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# GRENADA

## CLIMATE CHANGE POLICY ASSESSMENT

July 2019

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## CLIMATE CHANGE POLICY ASSESSMENT

May 30, 2019

Approved By
**Western Hemisphere and Fiscal Affairs Departments**

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# EXECUTIVE SUMMARY

**Grenada has made significant strides to counter climate change but meeting the daunting remaining challenges will require domestic policy actions and sustained international support.** Climate change is an existential threat to Grenada. Increasing frequency and intensity of coastal storms threatens infrastructure and livelihoods, as do increased risk of coastal flooding and drought. Notably, Hurricane Ivan in 2004 caused damages of over 200 percent of GDP. Grenada has recognized this by placing climate resilience at the center of its policy making and forging strategic alliances with key global climate finance providers. However, the challenges facing the country remain daunting and will require large increases in international support, both financial and technical, to assist the Grenadian authorities turn their impressive resilience plans into action.

**This Climate Change Policy Assessment (CCPA) takes stock of Grenada's plans to manage its climate response, from the perspective of their macroeconomic and fiscal implications.** The CCPA is a joint initiative by the IMF and World Bank to assist small states to understand and manage the expected economic impact of climate change, while safeguarding long-run fiscal and external sustainability. It explores the possible impact of climate change and natural disasters on the macroeconomy and the cost of Grenada's planned response. It suggests macroeconomically relevant reforms that could strengthen the likelihood of success of the national strategy and identifies policy gaps and resource needs.

**General preparedness for climate change.** Grenada has made significant strides in preparedness. Its Nationally Determined Contribution (NDC) sets out an ambitious agenda for mitigation. The Climate Change Policy and National Adaptation Plan (NAP) provide costed detailed plans for adaptation and resilience building. The establishment of the Ministry of Climate Resilience in 2017 has further promoted mainstreaming of climate adaptation. However, implementation capacity remains a huge impediment to meeting NAP goals, particularly given Grenada's tight fiscal constraints. Post-disaster activities and responsibilities are well-articulated but require formalization and more progress is required on financing. A Disaster Resilience Strategy (DRS) drawing on the recommendations of the CCPA and summarizing and synthesizing actions from other plans and strategies would help Grenada improve its readiness to cope with future disasters.

**Mitigation.** Grenada plans to progress on its mitigation pledge for the Paris Agreement in the near term by expanding the share of renewable energy in the power generation mix and by adopting energy efficiency measures including in the transport sector. However, progress has been slow and a finalized legal and regulatory framework is needed to provide incentives for this to occur. In addition, Grenada could consider using upstream fuel excise-based carbon taxation to reinforce price incentives towards energy efficiency paying due attention to distributional impacts, administrative efficiency and competitiveness. Feebates (tax-subsidy schemes integrated into existing excises) could further reinforce mitigation incentives.

**Adaptation.** Grenada's adaptation strategy—the NAP—covers all infrastructure sectors, land, agroforestry, agriculture, fishing, food security, water, mangrove, marine, coral, health, and zone

management. An estimated one-third of capital expenditures in 2019 budget already goes to resilience-building projects. However, progress is hindered by capacity constraints, in particular in investment project execution. Progress is being made on supporting policies and regulations but implementation and enforcement need to be strengthened, notably with regard to building codes and draining maintenance.

**Financing.** Grenada faces huge financing challenges to meet its ambitious climate change policy. The authorities have estimated financing needs at about US$500 million, equivalent to over 40 percent of 2018 GDP. Even if most mitigation investment can be financed by the private sector, the required adaptation investment of at least US$340 million out of the $500 million estimated by the authorities is difficult to reconcile with fiscal constraints and other priority needs, including general infrastructure maintenance and development. Proposed reforms to the Fiscal Responsibility Law (FRL) may open some space for increased revenue and loan-financed investment in resilient infrastructure but maintaining a safe debt level means that this will be limited. Maximizing use of available grant financing is therefore crucial for Grenada to ensure long term fiscal sustainability while meeting climate adaptation goals. Grenada has made some progress in beginning to access global climate financing and needs to build on this to maintain progress. However, as the availability of these funds for Grenada may be limited they will need to be supplemented by domestic revenue mobilization, available concessional loans and increased private sector participation remain key to any resource mobilization strategy.

**Risk management.** Grenada has well identified disaster and climate risks but does not yet have a comprehensive risk and contingent liability assessment. The authorities have put in place a number of elements of a comprehensive natural disaster risk layering strategy, including establishing contingency funds, participating in regional parametric insurance schemes and including a hurricane clause in debt restructuring agreements. However, indemnity and catastrophe insurance is under-used in both the public and private sectors and Grenada has not established contingent lines of finance. Fiscal buffers also fall short of desirable levels. Grenada could enhance its risk management by putting place a National Natural Disaster Risk Financing Strategy as a key element of the broader DRS. This would guide future policy making on risk transfer and retention, including trade-offs between options and provide a framework for seeking increased international support.

**National processes.** The establishment of Ministry of Climate Resilience has helped to further strengthen the mainstreaming of climate-related projects. Climate resilience has been built into the public sector investment program framework as a key screening element, but in practice the weight given to climate resilience project prioritization and selection process is not yet clear. Weak project management capacity is a considerable drag on Grenada's public investment management system. Grenada should establish an asset registry which would be the foundation for well managed asset insurance and disaster loss assessment.

