safe rewiring standards and reconnection costs standards for at least 20% of the customers that remain disconnected.
 - (iv) Type of Sex of household head (HH).
 - (v) HH size, composition and dependency ratio (PWDs, children, elderly, youth etc.).
 - (vi) Highest education level and employment status of HH members.
 - (vii) Type of dwelling and quality rating (level 1 -5).
 - (viii) Energy use and practices by HHs members.
 - (ix) Type and scale of commercial enterprises (including MSMEs).
 - (x) Perception of safety.
 - (xi) Every opportunity must be taken to maximise access to data from ongoing or planned research such as the CDB financed RRL's Needs Assessment, Capacity Building and Grant Assistance for Micro, Small and Medium Enterprises in Barbuda and other primary work by the Department of Environment.
- (d) Undertake analysis of the available data and define the primary barriers to customers who have not reconnected to the grid.
- (e) Recommend the most appropriate designs for a RSP that will address these barriers. The RSP is expected to directly benefit 108 APUA applicants with temporary connections and 155 applicants unconnected to the grid. Another 500 potential customers may also benefit from the project (that is, 45% of 1,099 pre-hurricane electricity customers). The Consultant will consultatively determine the selection criteria, implementation process, monitoring

arrangements and related documentation necessary. The proposed RSP should particularly focus on assuring access to the most vulnerable households. These may include households with Board of Guardians social protection status and households with characteristics such as single female headship, and high dependency ratios with PWDs, children, youth and elderly.

- (f) Recommend the most appropriate provisions for the EEP. The EEP is geared at strengthening energy efficiency awareness practices with concomitant provision of energy efficient light bulbs to contribute to reducing household consumption and avail disposable income for other expenditure. The consultant will consultatively determine public education methodologies suitable for Barbuda, communication materials (brochures, videos, blogs, social media, billboard) to be developed, quantity of light bulbs and promotional materials (magnets, key rings etc.), implementation process, monitoring arrangements and related documentation necessary. The terms of assuring access to the most vulnerable households with Board of Guardians social protection status and households with characteristics such as single female headship, and high dependency ratios with PWDs, children, youth and elderly must be defined.
- (g) Produce standard bidding documents for contract(s) required to implement the RSP including EEP.
- (h) Develop a social inclusion and gender sensitisation training to build the capacity of APUA, Barbuda Council, contractors and project-related workers to strengthen their ability to deliver socially inclusive² and gender-responsive activities that minimise the negative social and gender effects of infrastructure construction projects, and promote participation of vulnerable groups in key growth sectors of the economy. The training should use GOAB's approved *Gender Equality and Social Inclusion Guidelines for Implementing Infrastructure Projects* financed as the basis for the training³. The sensitisation will support all Project actors to strengthen their social and gender analysis capacity to deliver socially inclusive and gender-responsive activities that minimise the negative social and gender effects of infrastructure construction projects, and promote participation of vulnerable groups in key growth sectors of the economy.
- (i) Develop the social and gender components of a draft Environmental and Social Management Plan (ESMP), including a participatory Stakeholder Engagement Plan (SEP). The SEP will build on existing formal and informal infrastructure for communication and decision-making. The SEP will identify a project-wide Grievance Redress Mechanism (GRM) to facilitate communication with affected people. The consultant will be responsible for;
 - (i) identifying project stakeholders and specific Project issues that would impact different groups of stakeholders such as APUA, central Government, local

² Social inclusion is the process of improving the terms on which individuals and groups take part in society - improving the ability, opportunity, and dignity of those disadvantaged on the basis of their identity (<http://www.worldbank.org/en/topic/socialdevelopment/brief/social-inclusion>). This process includes those who are traditionally excluded due to inequalities associated with, *inter alia*, gender, poverty, disability, age cohort, geographic location (urban/rural/peri-urban), ethnicity, race and indigenous peoples' identity. The exclusion experienced may be evident in stereotypes, stigmas, and superstitions based on group identity and intersection of multiple identities.

³ The training would be adapted and delivered in partnership with MSTHRD's DOGA, Youth Affairs, Disability Affairs and Family Services departments. The training would be adapted and delivered in partnership with MSTHRD's DOGA, Youth Affairs, Disability Affairs and Family Services departments.

Government (the Barbuda Council), non-governmental organisations, international development partners and the Barbudan citizenry;

- (ii) developing and maintaining constructive stakeholders relationships including determining appropriate engagement levels, techniques and duration to provide timely and responsive support;
 - (iii) encouraging the participation of all stakeholder groups amongst the population of Barbuda including women, men, youth, elderly and PWDs in non-traditional dialogue spaces and trades;
 - (iv) coordinating the establishment and effective functioning of formal community participation consisting of a cross-section of residents, entrepreneurs, Micro, Small and Medium Enterprises (MSMEs), and the Barbuda Council. The objectives include: (a) keeping community members informed on matters related to implementation including unexpected disruptions; (b) anticipating and preparing for any inconveniencies that could emerge; and (c) facilitating the reporting to the APUA on matters of concern to residents and the business community; and
 - (v) The GRM should consider the following indicators: (aa) number and type of grievances received in total, disaggregated by sex, age cohort, disability, sector, country of origin, if applicable; (bb) average time to resolve grievances, by category of grievance; (cc) reasons for non-resolution of grievances disaggregated by sex, age, disability, sector, country of origin of origin, if applicable; and (dd) trend analysis related to grievances received disaggregated by sex, age, disability, country of origin of origin, if applicable.
- (j) Develop a specific Results Monitoring Framework (RMF) developed for the Consultants' portfolio and in alignment with the broader Project RMF taking into consideration:
- (i) **Indicators:** (1) targeted stakeholders by project sector, sex, age and disability wherever possible; (2) households to be affected by the project, including references to both direct and indirect impacts; (3) the profile of the members of at least one CPGs, such as sex (males/females), age cohort (youth, elderly etc.), disability status (disabled vis nondisabled), residential location, and business/community group represented;
 - (ii) **Monitoring and evaluating:** (1) stakeholder attitudes towards project activities; (2) community participation to ensure that all groups are actively engaged including those most vulnerable; (3) the implementation of social mitigation measures during the RSP implementation; and (4) the direct and indirect employment under the project (disaggregated by sex, age cohort and disability, wherever possible).

Implementation Phase – Supervision and Monitoring of the Barbuda Reconnection Support Programme

- (k) Provide expert advice and support to APUA for the clarification of queries raised by tenderers during tendering stage;

- (l) Provide technical and financial evaluation of received bids and preparation of a bid evaluation report;
- (m) Supervision and monitoring of the implementation of the RSP including EEP developed in the Design Phase.
- (n) Advisory and Project Management Support, with partners including:
 - (i) APUA Barbuda through the Project Coordinator.
 - (ii) Engineering Works Design and Supervision Consultant.
 - (iii) Contractors delivering works under the project.
 - (iv) Residents of Barbuda.
- (o) Delivery of social inclusion and gender sensitisation training to APUA, Barbuda Council, contractors and project-related workers.
- (p) Develop and monitor against a specific Results Monitoring Framework (RMF) developed for the Consultant portfolio and in alignment with the broader Project RMF taking into consideration; and
- (q) Monitor the implementation of the ESMP including SEP and GRM. Monitoring requires the production of relevant ESMP reports in keeping with approved reporting templates and timeframe with the APUA.

4. SUPERVISION OF CONSULTANTS

4.1 Direct supervision of the consultants will be carried out by APUA. A Project Coordinator (PC) will be assigned from within APUA and will have day-to-day responsibility for project coordination, coordinating all meetings of the consultants with the various stakeholders, monitoring adherence to the implementation schedule, monitoring performance criteria and generally ensuring compliance with the various conditions associated with the funding. Delay or changes in scheduling and overall scope of work must be brought to the attention of PC as soon as reasonably practical. Where approval is required, a written request must be made by the Consultants and approval obtained, prior to the commencement of any related action. All consultants' reports will be submitted to the PC for the necessary distribution to the various stakeholders for review.

5. REPORTS AND TIME SCHEDULES

5.1 The consultants shall commence fieldwork within four weeks of the effective date of the contract and shall submit the following number of reports to APUA and CDB within the time periods indicated. Further, the Consultant would be responsible for integrating their work into the PC's reporting and other requirements. Reports shall include:

- (a) Inception Report with clear outline methodology and work plan, within two weeks of commencement of assignment.
- (b) Draft RSP and Social Inclusion Training Design Report.

- (c) Final RSP and Social Inclusion Design Report.
- (d) RSP Bidding Documents.
- (e) RSP Bid Evaluation Report.
- (f) Monthly RSP implementation monitoring reports.
- (g) Draft RSP and Social Inclusion Training Completion Report.
- (h) Final Report covering all the Consultant activities, within 13 months of commencement of assignment.

