PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC3412

Project Name	Energy Resilience for Climate Adaptation (P149522)
Region	LATIN AMERICA AND CARIBBEAN
Country	Belize
Sector(s)	General energy sector (100%)
Theme(s)	Climate change (100%)
Lending Instrument	Investment Project Financing
Project ID	P149522
GEF Focal Area	Climate change
Borrower(s)	Government of Belize
Implementing Agency	Ministry of Energy, Science and Technology, and Public Utilities
Environmental Category	B-Partial Assessment
Date PID Prepared/ Updated	22-Jan-2014
Date PID Approved/ Disclosed	24-Jan-2014
Estimated Date of Appraisal Completion	01-Oct-2014
Estimated Date of Board Approval	30-Apr-2015
Concept Review Decision	Track I - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

Belize is a lower middle income country with a population of about 350,000 people and an approximate GDP of $4,600 per capita. The country's economy relies primarily on agriculture and agroindustries, tourism, fisheries, logging and some oil production. Growth is now beginning to rebound after several years of stagnation and adjustment; but the recovery remains fragile. According to the IMF, GDP growth was 1.9% in 2011, rising to 5.3% in 2012 despite a fall in oil and fruit exports, and projected at 2.5% for 2013. In March 2013, the Government of Belize (GoB) exchanged its "super-bond" debt for US$ denominated bonds, which provides near-term debt service relief, but fiscal pressures still continue due to public sector wage increases, public investment programs and the continuing litigation regarding the nationalization of the telecommunication and electricity distribution companies.

Belize has been ranked 8th from 167 countries for climate risk by the World Bank; and the United

Nations Framework Convention on Climate Change (UNFCCC) has identified that the country is among the most vulnerable to the adverse impacts of climate change (GOB, 2002). Its economy and people's wellbeing are already bearing the cost of past catastrophes, and is vulnerable to what are likely to become more frequent and intense adverse weather related events in the future. Hurricane Keith in 2000 caused damage exceeding 45 percent of GDP, while Hurricane Iris in 2001 submerged Belize City in storm surges that resulted in damages estimated at 25 percent of GDP. Tropical Storm Arthur in 2008 also caused extensive damage to critical infrastructure as well as the agriculture sector . In fact, recovering from many of these past losses has contributed to the GoB's fiscal woes, where the debt-to-GDP ratio still remains at a concerning 80 percent; and the fiscal situation has constrained the GoB's ability to make necessary investments to enhance the country's resilience.

Reversing this trend and incorporating the latest cutting edge techniques and approaches to climate resilience will be essential in order to maintain Belize's fragile economic recovery; and better withstand and recover from the future extreme weather conditions that are likely to be exacerbated by climate change effects. With 55 percent of the population recognized in the World Bank's Country Partnership Strategy (CPS) as being either poor or susceptible to falling into poverty, climate change is sure to further test the resilience of Belize in the future.

Sectoral and Institutional Context

Underinvestment in new infrastructure and maintenance of existing assets (including upgrading) are key constraints to achieving sustained growth in Belize, and it also increases the vulnerability to natural disasters. Investments in energy are also important, especially electricity infrastructure, in order to ensure adequate power supply that can be reliably transported through resilient transmission and distribution systems.

Belize's energy system has a total domestic installed power generation capacity of 97 MW, with additional capacity of up to 50 MW available from Mexico. 55.5 MW of total domestic capacity is hydro-based and 13 MW (representing 12% of the total electricity consumed) come from combustion of sugar cane bagasse (biomass), which has off-setting seasonality with hydropower availability and partly addresses reliability concerns due to drought conditions and changing rainfall patterns . The peak electricity demand is about 80 megawatts (MW) with power consumption growing at an average of over five percent per year. Imported Mexican electricity costs 22 US cents/kWh compared with about 11 US cents/kWh for available domestic hydro and biomass based supply.