**Priority needs.** To meet its mitigation plan, Grenada will need to rely heavily on private investment. Investment needs for adaptation require using as much grant and concessional financing (including contingent financing for natural disasters) as possible to maintain debt sustainability, while also creating space for private sector participation and increasing, where possible, domestic resource

mobilization. Expansion of insurance coverage should also play a role but cannot substitute for investments in resilient infrastructure. Capacity building will also be crucial including for public investment management and to help complete the DRS, move toward carbon taxation, and enhance implementation of sectoral adaptation plans.

## A. Recommendations—Summary

**General Preparedness**

1. Review and update the NDC to reflect developments since the Paris Accord, including revising its targets and further develop related implementation plans and cost estimates .
2. Develop a comprehensive Disaster Resilience Strategy (DRS) in cooperation with IMF, World Bank and other development partners.
3. Improve climate data collection and use including information collection on the costs of high and low intensity disasters, disaster response expenditure, and sources of financing.
4. Finalize and enact the national overarching Disaster Risk Management (DRM) legislation and adequately resource the National Disaster Management Agency (NaDMA).

**Mitigation**

5. Consider a moderately scaled carbon tax applied across fossil fuels (including those currently exempt from excise).
6. Progressively, and cost-effectively, expand renewable power generation and energy efficiency through integrated resource planning and finalize regulatory framework under the Electricity Supply Act.
7. Consider creating a market for the private sector to scale renewable energy penetration through well-structured public private partnerships (PPPs) backed by clear regulations.
8. Modify the excise tax system for vehicles to include a feebate with the implicit CO2 price rising over time, and an ad valorem component set to maintain revenue.
9. Introduce a system of feebates for electricity-using products with the reward for energy efficiency rising over time and an ad valorem component set to maintain revenue.

**Adaptation**

10. Develop an inventory of public assets and power infrastructure in Grenada that follows an updated and finalized land use policy and links to an updated geo-referenced cadaster.
11. Map infrastructure assets to areas that are vulnerable to climate risks and natural and take actions to enhance resilience such as land raising, segmentation of transmission lines, relocation of assets, and building barriers.

12. Put in place a comprehensive agriculture risk management system, including mechanisms to mitigate, reduce, or transfer risk and increase coping capacity supported by improved hydrometeorological information service delivery for farmers.
13. Draft and implement a nationwide vegetation management plan.
14. Strengthen the enforcement of building codes and draining maintenance.
15. Strengthen institutional and further advance enabling policy environment for building coastal resilience and promoting the blue economy.

**Financing**

16. Clarify remaining financing needs, by updating the NAP.
17. Prioritize the maintenance of the foreign-financing pipeline, with emphasis on timely utilization of available concessionality.
18. Use available fiscal space, guided by an amended FRL, to increase investment in resilient infrastructure.
19. Ensure all relevant policy and legal frameworks are in place for attracting private investment in the energy sector and other relevant sectors (e.g., sustainable tourism).

**Risk Management**

20. Formalize a national disaster risk financing strategy focusing on building a comprehensive risk buffer. This should include improving availability of data on losses from disaster, inventorying public assets, clarifying budget processes and engaging with development partners on financing modalities.
21. Clarify regulations for accessing the National Transformations Fund's Contingency Fund in the event of a natural disaster.
22. Optimize Caribbean Catastrophe Risk Insurance Facility (CCRIF) coverage and broaden the use of property indemnity insurance.
23. Enhance insurance coverage for public assets and incentivize private uptake.
24. Explore with private insurers the options for expanding the traditional market, both for housing and socially-desirable services such as flood and agriculture insurance, which may require public sector involvement.
25. Adopt parametric insurance policy to help protect the financial assets of coastal fishing communities.

**National Processes**

26. Enhance technical capacity and coordination mechanisms within the Ministry of Climate Resilience (MoCR), to mobilize climate finance and enhance its project implementation capacity.

27. Enhance the medium-term fiscal framework (MTFF) and fiscal risk analysis by including macroeconomic analysis of natural disasters and climate change.

28. Develop more rigorous project prioritization criteria to better align public investment with policy priorities. Establish National Transformation Fund (NTF) board to strengthen project screening.

29. Improve COA and budget classification to identify and track mitigation and adaptation spending. Ensure they clearly differentiate capital and current budget and continue cleaning up the current expenditures existing in capital budget.

30. Strengthen staff capacity in public investment management and improve capital project preparation with a focus on large projects to ensure timely delivery of capital projects.

# INTRODUCTION

*This report for Grenada is the fourth pilot Climate Change Policy Assessment (CCPA) for Small States. The CCPA is a joint initiative by the IMF and World Bank to assist small states to understand and manage the expected economic impact of climate change, while safeguarding long-run fiscal and external sustainability.*

1. **This joint World Bank-IMF Climate Change Policy Assessment was prepared in collaboration with the Government of Grenada.** It reviews the government's plans for mitigating and adapting to the effects of climate change, in line with Grenada's Nationally Determined Contribution (NDC) under the Paris Agreement, and gives recommendations on how to strengthen policies while maintaining a sustainable macroeconomic framework. Its findings are intended to help policy making, support the preparation of updates to the NDC and assist in financing discussions.

2. **Grenada faces intense challenges from climate change.** Increasing risks of major natural disasters are the most obvious threat. Grenada sits at the southern end of the hurricane belt and so is less at risk of frequent events than some of its Eastern Caribbean peers. Nevertheless, the risks of devastating disasters remain highly elevated. Hurricane Ivan in 2004 caused damage of over 200 percent of GDP, and a smaller Hurricane Emily the following year, intensified the costs. Hurricane Ivan caused damages to an estimated 80 percent of Grenada's electricity distribution system, leaving three quarters of its residents without power. Slower moving impacts of climate change are equally concerning. Rising sea levels are an acute risk to the population, most of which live coastally, and where almost all of the major economic infrastructure is located. Drought and changing weather patterns also endanger livelihoods; for example, the recent significant damage to agricultural production as a result of flooding.