6. QUALIFICATIONS AND EXPERIENCE

6.1 The team from the Consultant firm must possess the following:

Lead Consultant – Social Development Specialist

- (a) Masters degree in sociology, social policy, gender and development studies, international/community development, public policy or other related field.
- (b) Minimum of ten (10) years' relevant practical programming experience encompassing stakeholder engagement practice, poverty/social/gender assessment, community development, and behaviour change modification.
- (c) Minimum of five (5) years' experience in social research using participatory approaches including quantitative and qualitative research through surveys, focus groups, workshops, facilitation, etc.
- (d) Minimum of three (3) years' experience conducting intersectionality work or research in gender, disability, youth, labour, and other social inclusion issues.
- (e) Excellent written and verbal communication skills in English.
- (f) Proven capacity to a multi-disciplinary team.
- (g) Experience in Antigua and Barbuda and/or the Caribbean Region.

Electrical Reconnection Consultant – Senior Electrician

- (a) Level III in Electrical Installation (Caribbean Vocational Qualification) or equivalent required.
- (b) Minimum of Five (5) years directly related experience in building inspection for compliance with electrical codes or seven (7) years of experience in electrical construction or building trades including reading construction plans, estimating and commissioning of new construction.

- (c) Prior experience on Barbuda or with APUA’s electrical codes and national laws would be an advantage.

BUDGET
(USD)

	CDB	APUA	GOAB	Total
<u>Consultants</u>				
Fees		-	-	
Per Diem	110,000	-	-	110,000
Travel		-	-	
Equipment Rental, Incidentals, Materials	20,000	-	-	20,000
Contingencies		-	-	
<u>Documents and General Support</u>				
Office /Communication	-	3,000	3,000	6,000
Administrative Support		3,000	3,000	6,000
Local Transport	-	4,000	4,000	8,000
Total	130,000	10,000	10,000	150,000

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

APPENDIX 2.3

RESULTS MONITORING PLAN

Indicator	Baseline	Year 2019	Year 2020	Year 2021	Year 2022	Responsibility for Data Collection
1.1 Average electricity outage time at key Public Buildings post natural hazard events (days) (#) (#)	365;					APUA, CDB
1.2 APUA post hurricane electricity outage time (days) (#) (#)	365;					APUA, CDB
2.1 Energy savings as a result of EE/RE interventions (MWh)	0;	0	0	219	219	CDB
3.1 Number of customers reconnected to the grid (disaggregated by sex of household head and Board of Guardian Status) (#) (#)	0;					APUA

Indicator	Baseline	Year 2019	Year 2020	Year 2021	Year 2022	Responsibility for Data Collection
1.1 Design report and associated procurement documents completed (Yes/No) (Yes/No)	No;					PC, Consultant
2.1 Number of public facilities with renewable back-up generation (#) (#)	0;					Engineering Supervision Consultant
2.2 Conventional or renewable power generation capacity installed (kW)	0;	0	100	0	0	Engineering Supervision Consultant

Indicator	Baseline	Year 2019	Year 2020	Year 2021	Year 2022	Responsibility for Data Collection
3.1 Number of participants trained (by Agency - APUA, Barbuda Council, contractors and project-related workers) (#)	0;					Consultant, PC
3.2 Percentage of trainees rating of the content of the training as valuable / committing to incorporating the training in future projects or policies (#)	0;					Consultant
3.3 Number of household electrical assessments completed (disaggregated by sex of household head and Board of Guardian Status) (#) (#)	0;					PC
3.4 Gender and Social Inclusion Training Design completed (Yes/No)	No;					Consultant, PC
3.5 RSP Design Report and associated documents delivered (Yes/No)	No;					Consultant, PC
4.1 Supply lines installed or upgraded (Km)	0;	0	8	0	0	Engineering Supervision Consultant
Urban ;						
Rural ;						

APPENDICES TO CHAPTER 3 - FINANCING PLAN

APPENDIX 3.1 **PROJECT COSTS AND PHASING PLAN**

PROJECT COSTS PHASING AND FINANCING PLAN

Components	OSF-GBP	Total	COUNTERPART		Total
	UK CIF Resources		GOAB	APUA	
2019 TOTAL					
Project Management	2,500	2,500	-	-	2,500
Base Cost	2,500	2,500	-	-	2,500
Physical Contingency	-	-	-	-	-
Price Contingency	-	-	-	-	-
Total Project Cost	2,500	2,500	-	-	2,500
Interest During Implementation	-	-	-	-	-
Commitment Fees	-	-	-	-	-
Total Financing	2,500	2,500	-	-	2,500
Percentage Financing	100.00%	100.00%	-	-	100.00%
2020 TOTAL					
Infrastructure Works	925,000	925,000	-	237,000	1,162,000
Engineering and Construction-related Services	157,000	157,000	7,900	7,900	172,800
Goods	1,397,818	1,397,818	16,154	8,245	1,422,217
Project Management	7,500	7,500	7,900	7,900	23,300
Capacity Building	102,000	102,000	7,900	7,900	117,800
Base Cost	2,589,318	2,589,318	39,854	268,945	2,898,117
Physical Contingency	258,182	258,182	3,196	26,105	287,483
Price Contingency	-	-	-	-	-
Total Project Cost	2,847,500	2,847,500	43,050	295,050	3,185,600
Interest During Implementation	-	-	-	-	-
Commitment Fees	-	-	-	-	-
Total Financing	2,847,500	2,847,500	43,050	295,050	3,185,600
Percentage Financing	89.39%	89.39%	1.35%	9.26%	100.00%
2021 TOTAL					
Project Management	-	-	3,950	3,950	7,900
Base Cost	-	-	3,950	3,950	7,900
Physical Contingency	-	-	-	-	-
Price Contingency	-	-	-	-	-
Total Project Cost	-	-	3,950	3,950	7,900
Interest During Implementation	-	-	-	-	-
Commitment Fees	-	-	-	-	-
Total Financing	-	-	3,950	3,950	7,900
Percentage Financing	0.00%	-	50.00%	50.00%	100.00%
TOTALS					
Infrastructure Works	925,000	925,000	-	237,000	1,162,000
Engineering and Construction-related Services	157,000	157,000	7,900	7,900	172,800
Goods	1,397,818	1,397,818	16,154	8,245	1,422,217
Project Management	10,000	10,000	11,850	11,850	33,700
Capacity Building	102,000	102,000	7,900	7,900	117,800
Base Cost	2,591,818	2,591,818	43,804	272,895	2,908,517
Physical Contingency	258,182	258,182	3,196	26,105	287,483
Price Contingency	-	-	-	-	-
Total Project Cost	2,850,000	2,850,000	47,000	299,000	3,196,000
Interest During Implementation	-	-	-	-	-
Commitment Fees	-	-	-	-	-
Total Financing	2,850,000	2,850,000	47,000	299,000	3,196,000
Percentage Financing	89.17%	89.17%	1.47%	9.36%	100.00%

APPENDICES TO CHAPTER 4 - PROJECT VIABILITY

APPENDIX 4.1 TECHNICAL ANALYSIS

1. Barbuda and its electricity system were extensively damaged during Hurricane Irma: On September 6, 2017, 257km/h winds and storm surges from Category 5 Hurricane Irma damaged or destroyed approximately 95% of the structures on Barbuda. The entire power system was damaged by the Hurricane, including: the APUA power station, 150kWp solar PV plant, and approximately 95% island’s distribution network either damaged or destroyed.

TABLE 1: TROPICAL STORMS AND HURRICANES IMPACTING BARBUDA 1989-2019

Category*	Max Sustained winds (kph)	Name	Month	Year
1	120	Klaus	Oct	1990
TS	93	Iris	Aug	1995
4	213	Luis	Sep	1995
1	139	Bertha	July	1996
TS	102	Lenny	Nov	1999
1	120	Debby	Aug	2000
2	176	Earl	Aug	2010
TS	83	Maria	Sep	2011
1	130	Gonzalo	Oct	2014
5	287	Irma	Sep	2017

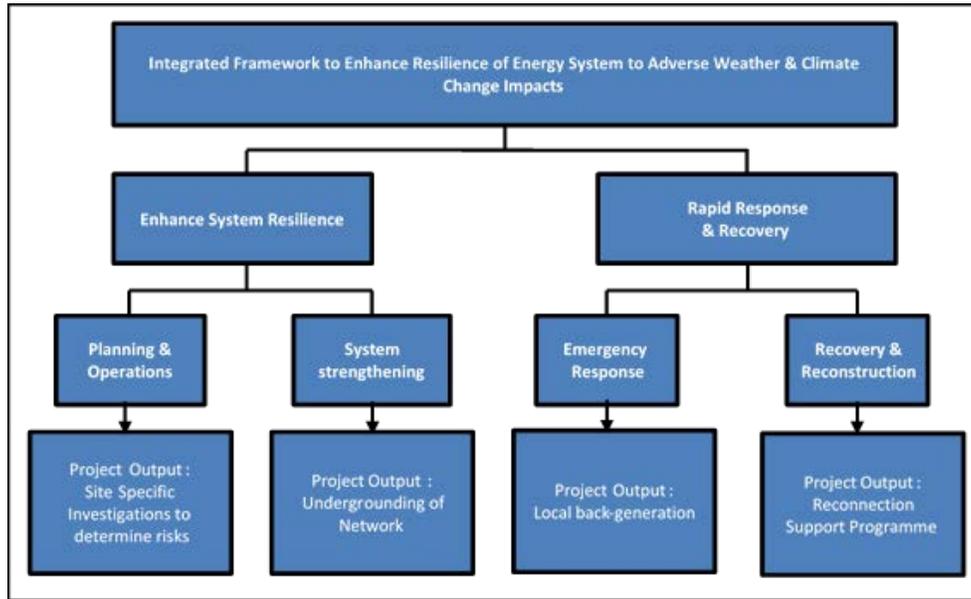
*Saffir-Simpson Hurricane Wind Scale

**TS – Tropical Storm

2. **The project aims to enhance the ability of the electricity network in Barbuda to accommodate and recover from tropical storms.** Technical analysis has focused on ‘resiliency’ as opposed to the ‘reliability’ of the network. Reliability measures that are standard in the electricity industry, for example metrics such as SAIDI, SAIFI and CAIDI, do not give a good measure of the ‘resilience’ or capability of utilities to withstand or recover from disasters. A reliable network can have elements of resilience however the impact of Irma has shown the overhead line network is extremely vulnerable to high-winds and that any reconstruction effort will be protracted.