Due to climate change, Belize is beginning to experience adverse changes in rainfall patterns; increasing and volatile temperatures; more intense hurricanes; and potential for coastal flooding from storm surges and rising sea-levels - key factors that expose vulnerabilities in the energy sector making adaptation an imperative. Among others, studies for Belize predict a concerning 3.5°C increase in average temperatures over 2010-2100, which is above the global average. Also, both frequency and duration of Atlantic hurricanes display statistically significant increasing trends and there has been an almost doubling of the category 4 and 5 hurricanes during recent periods. These climate trends can have direct impacts on demand for electricity, power generation, ageing infrastructure, and the dependence on imported electricity and fossil fuels. Other studies suggest that the intensity of recurrent rainfall anomalies from the effects of El Niño and La Niña will increase and it will probably occur more frequently due to the effect of climate change . These impacts could cause the hydropower technologies to compete for the same scarcer water resources

as other sectors such as agriculture. Rising temperatures, on the other hand, could drive up energy demand for greater utilization of refrigerators and air conditioning. Extreme weather conditions can also affect energy infrastructure such as power transmission and distribution systems and generation facilities, causing major electricity supply disruptions.

Energy resilience needs to be addressed across the entire energy value chain, including resource endowment, design and operations, transmission and distribution, and energy demand. Examples of climate change adaptation measures include enhanced designs to provide physical protection such as strengthening transmission lines, constructing subterranean distribution networks, or the installation of retractable wind turbines. Other approaches could be to site key infrastructure in safer areas when feasible, or to adapt hydropower operation and maintenance for example, to new river flow and water resource patterns. Another approach to climate change adaptation is sharing of risks and costs of potential climate impacts. This could include financial instruments such as derivatives or insurance to spread costs and risks, as Belize has attempted to do by participation in regional or the diversification of generation resources.

The GoB is refocusing its efforts to strengthen its institutional capacity and invest in the energy sector. It recently established the Ministry of Energy, Science and Technology, and Public Utilities (MESTPU), stressing the need for more focused energy sector development oversight . In 2012, MESTPU issued the National Energy Plan (NEP), which establishes ambitious goals for sector development that include: a) manage demand through improvements in the efficiency of energy utilization and conservation, b) reduce the dependence on imported fuels, c) increase the utilization of biomass and waste for energy production, d) eventually transform country towards a net electricity exporter, and e) strengthen the institutional capacity of MESTPU to carry out the mandate to reform the energy sector. Additional legislation has been issued to address disaster disk management (DRM), regulation of building standards, and management of the environment and coastal areas, to name a few. Institutionally, the Public Utilities Commission (PUC) and BEL are expected to play a key role in implementing the reforms set out in the NEP.

In spite of the efforts resulting in these new policy measures to strengthen climate resilience and risk management, challenges remain due to lack of effective coordination and limited domestic capacity. Similarly, accurately identifying climate change adaptation needs and developing robust solutions requires adequate and reliable information, and sufficient domestic implementation capacity, both of which require strengthening in Belize. As with most climate related decision making, the available data is inadequate or unreliable to make well-informed, risk-based decisions. Further challenging existing efforts is the limited domestic capacity across the GoB and other stakeholders, including with MESTPU.

Despite these constraints, the increasing importance of mainstreaming climate adaptation action led the GoB to seek a more comprehensive approach for addressing some of these challenges. The GoB recently presented a National Climate Resilience Investment Plan (NCRIP) to the Climate Investment Funds (CIFs), which primarily focuses on “roads, public transport, critical public buildings (for instance health/ storm shelters) and drainage”. Given the critical strategic importance of infrastructure resilience to impacts of climate change, the World Bank supported this initiative preparing the $30 million IBRD funded Climate Resilient Infrastructure Project (CRIP) in 2013, which primarily focuses on the key areas of road rehabilitation, flood mitigation and drainage. The proposed Energy Resilience for Climate Adaptation Project is an important opportunity for better

integrating critical energy sector considerations within the NCRIP to provide a more comprehensive approach to addressing climate resilience and adaptation.

Relationship to CAS

The proposed Energy Resilience for Climate Adaptation Project is fully consistent with the World Bank's Country Partnership Strategy (CPS) for Belize covering FY2012-2015; is in line with the GoB's national development objectives and plans; and supports global development objectives for climate resilience and adaptation. It is designed to assist GoB's efforts to adopt a sustainable natural resource based economic model that promotes growth while reducing its vulnerabilities to impacts of climate change and natural hazards. More specifically, the CPS calls for helping mainstream policies, strengthen institutional capacity, and support investments - all related to climate change and resiliency. It is also consistent with global climate change goals for adaptation, which aim to "reduce the impacts of climate change that is happening now and increase resilience to future impacts" (UNFCCC) and for which the Special Climate change Fund (SCCF) was established. It supports "long-term and short-term" "adaptation and technology transfer" activities in developing countries.