### *An Overview of the Report*

3. **For easy reference, the report broadly replicates the recommended structure of the NDC:** it first discusses general preparedness for climate change; the mitigation commitment and strategy; adaptation needs and strategy; national processes; and financing. However, the focus of the report is on the macroeconomic challenges that may be confronted in dealing with climate change, and policy recommendations for responding adequately to these.[1] The guiding template for CCPAs is attached as Appendix I.

# CLIMATE CHANGE RISKS AND PREPAREDNESS

*Grenada is one of the small states highly vulnerable to climate change and natural disaster risks. Increases in temperature and intensified extreme weather will lower agriculture output, depress labor productivity, and affect human health, If the sea level rises, the majority of Grenada infrastructure and*

[1] The CCPA will be attached to the papers for the IMF's 2019 Article IV Consultation.

*settlements located on or near the coast will be threatened. The potential loss to GDP would threaten prospects for debt sustainability.*

## A. Impact of Climate Change Risks on the Macro-Framework/Long-Term Outlook

***How Vulnerable Is the Economy to Climate Change?***

4. **Grenada is highly exposed to climate change and natural disaster risks**.

- Grenada is vulnerable to a wide range of exogenous shocks, which are exacerbated by adverse climate change impacts and overall climate variability. Climate change projections for Grenada predict an increase in average annual temperature, reduced average annual rainfall, potential for an increase in the intensity of tropical storms and increased Sea Surface Temperatures

- Regional Climate Model (RCM) projections indicate an increase ranging from 2.4˚C to 3.2˚C in mean annual temperatures by the 2080s in the higher emissions scenario. In the near term, General Circulation Model (GCM) projections of rainfall span both overall increases and decreases, ranging from -40 to +7 mm per month by 2080. Most projections tend toward decreases. Projections also indicate increases in sea surface temperature throughout the year. Projected increases range from +0.9˚C and +3.1˚C by the 2080s. [2]

- Of the 182 countries in the Climate Risk Index, Grenada was in the top 2 percent for losses to climate-related natural disasters as a percent of GDP during 1997–2017 and in the top 5 percent of climate-related disaster fatalities.[3]

- Grenada's annual average loss from of wind-related events and floods averages just under US$20 million, or 1.7 percent of GDP. This amount includes total direct and indirect losses the public and private sector, on average in any given year over the long-run. Of that US$20 million, roughly US$12 million, is the estimated replacement values associated with direct, physical damage. Further, of that US$12 million, the government will experience direct damage to its own assets amounting to about US$3.5 million (0.3 percent of GDP). Once every 100 years, on average, these costs are expected to exceed US$386 million, or more than 35 percent of GDP. That is, even before climate change, there is a 1 percent probability in any year that a disaster will impose direct and indirect losses of more than 35 percent of GDP.[4]

[2] CARIBSAVE Climate Change Risk Profile for Grenada (2012).

[3] Global Climate Risk Index 2017/2018. *https://germanwatch.org/en/14638*.

[4] Estimates based on actuarial analysis of historical direct and indirect damage to each sector from wind and flood-related events. "World Bank Group. 2018. Advancing Disaster Risk Finance in Grenada." World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/29748 License: CC BY 3.0 IGO.

- The majority of infrastructure and settlements in Grenada is located on or near the coast, including government, health, commercial and transportation facilities. These areas already face pressure from natural forces (wind, waves, tides and currents) and human activities, (beach sand removal and inappropriate construction of shoreline structures). The impacts of climate change, in particular sea level rise, will magnify these pressures and accelerate coastal erosion.

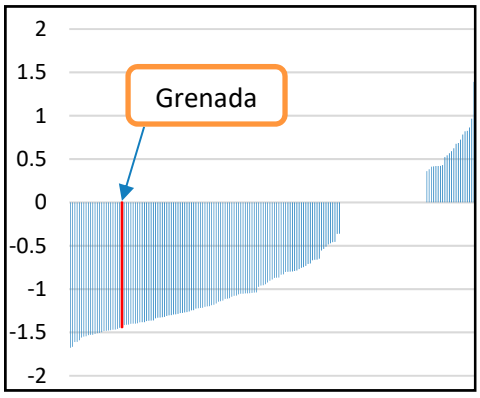
- Grenada's beaches are at risk of significant erosion from the rising sea levels, and key coastal infrastructure would be inundated by a 1 meter sea level rise. This would affect 73 per cent of all major tourism resorts as well as 40 per cent of all seaport lands. Other at-risk areas included the main hotel belt in Grand Anse, sections of the coastline close to the Point Salines International Airport, the Eastern Main Road leading out of Grenville and passing through Soubise and Marquis and the front streets in Hillsboroug and Harvey Vale in Carriacou.[5] Between 1993 and 2015, the monthly average sea level has increased at a rate of roughly 0.3 mm/month or 3.6 mm/year.