3. The IPCC defines the act of enhancing resilience as “strengthening the ability of a system and its component parts to anticipate, prepare for, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through the preservation, restoration, or improvement of its basic structures and functions”. The project has utilized the World Bank’s *Integrated Framework to Enhance Resilience of Energy System to Adverse Weather & Climate Change Impacts* (see figure below) to identify the components best suited to enhancing the resilience of the Barbuda electricity system. The framework is aligned with *ISO 31000:2009, Risk Management—Principles and Guidelines*.

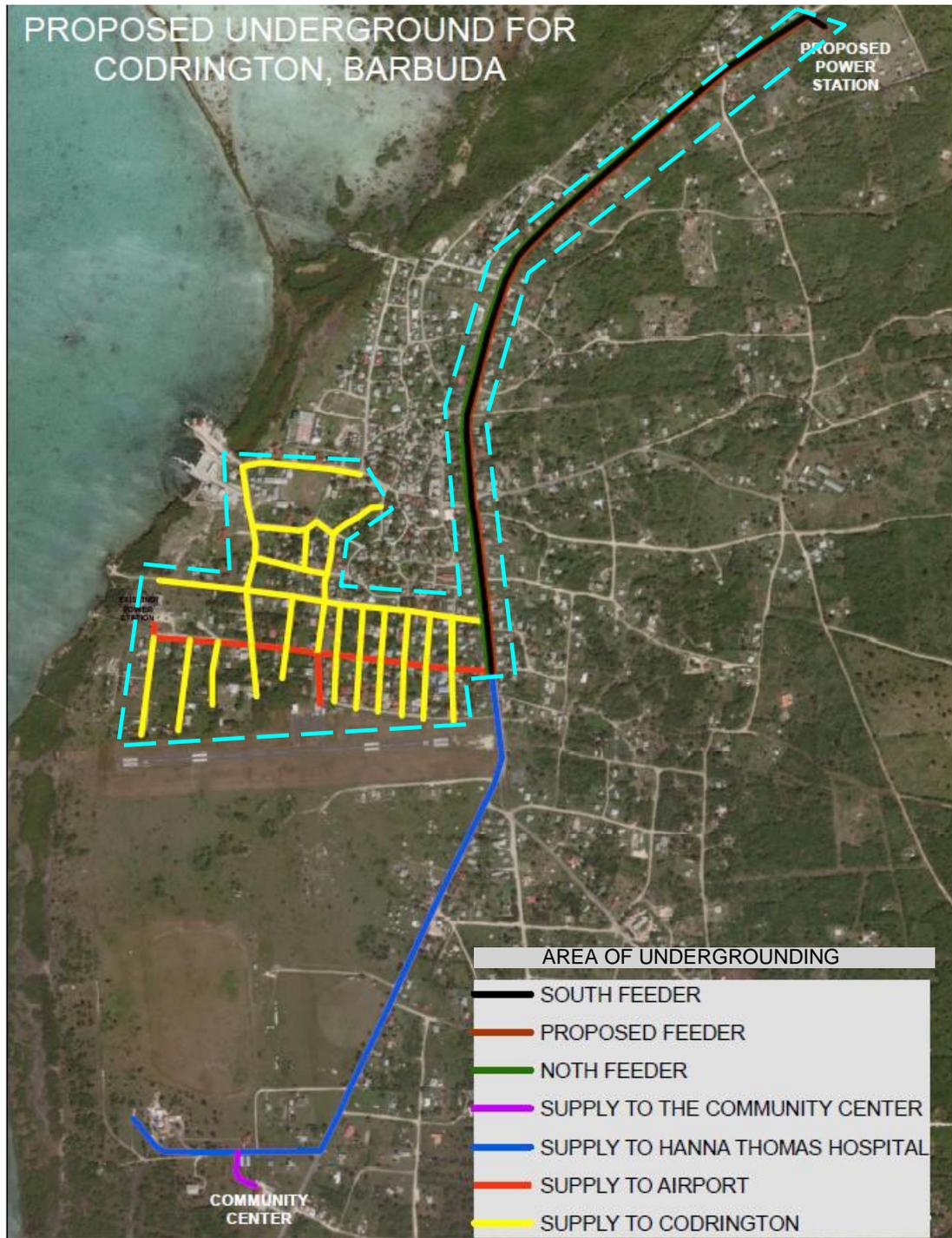
Figure 1 Integrated Framework to Enhance Resilience of Energy System to Adverse Weather and Climate Change Impacts



4. **The primary risk reduction measure is the undergrounding of the main distribution lines in the North of Barbuda.** Electricity transmission and distribution networks built to international standards are built with some level of redundancy to allow them to cope with the disruption of one network element by rerouting power, thereby reducing the time of post-disaster disruptions to consumers. Where redundancy is not possible, hardening of that network element or alternative network topologies can be used. All of APUA’s existing customers on Barbuda are currently reliant on three main 11kV OHLs (also known as “feeders” or “feeder lines”) that transmit electricity to the distribution transformers and then onto customers premises. However, the development of a new power station site to the North of Codrington to reduce the risk of storm-surge, will also mean that all three existing feeders will run south from the new site along the main road before separating to supply Codrington and the smaller loads further South (see map). Any failure during a storm to this OHL route will mean the loss of all feeders and a loss of power to all APUA customers until the reconstruction of the OHLs is complete.

5. Undergrounding of this Northern route is recommended as it presents the highest risk mitigation against tropical storm events when compared to strengthening the existing overhead line network. Recent evidence from infrastructure hardening using underground service cables, strengthened poles and aerial bundled conductors performed very well during the passing of Category 4 Cyclone Gita in 2018. The cyclone damaged 45.9% of the portions of the power grid that had not been upgraded, compared to only 4.7% of the upgraded segments of the grid. A further benefit for the network on Barbuda is the reduction of repair time presents a significant benefit to the ability of APUA to cope following a disaster by freeing up crews to focus on the lower voltage distribution lines and customer-level reconnection.

Figure 2: APUA Proposed Options for Underground Feeders on Barbuda



6. A secondary risk reduction measure is the provision of localized back-up power. There are a number of key buildings that provide critical emergency services, act as storm shelters or have been identified as key community buildings that would be utilised in the aftermath of a disaster (see table xx). A number of these buildings, such as the Barbuda hospital, are not located on the proposed undergrounding routes and/or require electricity during the storm itself when the grid will be switched off. Back-up power

to these building will address this risk, the most common option is diesel or gasoline powered back-up generation, however this has not been recommended under this project for the following reasons. First, the overarching energy strategy for Barbuda is to reduce its reliance on fossil fuels. Second, the most recent experience of Irma has shown that reliance on fuel that is trans-shipped from Antigua means that any back-up generation capability is dependent on the supply via boat from Antigua, a supply line which is itself at risk from disruption during a tropical storm event.

7. The alternative proposed for the Project is a grid-connected hybrid solar PV system that provides renewable energy generation to the grid during normal operation but is able to act as a back-up source of power during blackouts and emergency situations such as hurricane. The design approach of the hybrid solar PV systems is based on a similar intervention the CDB is undertaking with GOAB on Antigua to install hybrid solar PV systems on schools and clinics. Furthermore, all Solar PV installations will meet the CDB’s new *Climate Resilient Solar PV Guidelines* that specify the standards required by Solar PV ground mounted and roof mounted systems in-order to withstand a hurricane event like Hurricane’s Maria and Irma.

TABLE 2: LIST OF GOVERNMENT BUILDINGS IDENTIFIED FOR BACK-UP POWER SYSTEMS

Item	Description	Designated Shelter	Proposed Under Ground Feeder Supply
1	Community Center	Yes	No
2	Codrington Airport		No
3	Fisheries Complex	Yes	Yes
4	Council Administration Building		Yes
5	Police Station		Yes
6	Public Health Clinic		Yes
7	Hannah Thomas Hospital And Dental Lab		No
8	Doctor’s Residence		No
9	Nurses’ Hostel		No
10	Post Office		No
11	Sir McChesney George Secondary School		No
12	Holy Trinity School		Yes

8. **Improving the number of people who will benefit from a more resilient grid through a targeted Reconnection Support Programme.** Determining and then addressing the exact barriers to access is important if the population of Barbuda is to return to normalcy in the shortest possible time and access the full benefits of a more resilient system. The consultancy is primarily focused on identifying via a survey and stakeholder engagement process the primary barriers to reconnection. The Reconnection Support Programme itself will need to support customers meeting the APUA reconnection regulations, ensuring all electrical works are undertaken by electricians licensed to work in Antigua and Barbuda.