II. Proposed Development Objective(s)

Proposed Global Environmental Objective(s) (From PCN)

15. The development objective of the proposed Energy Resilience for Climate Adaptation Project is to enhance resilience of the energy system to adverse weather and climate change impacts.

16. The proposed will be designed to complement the Climate Resilient Infrastructure Project (CRIP) that is being financed in parallel by the World Bank, and help reinforce the inclusion of energy resilience as a key adaptation focus in the comprehensive National Climate Resilient Investment Plan (NCRIP).

Key Results (From PCN)

B. Key Results

- Incorporation of climate resiliency in planning of energy infrastructure and systems
- Introduction of methodologies and techniques for adaptation of energy systems to climate change
- Risk-based prioritization of investment selection in consideration of natural hazards and climate impact
- Strengthened domestic institutional capacity to identify and manage climate risk

III. Preliminary Description

Concept Description

Component 1: Mechanisms for Adaptation Planning and Capacity Building ($2.5 million from SCCF, $1.5 million GoB). It is paramount to analyze in detail and confirm the vulnerabilities and adaptation challenges that are specific to the energy sector in Belize including its cross-sectoral linkages; and develop a risk management approach to allow for identification, quantification and prioritization of climate change adaptation interventions and investments. This will provide the GoB with the tools to systematically and iteratively evaluate climate risks, and make informed, risk-based decisions regarding adaptation interventions, and build in-house capabilities at MESTPU and other related agencies to better model and project future impacts of climate change.

Component 2: Development and implementation of a comprehensive set of measures to demonstrate increase in the resilience of the energy sector ($7 million from SCCF, $3 million estimated from sources to be determined). A comprehensive resilience program developed around the demonstration of the following three key pillars, which will transfer knowledge and develop experience that can be further replicated:

a. Planning and policy for implementation of energy resilient action. It will be important to create sufficient incentives, introduce necessary regulatory requirements and enhance the environment for making investments and taking actions to improve the resilience of the energy system. Some examples include: (a) incentives for greater penetration and integration of alternate sources of energy, b) introduction of standards and codes, c) adapted planning and design, and d) a bio-energy policy.

b. Demonstration of design/engineering techniques and investments to strengthen resilience of the energy system. Selected small-scale investments and priority interventions will introduce cutting-edge designs and techniques to enhance resilience with minimal or no safeguards risks.

c. Strengthening implementation capacity for response and recovery. Steps will be taken to ensure vital multi-sector emergency services (such as the availability of electricity for key hospital and medical installations, or for operating pumps to relieve flooding). The other area of focus will be to ensure there is adequate knowledge and capacity for rapid recovery and restoration of energy services when damage is sustained (such as developing redundancies, including emergency procedures, or sufficient rapid-response capabilities).

Component 3: Project Implementation Support and Dissemination for Knowledge Sharing ($0.5 million from SCCF, $0.3 million from GoB). The component will provide incremental support to the MESTPU designated staff that are overseeing the project, with additional technical, fiduciary, safeguards, and project management capacity for successful implementation. It will also assist with the wider dissemination and sharing of experience and lessons learned with stakeholders in regional countries facing similar circumstances to Belize.

Considering the limited consideration of climate change adaptation needs in the energy sector in existing projects, the demonstrative nature of the proposed Energy Resilience for Climate Adaptation Project in Belize will serve as a pilot operation providing useful learning and lessons for replication in other countries that face similar circumstances as Belize. It is expected to be a first in a series of potential future operations in the Caribbean region to address energy resilience within an overall framework for DRM.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	×		
Natural Habitats OP/BP 4.04		×	
Forests OP/BP 4.36		×	
Pest Management OP 4.09		×	
Physical Cultural Resources OP/BP 4.11	×		
Indigenous Peoples OP/BP 4.10			×
Involuntary Resettlement OP/BP 4.12		×	
Safety of Dams OP/BP 4.37			×

Projects on International Waterways OP/BP 7.50		x	
Projects in Disputed Areas OP/BP 7.60			x

V. Financing (in USD Million)

Total Project Cost:	12.80	Total Bank Financing:	0.00
Financing Gap:	0.00		

Financing Source	Amount
Borrower	4.80
Global Environment Facility (GEF)	0.00
Special Climate Change Fund	8.00
Total	12.80

VI. Contact point

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