- Climate change impacts such as increase in temperature, variability of seasonal precipitation and increased occurrences of extreme weather events, affect Grenada's forest ecosystems. In particular, changes in precipitation and increased temperatures could result in a loss of forest zones and their possible migration to higher elevations. In addition, there are increased fire risks and soil erosion. Likewise, hurricanes can also cause serious damage to forest and forest infrastructure

***What Impact Could Climate Change Have on Macro-Sustainability?***

5. **Grenada's GDP is expected to be critically impacted by climate change**. An increase in temperature has adverse macroeconomic consequences especially in countries with relatively hot climates**.** This will occur through various channels. Agricultural output could be lower, labor productivity could be depressed in sectors more exposed to the weather, capital accumulation could be reduced, and human health can be poorer. These effects are especially strong in countries with relatively hot climates, such as Grenada. Using the 1950–2014 data, World Economic Outlook (2017) estimates that countries with high temperatures incur more negative effect on per capita GDP from

**Figure 1. Grenada: Effect of 1 Degree Temperature Increase on Real per Capita Output Across the Globe**
(Percent)



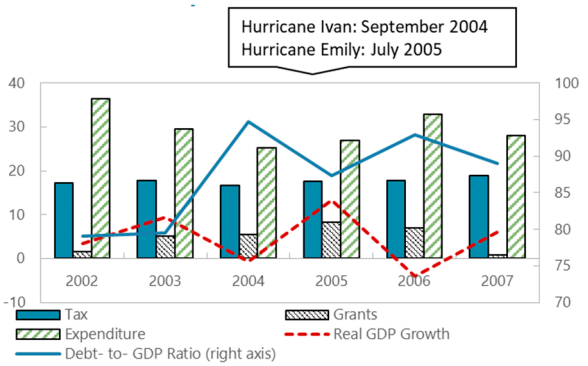

Source: World Economic Outlook, October 2017

[5] Ibid.

a given size increase in temperature. For Grenada, an increase in the temperature by 1 degree Celsius is estimated to decrease real GDP per capita by 1.4 percent on impact (Figure 1).

6. **Climate change is likely to increase risks of extreme natural disasters with significant effects on macro-sustainability.** Large natural disasters affect debt sustainability through several channels. Economic growth decreases on impact and this also negatively affects revenue. At the same time, expenditure increases to address post-disaster recovery and reconstruction. These factors all increase the level of debt and adversely affect debt sustainability. If the external grants are received, however, it mitigates the negative effects. Economic growth can also recover after the initial drop as the reconstruction progresses. All these forces were at play during and after Hurricane Ivan in 2004 and Hurricane Emily in 2005 (Figure 2).

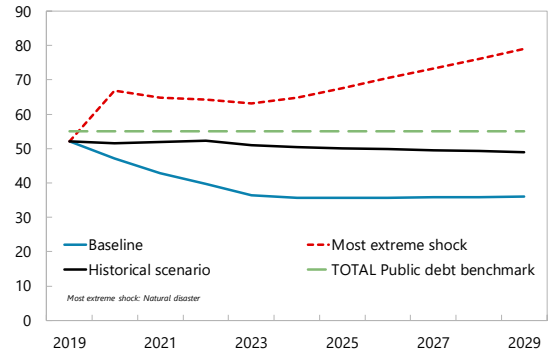
**Figure 2. Grenada: Hurricanes and Macro Variables**
(percent of GDP)




Source: IMF Staff estimates.

7. **Debt sustainability analysis (DSA) also illustrates the effects of natural disaster shocks going forward (Figure 3).** The 2019 DSA projects that a large natural disaster (assuming 10 percent of GDP shock and the following interactions in real GDP growth and exports growth shocks to be 15pp and 25pp respectively) would delay the attainment of the threshold for the debt-to-GDP ratio for the 10–year horizon and mean that Grenda would be unable to achieve the regional debt reduction target.[6]

**Figure 3. Grenada: Indicator of Public Debt Under Alternative Scenarios, 2019–29**




Sources: Staff calculations

8. **Staff's analysis indicates substantial negative long-run effects of the climate change on output and other key economic variables (Figure 4).** In a dynamic stochastic general equilibrium model (DSGE) tailored to capture key features of Grenada, the estimated change in temperatures (middle scenario) would cause real GDP and private investment to fall by about 5 percent and private employment by 6 percent respectively.[7] At the same time, out-migration and interest rates would increase perceptibly, by around 5–6 percent. There would be also a moderate

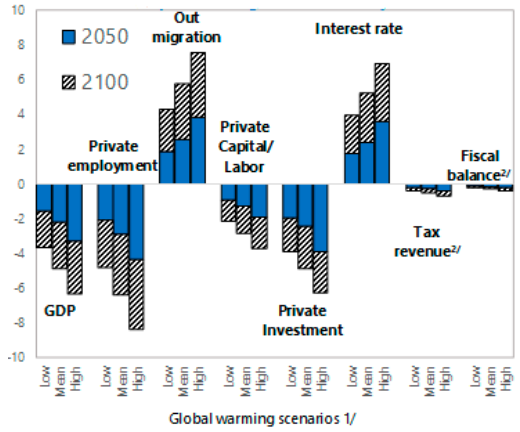
[6] See Grenada: Staff Report for the 2019 Consultation—Debt Sustainability Analysis.

[7] See IMF Country report 19/63, pp. 22–26, for the detailed description of the model.

deterioration in tax revenues and fiscal balances.[8] The negative effects of climate change are probably understated by the model, since its main transmission channel is the intensification of wine-related natural disasters and does not include other effects potentially very relevant for Grenada, such as the rise in sea water levels that would affect some of the most valuable economic assets, such as the main harbor and beaches.

**Figure 4. Grenada: Economic Impact of Global Warming**

(In percent change relative to 2018)




Source: Staff calculations based on authorities' data.
1/Based on increase of atmospheric temperatures in the RCCP8.5 scenario, the IPCC 2014 report:
Low: 1.2 to 3.0 degrees Celsius by 2050 and 2100 respectively.
Mean: 1.7 to 4.3 degrees Celsius by 2050 and 210 respectively.
High: 2.2 and 5.6 degrees Celsius by 2050 and 2100 respectively.
2/ In percentage points of GDP.