TABLE 3: APUA ELECTRICITY BILLED SUMMARY JANUARY 2017 VS JANUARY 2019

	Locations Billed		kWh units Billed	
	2017	2019	2017	2019
Domestic Barbuda	712	270	146,122	67,276
Government Barbuda	23	3	23,885	1,771

9. **The combined design and supervision approach for the engineering aspects of the project is proposed.** The scale of the works and the logistical difficulty of working in Barbuda mean a single consultancy covering both the site specific investigation and then the monitoring and evaluation of works has been preferred over two separate consultancies. As the route of the proposed underground cable is already known, the primary design considerations are site-specific investigations into soil type and excavation requirements along the route and determination of the appropriate cable insulation type. The technical specifications of the cable will need to meet APUA’s electrical requirements and be rated to 15kV to allow for load growth over the cables expected 40-year lifespan. Selection of the cable conductor and insulation specification will need to take into account the suitability for the Barbuda environment and the capacity of APUA to undertake repairs and maintain the cables over their lifespan. All Underground cables will need to meet IEC 60502-2 and IS 1255 Code of practice for Installation and maintenance of power cables.

10. **Grid reconstruction took over a year, with resiliency measures restricted by APUA’s limited financial resources:** GOAB report grid reconstruction reached pre-storm levels approximately 18-months after Hurricane Irma made landfall on Barbuda. The entire Barbuda population was evacuated to Antigua following the storm, however those returning to Barbuda in the months following the storm relied on back-up diesel generation. APUA’s reconstruction efforts were restricted by the budget available for reconstruction and the need to be expeditious as possible following the storm. Nevertheless some resiliency measures were undertaken including the identification of a new site for power station that is less vulnerable to storm surge; and the replacement of lower load bearing Class 3 and Class 5 poles with the marginally higher rated Class 2 poles (see Table 4 below). However, APUA note that although the overhead distribution system is marginally more resilient, compared to its pre-storm status, the ideal design would have been the undergrounding of circuits.

TABLE 4: AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDAR-05: WOOD POLE HORIZONTAL LOAD CLASSES

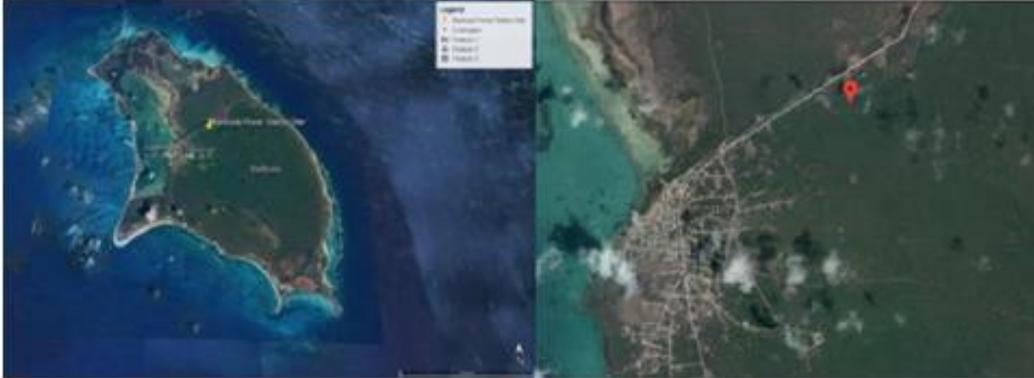
Class	Horizontal Load (lb)	Pole Use
6	1,500	Telecommunications
5	1,900	Distribution
4	2,400	
3	3,000	
2	3,700	
1	4,500	
H1	5,400	Transmission
H2-H6	6,400-11,400	

11. **Barbuda is now completely reliant on expensive fossil fuel for electricity generation.** The destruction of a 150kWp solar PV plant in Barbuda means the island is solely reliant on APUA's three operational high-speed diesel units (see Table below) and diesel fuel trans-shipped from Antigua for its electricity supply. APUA reports the fuel cost is estimated to be XCD0.9422/kWh, which is among the highest within the region.

TABLE 5: APUA INSTALLED GENERATION OPERATING STATUS.

Generator Type	Rating (kW)	Status	Generator Type	Rating (kW)	Status
CAT C-15	400	Operational	Perkins	660	Not operational
CAT 3508	650	Operational	CAT C-27	700	Not operational
CAT 3512	1500	Operational	CAT 3412	850	Not operational

APPENDIX 4.1.2 SUMMARY OF MASDAR GREEN BARBUDA PROJECT

Project Type		719 kWp ground mounted PV plant, 862kWh Li-Ion battery and 660kW of Diesel generation	
			
Figure 1: Barbuda map, site of the PV plant			
General Information			
Country	Antigua and Barbuda		
Site	North-East of Codrington, Barbuda Latitude: 17.6537450 and Longitude: -61.8036290		
Key Stakeholders	ADFD, MoFAIC, Masdar, CDF, NZ MFAT	Donors	
	Ministry of Public Utilities, Civil Aviation, Energy and Transport	Ministry representing the government of Antigua and Barbuda	
	APUA	Utility / Project Recipient and operator	
Yearly global horizontal solar radiation	2080	kWh/m ²	
Technical Information			
Land area	20,000	m ²	
PV capacity	719	kWp	
Solar yield	1,287	MWh/a	
Specific Solar yield	1,789	kWh/kWp	
BESS Capacity	862	kWh	
BESS Annual throughput	230,000	kWh/yr	
Diesel Capacity	660	kW	
Economic Information			
LCOE (25 years)	0.48	USD/kWh	

Baseline LCOE (25years; no additional PV)	0.71	USD/kWh
Electricity price (commercial customers in 2015)	0.38 ² •subsidised by government	USD/kWh
Fuel saved by renewables system	260,000	(L/yr)
Operating expense saved based on current diesel price of \$1.24/L	330,000	(USD/yr)
CO ₂ Saved	700,000	(kg/yr)

Project highlights

This project will include the construction of a new diesel baseload power station with integrated control and supply of 70kW of PV, utilizing 862 kWh of Li-Ion battery energy storage. Following commissioning, Barbuda's annual energy supply to come from renewables will be over 50%.

The Design will hold space for further generators, PV and BESS to be added in the near future as Barbuda's economic recovery continues and electrical load increases, spurred on by the Islands improved energy security and stability.

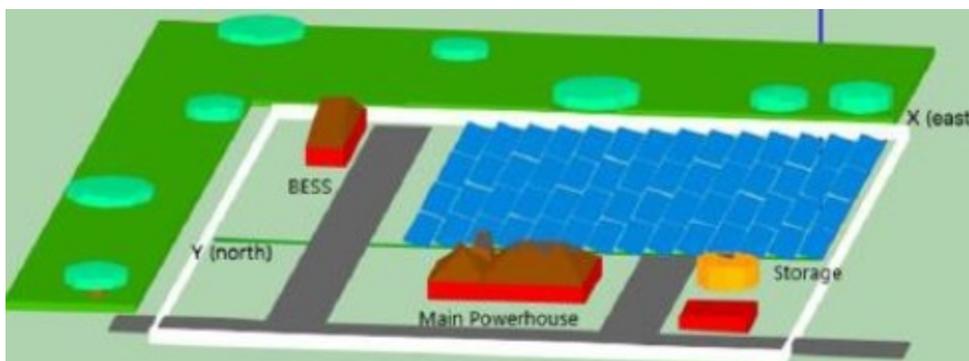


Figure 2 – Conceptual Illustration of Project

APPENDIX 4.2 **GENDER MARKER ANALYSIS**

Project Cycle Stage	Criteria	Score
Analysis 1	Consultations with relevant categories of males and females and relevant gender-related public/ private sector organisations and Non-Governmental/ Community-Based Organisations will take / have taken place	Yes
Analysis 2	Socioeconomic, Sector and/or Institutional analysis considers gender risks and/or gender disparities that impact the achievement of project outcomes.	Yes
Design 1	Project interventions / policies address existing gender disparities.	Yes
Design 2	Project objective / outcome includes the enhancement of gender equality or the design of gender-responsive policies or guidelines.	No
Implementation 1	Implementation arrangements include either: Capacity building initiatives to enhance gender mainstreaming of the executing and/or implementing agency. Or Active participation of representatives of gender-relevant stakeholders in project execution.	Yes
Implementation 2	Terms of Reference of consultancy/project coordinating unit/project management unit includes responsibilities and resources, including budgets for gender mainstreaming.	Yes
Monitoring and Evaluation 1	Sex-disaggregated data included in the baselines, indicators and targets of the RMF. Or Collection of sex-disaggregated data is part of the project.	Yes
Monitoring and Evaluation 2	At least one gender-specific indicator at the outcome and/or output level in the RMF or included in tranche releases of PBLs.	Yes