## B. General Preparedness

***Is the Climate Response Strategy Consistent with Broader Development Goals?***

9. **Yes. Grenada is taking aggressive actions to mainstream climate adaptation into its broader development plans.** The NDC was based on the 2014–2018 Growth and Poverty Reduction Strategy. Grenada's NDC articulates its efforts to reduce national emissions as a contribution to global efforts to address climate change. It sets out an ambitious agenda for increased usage of renewable energy to achieve Grenada's carbon emission targets. Adaptation actions were also included but not in detail and were not costed. Since then the National Climate Policy and National Adaptation Plan have provided a clear direction for sectoral plans and climate action. The establishment of the Climate Resilience Ministry with a mandate to coordinate all actions related to adaptation reinforces this consistency. The National Development Plan, that is currently being developed in a participatory process has climate change at its center.

10. **Grenada has institutions and plans to deal with natural disasters but lacks a comprehensive disaster resilience strategy (DRS)**. A DRS would be an important part of the broader climate adaptation strategy. The authorities plan to develop such a strategy in 2019, working closely with the IMF, World Bank and other development partners, with each institution taking the lead in advising in their area of specialty. Such an overarching strategy would synthesize and supplement existing policies and plans in order to present a consolidated and prioritized strategy for building resilience to natural disasters. It would cover, inter alia, the infrastructure and other investments needed to limit the impact of disasters; the financial arrangements needed to respond to disasters and the institutional arrangements needed to respond effectively when disaster strike. This CCPA provides advice in a number of areas that will be key to developing an effective

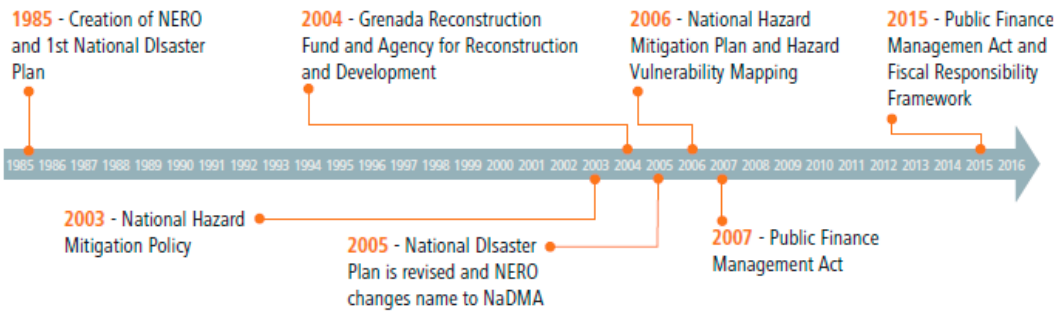
[8] The results on the impact of the climate change are sensitive to several assumptions, including the model's linearization around a steady state that keeps several variables such as population growth constant. Due to these reasons, the impact on the estimated levels of output for 2050–2100 needs to be interpreted with caution.

DRS. The next section focuses on post-disaster resilience, while subsequent sections identify investment, financing, risk management and government process improvements that would need to be incorporated into the DRS.

***How Well-prepared is the Country to Cope with Possible Intensified Disasters?***

11. **In Grenada, most activities surrounding disaster risk management (DRM) are related to preparedness, response, and recovery, and focus less on risk reduction or financing**. The creation of the National Emergency Relief Organization (NERO) formalized disaster management in Grenada in 1985 and produced a National Disaster Plan.

**Figure 5. Grenada: The Evolution of Grenada's Disaster Management Institutions**




12. **Recovery activities after Hurricane Ivan brought about organizational changes that mainstreamed Disaster Risk Management (DRM),** The National Disaster Plan was revised in 2005, a revision was driven by the National Emergency Advisory Council (NEAC). The NEAC, through this revision, also changed its name to the National Disaster Management Council (NaDMAC). NaDMAC meets at least once per month—more frequently during a disaster—and is composed of representatives from various ministries, the police, the transportation sector, public utilities, relief agencies, community organizations, churches, and the private sector. The plan includes clarification of the roles of government ministries, including the National Disaster Management Agency (NaDMA) that are derived from existing legislation and is currently undergoing another round of revisions with support from the Caribbean Disaster Emergency Management Agency (CDEMA) Coordinating Unit.[9]

13. **NaDMA is the disaster management coordinating body but is not resourced adequately to provide adequate ex-ante multi hazard preparedness and post disaster response.** Organizational authority is provided through the Office of the Prime Minister and the Emergency Powers Act of 1987. NaDMA coordinates and oversees the operations of 17 District

[9] NaDMAC, NaDMA. 2005. "National Disaster Plan." Version 3.1. and Grenada national progress report on the implementation of the Hyogo Framework for Action (2011–2013).

Disaster Management Committees during a disaster. NaDMA should consist of 11 staff with offices in the disaster operations center but is not fully staffed and is underfunded.[10] As a result, Grenada's capacity to respond to a major disaster without major outside support is limited. Risk reduction activities, emphasis on preparedness and response systems and improved insurance coverage will be key factors supporting coping and reconstruction capacity. Priority attention is required in terms of human and financial resources. One of the strengths of NaDMA's operations is its commitment to, and active engagement and partnerships with, nongovernmental organizations (NGOs), civil society, and the private sector. However, more-strategic engagement could be made of the private sector in mobilizing financial and technical resources to support prevention and mitigation interventions.

14. **Further development of systems for collecting and reporting information on damage and losses would aid disaster planning.** Grenada has a good system for collecting information on damages and losses sustained by different sectors for high-intensity events. However, information on high-frequency, low-intensity events is not reported in detail across ministries. For example, no final national report had been prepared yet regarding the floods which took place in August 2018, and this is partially due to a lack of coordination on the assessment process. A new database in line with the standard damage and loss assessment (DaLA) methodology across ministries is recommended, along with guidelines on how and when to enter information (Box x). Discussions with the MoF suggest that NaDMA could maintain and update the database if the appropriate funding was obtained. This would allow line agencies at national and subnational levels, as well as local authorities, to report damage and losses easily. It would also enable the MoF and other line ministries to access critical information for recovery planning and for reconstruction and retrofitting of existing infrastructure. Such a database would also be useful in backing up financing requests to donors, for example, the Climate Investment Fund. Although this initiative could be launched in the short term, a comprehensive database might take time to be fully completed.

**Box 1. Priorities for DRM Data Collection**

**The treatment of meteorological and geological hazards is the priority in Grenada as damages and losses from these events are regularly occurring, severe, and likely to be exacerbated by climate change**. Building the capacity for risk assessment based on meteorological and geotechnical hazards in Grenada requires the development of data and systems for understanding hazard, vulnerability and exposure and thus, informing associated adaptation schemes. One of the major challenges faced by Grenada is a lack of data and information vital for both understanding the hazards and climate change impacts faced, which is essential in supporting climate-informed decisions in applications such as meteorological forecasting, engineering design and development planning.

**Priority data needs include large scale topographic mapping, wind, rainfall and discharge measurements, detailed vegetation classification, geotechnical information on soils, and multi-hazard mapping**. Much of the existing information was collected over 40 years ago for the purpose of supporting

[10] NADMA currently has 6 staff and 2 interns: Director, Technical officer, Communications Officer, IT Officer, Receptionist, Public Information Officer, and 2 youth employment interns.

**Box 1. Priorities for DRM Data Collection (concluded)**

large scale agriculture, which was the cornerstone of the economy at the time. Outcomes in the form of data and information products, information systems, as well as technical capacity have already been achieved and are ongoing. Applications of these data for climate resilience and disaster risk management include information products for disaster response, impact-based forecasting and climate data products, coastal and landslide modelling and forecasting and spatial analysis. However, for these efforts to translate into tangible benefits, mainstreaming of these systems and skills and modernization of public service processes and decision support systems is vital.

15. **Finalizing the overarching legislative framework for DRM would provide impetus to these reforms.** At present there is no overarching legislation on DRF or DRM, which causes uncertainty and allows gaps in coverage.[11] In 2003 and 2006, the GoG articulated both a Hazard Mitigation Policy and a Hazard Mitigation Plan as part of its mandate to mainstream DRM into national development planning. The Hazard Mitigation Policy lists the development and implementation of appropriate economic programs for hazard risk reduction as a key strategic intervention.[12]The Hazard Mitigation Plan was written over 3 years, from 2003 to 2006, during which workshops and consultations were conducted with the public and private sectors to determine the scope of hazard assessment, to review outputs, and to achieve consensus mitigation actions. The main proposal of the plan was a Comprehensive DRM Act that would, among other activities, institutionalize a National Disaster Management Fund to finance disaster response and build capacity in the insurance sector to make natural hazard risk information public and to partner with the public sector in hazard mitigation measures. However, this Act has not yet been finalized.

16. **Deeper integration with regional bodies would strengthen disaster response capacity**. Given Grenada's size, capacity to both manage and prepare against climactic events and respond to a major disaster without outside support is infeasible. Regional technical organizations supporting these efforts include the Caribbean Institute of Meteorology and Hydrology (CIMH), the Caribbean Disaster Emergency Management Agency (CDEMA), as well as the Seismic Research Center (SRC) at the University of the West Indies. Deeper integration with these regional bodies will increase the technical and operational capacity of NADMA and DRM agencies in the region, which do not operate in isolation.

***Recommendations for General Preparedness***

1. Review and update the NDC to reflect developments since the Paris Accord, including revising its targets and further develop related implementation plans and cost estimates.

2. Develop a comprehensive Disaster Resilience Strategy (DRS) in cooperation with IMF, World Bank and other development partners.

[11] Grenada national progress report on the implementation of the Hyogo Framework for Action (2011–2013).

[12] Thomas, Dr. Linus Spencer. 2003. "Grenada National Hazard Mitigation Policy."

***Recommendations for General Preparedness (concluded)***

3. Improve climate data collection and use including information collection on the costs of high and low intensity disasters, disaster response expenditure, and sources of financing.

4. Finalize and enact the national overarching Disaster Risk Management (DRM) legislation and adequately resource NaDMA.

# CONTRIBUTION TO MITIGATION

*Grenada plans to progress on its mitigation pledge for the Paris Agreement in the near term by expanding renewable power generation (though a finalized regulatory framework is needed) and reducing energy use in the electricity and transport sectors. It has some limited scope to raise fuel prices unilaterally through carbon taxation. Feebates (tax-subsidy schemes integrated into existing excises) could further reinforce mitigation incentives.*

Grenada's NDC aims for a reduction in carbon dioxide ($CO_2$) equivalent emissions (covering $CO_2$ and methane from the energy, transport, waste, and forestry sectors) by 30 percent below 2010 levels by 2025 with an indicative reduction of 40 percent below 2010 levels by 2030. These targets are conditional on some level of external finance.