Analysis	Design	Implementation	Monitoring & Evaluation	Score	Code
1.0	0.5	1.0	1.0	3.5	Gender Mainstreamed (GM)

APPENDIX 4.3

ENVIRONMENTAL ANALYSIS

APPENDIX 4.3.1:

DRAFT ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Part A: Environmental							
Project Activities/Aspects	Potential Negative Impact	Impact Rating	Mitigation Measures	Responsibility	Monitoring indicators	Monitoring frequency	Monitoring officer
Digging of trenches	<ul style="list-style-type: none"> • Dust • Noise and vibration • Disturbance of residents • Obstruction of traffic flow • Trip/slip/fall 	<ul style="list-style-type: none"> • Moderate • Moderate • Moderate • Moderate • Low 	<ul style="list-style-type: none"> • Wetting to reduce dust, • Start early by 6:30 a.m. to avoid conflict with residents • Target off peak traffic period; • Kit workers with PPE/safety; • Road signs and barricades; • HSE training with PPE kits /Clear refuse frequently 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • Air quality/HSE plan 	<ul style="list-style-type: none"> • Daily 	<ul style="list-style-type: none"> • Engineering Supervising Consultant's Safe guards Officer
Installation of transformers, switches, conductors and conduits	<ul style="list-style-type: none"> • Trip/slip/fall • Disturbance of roadside traders. • Traffic obstruction • Obstruction of road shoulder with rubbish • Workers and pedestrians exposed to electrical shocks 	<ul style="list-style-type: none"> • Moderate • Moderate • Moderate • Low • Low • Low • Low 	<ul style="list-style-type: none"> • Kit workers with relevant PPE, cover man holes and trenches with slabs so that residents can safely access their homes • Work at off peak (traffic) periods • Install road blocks/road signs; • PPE and HSE training • Promptly haul drainage debris off road shoulders 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • Air quality/HSE plan 	<ul style="list-style-type: none"> • Daily 	<ul style="list-style-type: none"> • Engineering Supervising Consultant's Safe guards Officer

Part B: Social and Gender							
Project Activities/Aspects	Potential Negative Impact	Impact Rating	Mitigation Measures	Responsibility	Monitoring indicators	Monitoring frequency	Monitoring officer
During design, excavation and installation	Access to project areas and related project information and related potential negative impacts on households, public service users and economic/commercial sites.	• Moderate	(a) Undertake excavation and installation on a phased basis to reduce protracted obstructed access to households, public services and businesses. (b) Develop, implement and monitor a Stakeholder Engagement Plan with Grievance Redress Mechanism and clear communication strategies; (c) Establish and coordinate formal CPGs for each project location/site consisting of representatives of schools, residents, businesses, contractor as well as the APUA ^{1/} to manage information flow between project implementers and	• APUA • Contractor • Engineering/Supervision Firm	(a) Works Implementation Plan and Project Progress Reports (b and c) SEP developed, SEP Reports and Project Progress Reports	(a) Daily or other appropriate timeframe based on implementation plans (b) Monthly or other appropriate timeframe based on implementation plans	• Project Coordinator (PC) • Social Development Specialist (SDS) • Contractor • Engineering/Supervision Consultant's Safe guards Officer
During design, excavation and installation	Gender-based Risks on Work Sites in male dominated construction sector. ^{2/}	• Moderate	Provide social inclusion and gender sensitisation training of APUA, Barbuda Council, contractors and construction workers to manage the gender-based risks identified as part of contractual requirements.	• APUA • Contractor • Engineering/Supervision Firm	• Training Plan, Training Reports and Project Progress Reports	• Workshops prior to commencement of works	• PC • SDS • Contractor • Engineering/Supervision Consultant's Safe guards

^{1/} APUA's project coordinator and social development specialist will ensure that CPGs are inclusive, adequately represents the various groups of persons in project areas such as by sex (males/females), youth, disability status (disabled *vis* non-disabled), residential location, and business/community group represented. Prior to commencement of works, the APUA will brief the CPG on the works. The frequency of meetings and procedures for conducting meetings, documenting discussions held and decisions taken must be outlined. The CPGs will: (a) keep communities informed on matters related to implementation including unexpected inconveniences; and (b) facilitate the reporting of concerns from communities to the APUA. An appointed social development specialist will coordinate the CPG, as well as develop and monitor a Stakeholder Engagement Plan inclusive of communication strategies.

^{2/} Risks identified include but are not limited to commercial/transactional sex, alcohol and drug use, sexually transmitted diseases like HIV/AIDS, and managing gender relations/conflict resolution.

Project Activities/Aspects	Potential Negative	Impact Rating	Mitigation Measures	Responsibility	Monitoring indicators	Monitoring frequency	Monitoring
During design, excavation and installation	Inaccessible infrastructure for PWDs.	• Moderate	Ensure the design, excavation and installation works incorporate universal design criteria to accommodate physical access for PWDs in project areas.	•APUA •Contractor Engineering/ Supervision Firm	•Works Implementation Plan with universals Design consideration including ramps, and Project Progress Reports	•Daily during works (post-design)	•PC •SDS •Contractor •Engineering/ Supervision Consultant's Safe guards Officer
During design, excavation and installation	Employment opportunities at the community level for women, youth, disabled persons and other poor	• Moderate	(a) Develop a register of persons with the relevant skills to encourage the employment of poor and vulnerable groups and small businesses identified at the community level. Key Vulnerable Actors: women, youth, and PWDs. (b) Incorporate strategies to actively support gender-sensitive promotion of opportunities; use of childcare friendly schedules; and facilities at work sites such as toilets for males and females.	•APUA •Contractor Engineering/ Supervision Firm	(a) Develop Register based on secondary and primary research conducted by SDS, engage project stakeholders regarding employment opportunities ; and Project Progress Reports (b) ESMP reporting section of Project Progress Reports	(a) Mobilisation and execution prior to commencement of works. Monthly or other appropriate timeframe based on implementation plans	•PC •SDS •Contractor •Engineering/ Supervision Consultant's Safe guards Officer

APPENDICES TO CHAPTER 5 - RISK ASSESSMENT AND MITIGATION

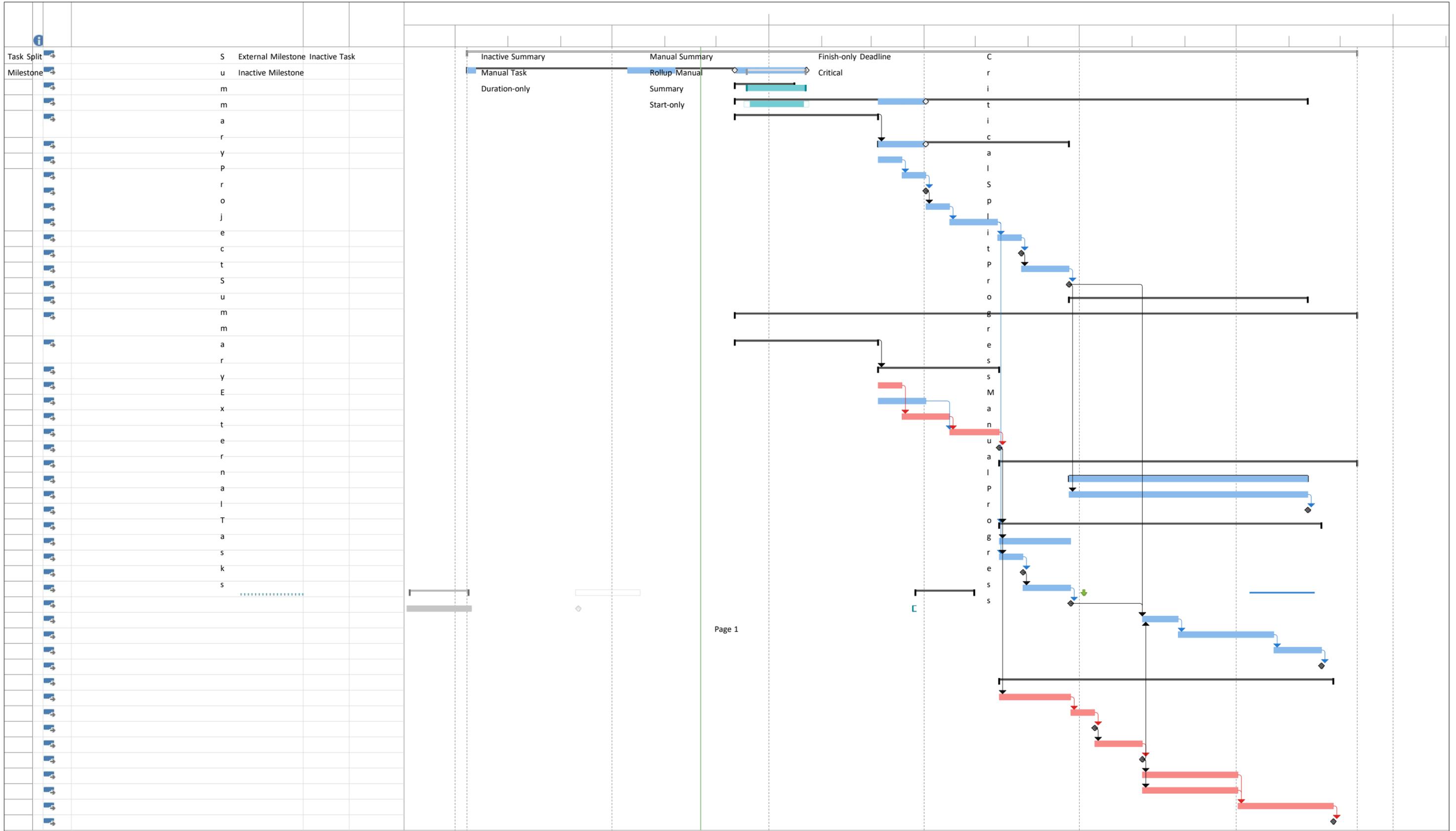
There are no appendices related to Chapter 5 (Risk Assessment and Mitigation)

APPENDICES TO CHAPTER 6 - IMPLEMENTATION AND PROJECT MANAGEMENT

APPENDIX 6.1

PROJECT IMPLEMENTATION SCHEDULE

ID	Task Mode	Task Name	Duration	Start	Jun	Qtr 3, 2019			Qtr 4, 2019			2020 Qtr 1, 2020			Qtr 2, 2020			Qtr 3, 2020			Qtr 4, 2020			2021 Qtr 1, 2021
						Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
0		Barbuda Energy Resilience Project	374 days?	Mon 7/8/19																				
1		1 CDB Grant Approvals Process	143 days	Mon 7/8/19																				
9		2 Project Management Arrangements	25 days	Thu 12/12/19																				
16		3 Preparation and Supervision of RSP	240 days	Thu 12/12/19																				
17		3.1 Procurement of Preparation and Supervision Consultant	60 days	Thu 12/12/19																				
23		3.2 Preparation of RSP Consultancy	80 days	Thu 3/5/20																				
24		3.2.1 Reconnection Support Programme Design	2 wks	Thu 3/5/20																				
25		3.2.2 Review of RSP Design by APUA	2 wks	Thu 3/19/20																				
26		3.2.3 Acceptance of RSP Design by APUA	0 days	Wed 4/1/20																				
27		3.2.4 Preparation Bidding Documents	2 wks	Thu 4/2/20																				
28		3.2.5 Invite Bids	4 wks	Thu 4/16/20																				
29		3.2.6 Evaluation of Bids	2 wks	Thu 5/14/20																				
30		3.2.7 Award of contract	0 days	Wed 5/27/20																				
31		3.2.8 Contract negotiation	4 wks	Thu 5/28/20																				
32		3.2.9 Contract Signed	0 days	Wed 6/24/20																				
33		3.3 Supervision of RSP	100 days	Thu 6/25/20																				
36		4 Engineering Design and Supervision and Monitoring Consultancy	261 days?	Thu 12/12/19																				
37		4.1 Procurement of Engineering Design, Supervision and Monitoring Consultant	60 days	Thu 12/12/19																				
43		4.2 Engineering Design	51 days	Thu 3/5/20																				
44		4.2.1 Preparation of Inception Report	2 wks	Thu 3/5/20																				
45		4.2.2 Environmental and Social Impact Assessment	4 wks	Thu 3/5/20																				
46		4.2.3 Climate Vulnerability Assessment	4 wks	Thu 3/19/20																				
47		4.2.4 Preparation Bidding Documents	4.2 wks	Thu 4/16/20																				
48		4.2.5 Invite Bids (Limited international Bidding process)	0 days	Thu 5/14/20																				
49		4.3 Engineering Supervision	150 days?	Fri 5/15/20																				
53		5 Reconnection Support Programme (RSP)	100 days	Thu 6/25/20																				
54		5.1 Implementation of Reconnection Support Programme	20 wks	Thu 6/25/20																				
55		5.2 Practical completion of RSP	0 days	Wed 11/11/20																				
56		6 Hybrid Solar Systems	135 days	Fri 5/15/20																				
57		6.1 Preparation of Bids	6 wks	Fri 5/15/20																				
58		6.2 Evaluation of Bids	2 wks	Fri 5/15/20																				
59		6.3 Award of contract	0 days	Thu 5/28/20																				
60		6.4 Contract negotiation	4 wks	Fri 5/29/20																				
61		6.5 Contract Signed	0 days	Thu 6/25/20																				
62		6.6 Design Phase	3 wks	Fri 8/7/20																				
63		6.7 Shipment Phase	8 wks	Fri 8/28/20																				
64		6.8 Installation Phase	4 wks	Fri 10/23/20																				
65		6.9 Practical Completion of HSS	0 days	Thu 11/19/20																				
66		7 Undergrounding of Distribution Network	140 days	Fri 5/15/20																				
67		7.1 Limited International Bidding Process (Goods and Wo	6 wks	Fri 5/15/20																				
68		7.2 Evaluation of Bids	2 wks	Fri 6/26/20																				
69		7.3 Award of contract	0 days	Thu 7/9/20																				
70		7.4 Contract negotiation	4 wks	Fri 7/10/20																				
71		7.5 Contract Signed	0 days	Thu 8/6/20																				
72		7.6 Delivery of Goods to Antigua and Barbuda	8 wks	Fri 8/7/20																				
73		7.7 Mobilisation of Contractor (works)	8 wks	Fri 8/7/20																				
74		7.8 Implementation Period	8 wks	Fri 10/2/20																				
75		7.9 Practical Completion of works	0 days	Thu 11/26/20																				



APPENDIX 6.2

ESTIMATED QUARTERLY DISBURSEMENT SCHEDULE

ESTIMATED QUARTERLY DISBURSEMENT SCHEDULE

Year	Quarter	OSF-GBP	Finance Charges	Total	Cumulative
2019	2019 - Q4	2,500	-	2,500	2,500
Sub-total		2,500	-	2,500	2,500
2020	2020 - Q1	30,550	-	30,550	33,050
	2020 - Q2	676,917	-	676,917	709,967
	2020 - Q3	1,071,265	-	1,071,265	1,781,232
	2020 - Q4	1,068,768	-	1,068,768	2,850,000
Sub-total		2,847,500	-	2,847,500	2,850,000
Total		2,850,000	-	2,850,000	2,850,000

APPENDIX 6.3

PROCUREMENT PLAN

All Estimated Costs Are In USD

A. General

1. Project Information

Country: Antigua and Barbuda
Borrower: Government of Antigua and Barbuda
Project Name: Reconstruction and Rehabilitation Grant - Barbuda Energy Resilience Project

Executing Agency: Antigua Public Utilities Authority

2. Bank's Approval Date of the Procurement Plan: December 16, 2019

3. This Procurement Plan is valid until: December 31, 2020

4. Prior Review Thresholds: Procurement decision subject to prior review by the Bank.

5. Reference to relevant Procurement Guidelines

- CDB's Guidelines for Procurement (2006)
- CDB's Guidelines for the Selection and Engagement of Consultants by Recipients of CDB Financing (2011)
- Other
- CDB's Guidelines for Procurement (2006) and CDB's Guidelines for the Selection and Engagement of Consultants by Recipients of CDB Financing (2011) subject to the exceptions to those guidelines approved under CDB's DiMSOG (2009).

6. Any Other Special Procurement Arrangements

- The Project will require a waiver of the Bank's Procurement Policy and Procedures for Projects Financed by CDB (November 2019), to permit the application of paragraphs 4.45 and 4.46 of CDB's Disaster Management Strategy and Operational Guidelines (DiMSOG, 2009)

7. Procurement Waivers

Procurement Waivers

B. Goods Works and Non-Consulting Services

Ref No.	Contract (Description)	Estimated Cost	Procurement Method	Prequalification (Yes/No)	Review by Bank (Prior/Post)	Expected Bid-Opening Date	Comments
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C. Consulting Services

Ref No.	Assignment (Description)	Estimated Cost	Selection Method	Review by Bank (Prior/Post)	Expected Proposal Submission Date	Comments
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D. Procurement Capacity Building activities for the Implementing/Executing Agency

- Capacity building for APUA is delivered via the contract for Design and Supervision of the Re-connection Support Programme. This Technical Assistance component will deliver a survey of households on Barbuda to collect sex aggregated data and determine the most vulnerable households that require re-connection. This consultancy will utilise this data to provide social inclusion and gender sensitization training for project contractors and APUA Barbuda staff.