***How does Grenada Intend to Progress on Its Emissions Reduction Targets?***

17. **Grenada's contribution to global greenhouse gas emissions (GHGs) is miniscule (0.0005 percent), but progress on mitigation remains important**. Implementing their mitigation commitments can give small states credibility in international dialogue on the Paris process, potentially leverage external finance, mobilize domestic revenues (though modestly in Grenada's case) through carbon pricing, and reduce dependence on volatile international oil markets.

**Table 1. Grenada: Mitigation Objectives and Proposed Actions in Grenada's NDC**

| Sector | Mitigation objective | Proposed actions |
|---|---|---|
| Electricity | Reduce $CO_2$ 30% by 2025 | 10% from renewables (10 MW from solar, 15 MW from geothermal, and 2 MW from wind)<br>20% from energy efficiency (20% efficiency increase for hotels and other existing buildings, 30% increase for new buildings) |
| Transport | Reduce $CO_2$ 20% by 2025 | Promote biofuels, raise gasoline/diesel taxes, fuel efficiency |
| Waste | Reduce methane by ≥90% | Capture methane and use for electricity; waste conservation |
| Forestry | Double carbon storage in protected areas | Plant fast-growing species, reduce fire risk |

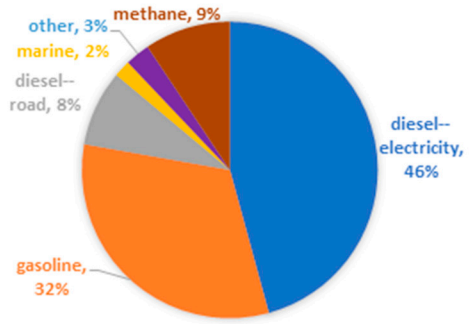
Source. Grenada NDC.

18. **Grenada's NDC contains sectoral mitigation objectives (Table 1), though specifics on policy instruments to implement them would need to be fleshed out**. The main commitments are: (i) to reduce $CO_2$ emissions from the power sector by 30 percent by 2025 through expanding the renewable generation share from (currently) 2 percent to 10 percent by 2025 and improving energy efficiency (e.g., for buildings); (ii) reducing emissions from land transport 20 percent by 2025 through promoting biofuels (liquified natural gas and diesel blends), raising fuel taxes, and fuel economy requirements; (iii) using methane capture technologies for reducing waste management emissions by over 90 percent; and (iv) doubling carbon storage in areas of protected forest by, for example, planting indigenous (faster growing) species. Additional policy actions mentioned in the NDC for progressing on commitment (i) include tax incentives for solar panels and water heaters, more efficient lighting in some government buildings, regulatory reforms to promote renewable and energy efficient investment, and new building codes. Commitment (iii) is a possibility more for the longer term given it would require significant investment in new (currently unproven) methane capture technologies and the same applies for commitment (iv) given that measuring the results would require significant capacity development, for example, for the monitoring of forest carbon storage.

## A. Clean Energy Plans

19. **Expanded use of renewable energy is feasible, but faces practical obstacles, and it would have a modest impact on nationwide $CO_2$ emissions.** Presently, renewable generation in Grenada accounts for a tiny fraction of supply—about 1 percent each from grid and off-grid (i.e., rooftop solar) generation. Solar generation for the grid could be scaled up and feasibility studies have been conducted. An ESIA study has been initiated regarding geothermal, funded by the CDB, and is expected to be completed by the end of the year. Wind has limited opportunities on the main island given the best sites are privately owned, however, there are some opportunities in the smaller islands (e.g. Caricou). Furthermore, there is still some uncertainty over future regulatory frameworks, holding up investment actions by Grenada's power company—Grenada Electricity Services (GRENLEC). While the 2016 Electricity Supply Act was amended in 2017, regulations still need to be implemented to facilitate private investment in renewable plants. In addition, land acquisition for solar generation sites could be hindered by land tenure issues. Currently, diesel plants account for all non-renewable generation supply and their emissions are estimated at 46 percent of nationwide (non-forestry) GHG emissions in 2018—meeting a ten percent renewable target would lower economywide GHG emissions about 4½ percent. Gasoline for motor vehicles is the next largest emissions source (32 percent), followed by landfill methane emissions (9 percent), diesel emissions

**Figure 6. Grenada: Sources of GHGs 2018**




Source. IMF spreadsheet model

from road vehicles (8 percent), marine diesel use (2 percent), and other sources, like liquified petroleum gas (LPG) used as a cooking fuel (3 percent)—see Figure 6.[13]

20. **Quantitative evaluation of policy options provides useful information for choosing mitigation instruments and their stringency**. This capability would help policymakers understand the trade-offs between different policy options, and their design, in terms of their impacts on energy use, energy prices, emissions, revenue, and oil import bills, while achieving national goals of growth and prosperity. A streamlined spreadsheet tool, parameterized to Grenada, is used for some preliminary analysis here (see below). The tool projects fuel use by energy sector using projections of GDP and assumptions about how higher GDP affects energy demand and about the rate of technological change (e.g., that gradually improves energy efficiency over time). The impacts of mitigation policies on fuel use and emissions depends on their proportionate impact on energy prices and assumptions about the price responsiveness of energy use. Annex I contains a description of the model and its parameterization for Grenada.[14]

21. **Some of the needed investments, for example for the expansion of renewables, will need refinements to their costing, screening, and prioritization**. A preliminary assessment for the NDC put cumulative investment costs for mitigation at US $161 million to 2025 (but without a breakdown by sector or technologies). Some of the investments would be public (e.g., upgrading the efficiency of lighting for streets and public buildings) but much of the finance should be private—for example, future investors seeking contracts to develop renewable energy sites. This could be an opportunity to investigate creating well-structured public-private partnerships (PPPs), which will require the development of clear regulations and building of capacity to analyze project and macroeconomic risks.[15]

22. **The electricity sector would benefit from the development of an Integrated Resource Plan (IRP) to guide investments.** This would help translate NDC targets into tangible investments. Integrated Resource Planning (IRP) is a comprehensive decision support tool and road map that enables an electricity utility to meet its objective of providing reliable and least-cost electricity service to all customers while addressing the substantial risks and uncertainties inherent in the business. IRP practice has been widely adopted by electric utilities in Caribbean. The IRP would evaluate all possible resources – both supply- and demand-side, to help Grenada achieve its NDC targets, clearly identify the cost of each technology, and prioritize them. The impact on the electricity tariff would also be examined.