E. Summary of Proposed Procurement Arrangement

Project Components / Contracts	CDB ('000)					NBF ('000)		Total Cost ('000)
	ICB	ICS	LIB	QCBS	Shopping	Counterpart	Co-Financing	
Infrastructure Works	-	-	-	-	-	-	-	1,162
Civil Works for the Undergrounding of Feeders	-	-	-	-	-	-	-	1,101
Electrical Works for the implementation of the Re-connection Support Programme	-	-	-	-	-	-	-	61
Engineering and Construction- related Services	-	-	-	-	-	-	-	173
Engineering Supervision Consultant	-	-	-	-	-	-	-	173
Goods	-	-	-	-	-	-	-	1,422
Goods for the Undergrounding of Feeders	-	-	-	-	-	-	-	717
Hybrid Solar Systems on Key Public Buildings	-	-	-	-	-	-	-	705
Capacity Building	-	-	-	-	-	-	-	118
Consultancy service for the preparation and monitoring of the Reconnection Support Programme (RSP)	-	-	-	-	-	-	-	118
Project Management	-	-	-	-	-	-	-	10
Procurement Support Specialist	-	-	-	-	-	-	-	10
Summary Costs	-	-	-	-	-	-	-	2,885

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

Goods, Works and Non-Consultancy Services

- NCB - National Competitive Bidding
- ICB - International Competitive Bidding
- RCB - Regional Competitive Bidding
- LB - Limited Bidding
- DS - Direct Selection
- FA - Force Account
- CP - Commercial Practices
- APA - Alternative Procurement Arrangements
- NBF - Non-Bank Financed
- Other

Consultancy Services:

- QCBS - Quality and Cost-Based Selection
- QBS - Quality-Based Selection
- FBS - Fixed Budget Selection
- LCS - Least-Cost Selection
- CQS - Consultants' Qualification Selection
- DS - Direct Selection
- CP - Commercial Practices
- APA - Alternative Procurement Arrangements
- ICS - Individual Consultants Selection
- NBF - Non-Bank Financed
- Other (as above)

APPENDIX 6.4

PROJECT MANAGEMENT DUTIES AND RESPONSIBILITIES

APPENDIX 6.4.1

DUTIES OF THE PROJECT COORDINATOR

The PC will be responsible for coordinating and monitoring all aspects of the implementation of the Project. Additional administrative, technical and clerical support will be provided by the Electrical Business Unit of APUA on Barbuda. The PC's duties will include, but will not be limited to:

- (a) preparation and submission to GOAB and CDB of work plans for the Project;
- (b) Monitoring and Evaluation (M&E) of the Project, in a manner consistent with the Project's M&E Framework;
- (c) submission to GOAB and CDB of Consultant's Reports;
- (d) supervision of all components, including ensuring that activities and procurement schedules are carefully planned and executed and that there is adherence to CDB's procurement procedures;
- (e) develop close working relationships with all project participants and stakeholders to achieve a shared vision of the Project and its objectives;
- (f) representation of APUA in all its dealings with all consultants, suppliers and contractors;
- (g) submit to CDB, quarterly reports on the investment cost of the Project in the format shown in the "Project Coordinator - Quarterly Reporting Requirements" presented in CDB's Appraisal Report or in such form or forms as may be specified by CDB within four weeks after the end of each quarter, commencing with the quarter following PC's assignment;
- (h) expedition of the submission to CDB of claims for disbursement/reimbursement with regard to all components financed from the Loan;
- (i) control the budget and introduce safeguards acceptable to CDB to prevent funds and assets misuse;
- (j) keep accounts on project-related expenditure and disbursement activities;
- (k) organise advertisement for, and assist, in the selection and engagement of the various consultants;
- (l) ensure that all contractual obligation are adhered to and make all necessary arrangements to ensure implementation meets projected targets; and
- (m) liaise with CDB on all relevant technical, financial and administrative aspects of the Project; and
- (n) submit to CDB [within three (3) weeks after the end of each month], the monthly reports prepared by the engineering consultants on the progress of the works.

APPENDIX 6.4.2

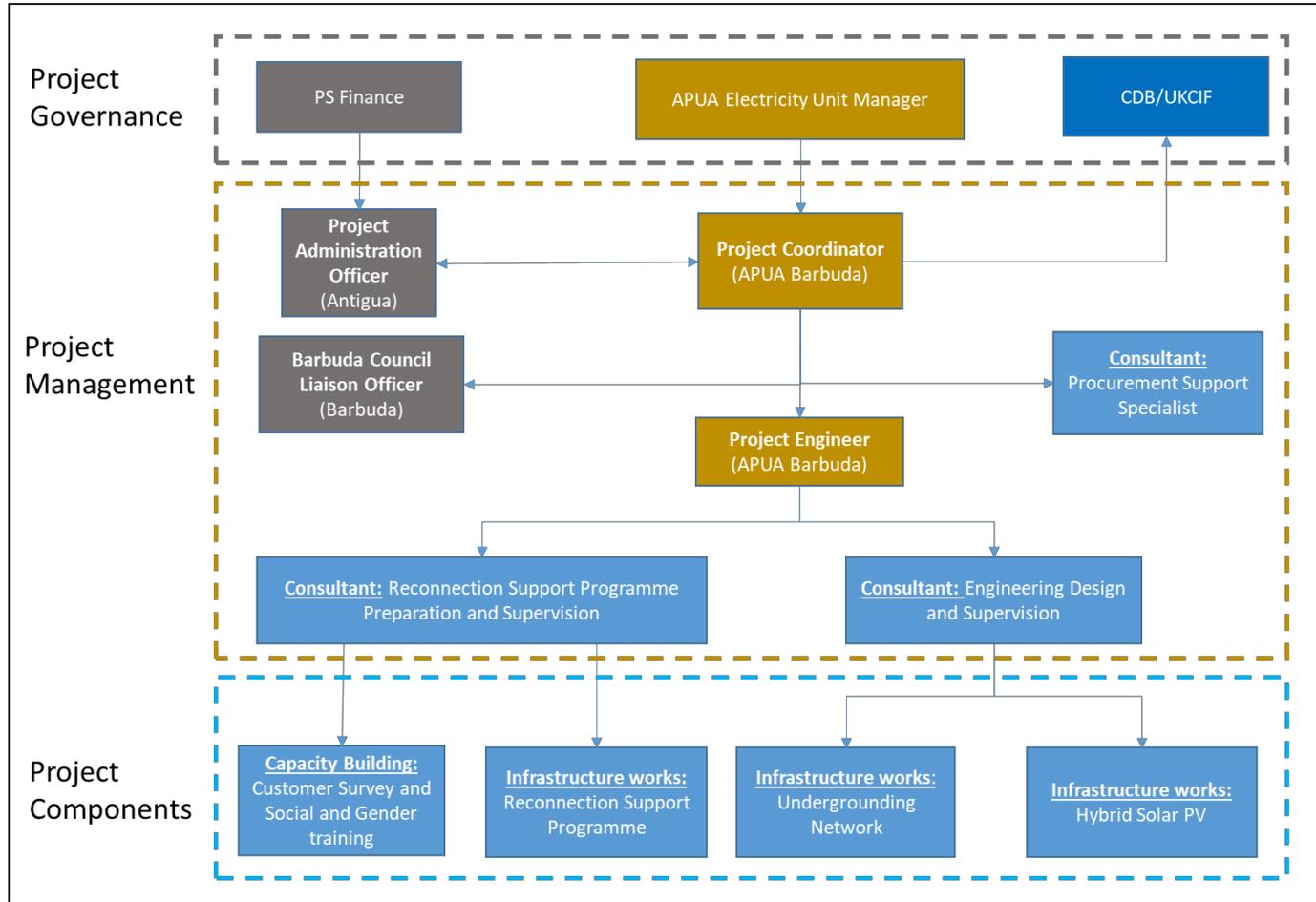
DUTIES OF THE PROJECT ENGINEER

1. The PE will report to the PC and will mainly be responsible for oversight of the installation crews installing the underground cables and other ancillary works required to complete the project. His/her duties will include, but will not be limited to:

- (a) planning, scheduling and coordinating installation activities;
- (b) assisting PC in the preparation of procurement documents;
- (c) directing and supervising the day-to-day technical operations of the Project, guided by the project documents and the Installation Work Plans;
- (d) Certifying any invoices from the contractor or supplier meet the technical requirements specified in the relevant bidding documents or other standards acceptable to APUA.
- (e) advising PC on technical aspects and costs variations;
- (f) liaising with the engineering consultant for technical support during installation;
- (g) ensuring adherence to the ESMP by the contractors;
- (h) Assisting the PC, with monthly reports on the progress of installation activities;
- (i) assisting PC with the preparation and submission of a Project Completion Report by the deadline specified in the Reporting Requirements contained in CDB's Appraisal Report; and
- (j) any other duties assigned by PC.

APPENDIX 6.4.3

PROJECT ORGANISATION CHART



APPENDIX 6.4.4

DUTIES OF THE BARBUDA COUNCIL LIAISON OFFICER

The BCLO will be responsible for assisting the PC with engaging with the Barbuda community and assisting the PC with the implementation of the Project. The BCLO will provide a point of contact for the Barbuda Council. The BCLO's duties will include, but will not be limited to:

- (a) assisting the PC to develop close working relationships with all project participants and stakeholders to achieve a shared vision of the Project and its objectives;
- (b) representation of the Barbuda Council in meetings with consultants, suppliers and contractors; and
- (c) support the PC and consultants in undertaking surveys by assisting with stakeholder engagement and organisation of public consultations.

APPENDIX 6.4.5

DUTIES OF THE PROJECT ADMINISTRATION OFFICER

The PAO will be responsible for assisting the PC with processing of disbursement claims and administrative requirements of the project that require processing by the Ministry of finance in Antigua. The PAO's duties will include, but will not be limited to:

- (a) assist the PC with submission to GOAB and CDB of Consultant's Reports;
- (b) assist the PC with ensuring that activities and procurement schedules are carefully planned and executed and that there is adherence to CDB's procurement procedures;
- (c) assist the PC with submission to CDB, of the PC's quarterly reports on the investment cost of the Project in the format shown in the "Project Coordinator - Quarterly Reporting Requirements" presented in CDB's Appraisal Report or in such form or forms as may be specified by CDB within four weeks after the end of each quarter, commencing with the quarter following PC's assignment;
- (d) assist the PC with the expedition of the submission to CDB of claims for disbursement/reimbursement with regard to all components financed from the Loan;
- (e) keep a record of project-related disbursement activities; and
- (f) assist the PC with the organisation of advertisements for, and assist, in the selection and engagement of the various consultants.

APPENDIX 6.4.6

DRAFT TERMS OF REFERENCE **CONSULTANCY SERVICES** **PROCUREMENT SUPPORT SPECIALIST**

1. INTRODUCTION

1.1 Barbuda and its electricity system were extensively damaged during Hurricane Irma which served a censal population of 1,634 persons, before the hurricane's passage. On September 6, 2017, 257km/h winds and storm surges from Category 5 Hurricane Irma damaged or destroyed approximately 95% of the structures on Barbuda (see Table 1). The entire power system was damaged by the Hurricane, including: the Antigua Public Utilities Authority (APUA) power station, 150kWp solar PV plant, and approximately 95% of island's distribution network was either damaged or destroyed.

1.2 APUA is the sole generation, transmission and distribution utility in Antigua and Barbuda. APUA owns transmission, sub-transmission and distribution facilities on both islands of Antigua and Barbuda. On Barbuda the distribution system voltages range from 6.6 kV to 11 kV with customers supplied by an overhead line network reconstructed following the 2017 hurricane.

1.3 The proposed project aims to support and complement the ongoing investment in grid reconstruction and renewable energy generation by addressing the remaining issues with regard to customer reconnection delays, vulnerabilities of the overhead lines in the distribution system, and the lack of sustainable emergency back-up supply requirements of the Barbuda Council. The project will also identify the feasibility of incorporating additional renewable energy sources, like wind, into a more resilient grid.

1.4 The benefits of the project approach are: (1) increased access to electricity services for the people of Barbuda; (2) Economic co-benefits by off-setting Government's energy budget from the energy consumption on Government buildings, (3) resilient electricity network for the wider Codrington area; and (4) low-carbon back-up generation capacity for essential community services.

2. OUTCOME

2.1 The expected outcome of the consultancy is the provision of advisory services to APUA to support them in expediting the necessary procurement activities under Barbuda Energy Resilience Project in accordance with CDB's Procurement Guidelines.

3. SCOPE OF SERVICES

3.1 The Consultant shall:

- (a) Procurement Planning: support the development of appropriate procurement arrangements and plan for project execution; and
- (b) Procurement Implementation: advice/support to
 - i) develop bidding documents
 - ii) evaluation exercises and development of evaluation report
 - iii) negotiations and contract award
 - iv) contract management issues

4. QUALIFICATIONS AND EXPERIENCE

4.1 Prospective Consultant should have a minimum of the following qualifications and experience:

- (a) hold relevant higher qualification in procurement, logistics, finance, accounting, or similar qualification. Preferably will hold a recognised procurement qualification;
- (b) at least ten (10) years' experience in the field of procurement, specifically in the context of MDBs or equivalent;
- (c) Transactional procurement and procurement advisory/consultancy experience, including on infrastructure projects;
- (d) ability to prepare and provide procurement training and capacity building, particularly in the context of low capacity environments;
- (e) ability to provide high quality technical advice and to prepare guides and manuals

5. DURATION

5.1 The assignment is expected to be completed over a 2-month period with the consultant providing input as required. The Consultant should budget for 12 and a half working days over this period.

6. REPORTING

6.1 Direct supervision of the consultant will be carried out by APUA. A Project Coordinator (PC) will be assigned from within APUA and will have day-to-day responsibility for project coordination, coordinating all meetings of the consultants with the various stakeholders, monitoring adherence to the implementation schedule, monitoring performance criteria and generally ensuring compliance with the various conditions associated with the funding. Delay or changes in scheduling and overall scope of work must be brought to the attention of PC as soon as reasonably practical. Where approval is required, a written request must be made by the Consultant and approval obtained, prior to the commencement of any related action. All consultants' reports will be submitted to the PC for the necessary distribution to the various stakeholders for review.

7. FINANCIALS

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

APPENDIX 6.5 **PROJECT ORGANISATION CHART**

APPENDIX 6.6 **IMPLEMENTATION SUPPORT PLAN**

APPENDIX 6.7 **DISBURSEMENT**

APPENDIX 6.8 **PROCUREMENT**

APPENDIX 6.9 **REPORTING REQUIREMENTS**

APPENDIX 6.9.1

PROJECT COORDINATOR - QUARTERLY REPORTING REQUIREMENTS

The required format for the Quarterly Progress Report follows:

QUARTERLY PROGRESS REPORT – FOR THE PERIOD [INSERT DATE]

1. EXECUTIVE SUMMARY

- (a) Summary statement describing progress on planned activities:
 - (i) Summary tables showing actual vs planned progress on key indicators of success.
 - (ii) Charts of cumulative actual disbursements against contract schedule.
 - (iii) Employment numbers (cumulative and for reporting period) by nationality - local/regional/international; age; sex (male/Female).
- (b) Summary of Key issues/ challenges faced (across project components) and any success stories
- (c) Lessons learned (what has worked well and/or what needs to be adjusted)

2. DETAILED PROGRESS UPDATE

- (a) Provide a narrative report setting out progress over the reporting period, linking this to the agreed work plan. Analyse and discuss what has gone to plan, identify any set-backs and set out how they will be addressed. Set out planned activities for the next quarter.

Project Component	Status/ Activities Completed	Issues/ Challenges	Activities Proposed For Next Quarter	1. On track 2. At Risk of slippage 3. Behind Schedule
Procurement				
Physical works				
Community Engagement/ Stakeholder Consultation				
Capacity Building				
Land acquisition				

3. RISKS/ISSUES

- (a) Provide updated risk and issues register. Discuss issues/risks and steps that are being done to address/minimise the impact of these on project delivery. A full risk register should be included as an Appendix using the format provided.
- (b) Report on any changes in external policies, politics, social or physical environment that may affect project's progress in coming months; include any plans for mitigation. Possible categories are:

- (i) Budgetary/Local counterpart funds
- (ii) Legal/Regulatory
- (iii) Procurement
- (iv) Macroeconomic/ Political
- (v) Project Design/Assumptions
- (vi) Performance - Supervision (CDB responsiveness)
- (vii) Performance - Supplier/Consultant/Contractor
- (viii) Land acquisition/ resettlement
- (ix) Monitoring and Reporting Systems (example, if too burdensome)
- (x) Disaster Risk / Adverse Events

4. SOCIAL AND ENVIRONMENTAL SAFEGUARDS

- (a) Discuss progress on implementing Relocation/ Resettlement Plans/ land acquisition
- (b) Report on ESMP - Discuss any incidents arising from the works and actions taken/instruction issued to deal with them. This should cover:
 - (i) Pollution prevention, control and management
 - (ii) Toxic and hazardous substances control and management
 - (iii) Critical natural habitats, biodiversity and ecosystem services
 - (iv) Cultural property and heritage
 - (v) Directly affected communities
 - (vi) Vulnerable groups
 - (vii) Land acquisition and involuntary resettlement
 - (viii) Community / worker health and Safety
- (c) Record of all community/worker health and safety incidents and any actions that have been taken. Highlight of any incidents that have occurred which are not included in the Contractor's Health and Safety log.
- (d) Discussion on the grievance mechanism process and implementation, including types of complaints received, and actions taken.

5. FINANCIAL REPORT

- (b) Provide a financial report setting out actual and forecasted expenditure, with each contract having its own budget line. There should be a clear distinction between what is paid through the United Kingdom Caribbean Infrastructure Fund grant, through a Caribbean Development Bank loan (if applicable) and by the implementing government. Accompanying narrative should include status of current/active contracts; progress on planned expenditure and budgets; and explanation of variations in excess of 10%.

Component	Expenditure in current month	Cumulative expenditure to date	Variance on planned expenditure (cumulative)	Comments/Reasons for Variance and/or Proposal to Meet Overrun
Total				
UKCIF Grant				
CDB Loan				
Government				

6. REVISED WORK PLAN

- (c) Present updates to planned work for next quarter and to end of project if applicable (and attach updated Gantt chart)

7. REPORTING AGAINST THE PROJECT RESULTS MONITORING FRAMEWORK

- (d) This section will require reporting against set indicators – to be provided.

8. APPENDICES

- (a) Excel Workbook (updates on key indicators in prescribed format)
- (b) Consultant monthly report
- (c) Supervising Consultant monthly report
- (d) Summary programme – Updated Gantt Charts
- (e) Incident analysis- Safety on site; Feedback from affected populations; Reports on consultations, etc.
- (f) Project risk register (covering all other project activities)
- (g) Current issues register
- (h) Report on Investment Costs
- (i) Photographs showing status/ progress on various project components