[13] $CO_2$ emissions from aviation fuel are excluded from domestic emissions as, under the Paris Agreement, countries only have responsibility for reducing emissions released within their own borders.

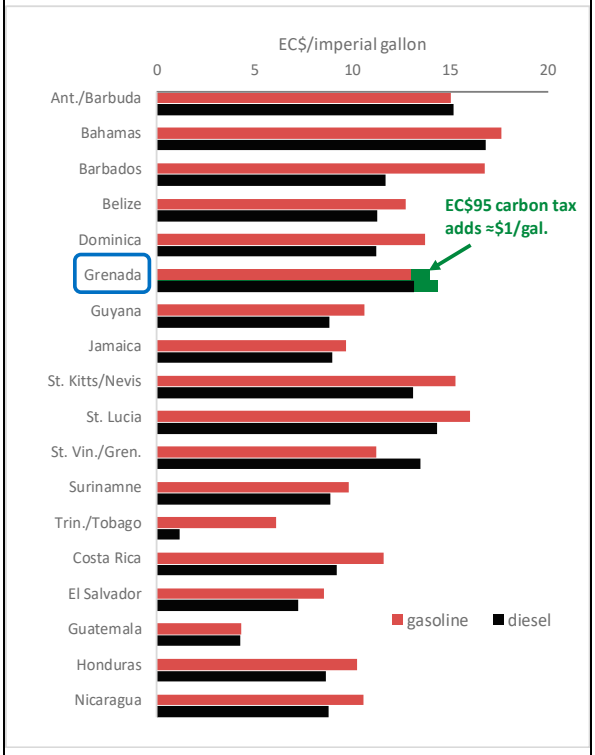
[14] The spreadsheet tool can be provided upon request.

[15] See "Public-Private Partnerships in the Caribbean Region: Reaping the Benefits While Managing Fiscal Risks" IMF 2019.

## B. Fuel/Carbon Taxation

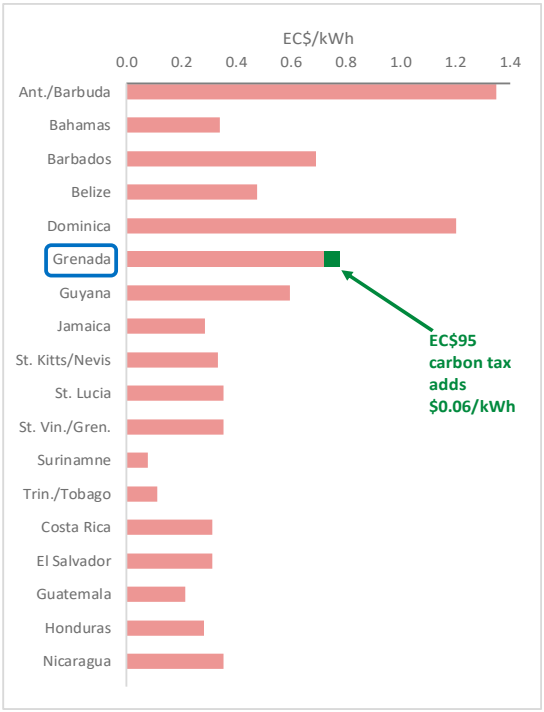
23. **Fuel and electricity prices in Grenada are similar or somewhat higher than those in the majority of other Caribbean and Central American countries**. Gasoline and diesel prices in Grenada were broadly representative of those in most other Caribbean countries in 2016, and significantly higher than those in Central American countries (Figure 7)—this comparison is for road diesel which is subject to excise, rather than diesel used in power generation which, in the case of Grenada (and many other countries), is not subject to excise. Electricity supply prices in Grenada in 2016 were on the high side relative to most comparator countries, though prices were significantly higher in Antigua and Barbuda and Dominica (Figure 8).

**Figure 7. Grenada: Retail Fuel Prices, Selected Countries, 2016**




Source: IMF staff estimates.
Note. Prices are from a cross-country database and differ from those reported by the Granada authorities and used below.

**Figure 8. Grenada: Electricity Supply Prices, Selected Countries, 2016**




Source: IMF staff estimates.
Note. Prices are from a cross-country database and differ from those reported by the Granada authorities and used below.

***Does the Current Tax System Deliver Appropriate Carbon Pricing?***

24. **Current fuel taxes fall will not deliver mitigation commitments unless there is a rapid increase in the decoupling of emissions from growth**. According to IMF spreadsheet modelling (Table 2), baseline or business as usual (BAU) fossil fuel $CO_2$ emissions—that is, emissions in the

absence of new mitigation policies—are 12 percent higher in 2025 than in 2010 and 15 percent higher in 2030.[16] The NDC emissions target therefore implies very substantial emissions reductions below BAU levels in 2025 and 2030 of 37 percent and 48 percent respectively. The growth in emissions is much smaller than the growth in real GDP (the latter is 60 and 83 percent higher in 2025 and 2030 than in 2010 respectively) due to improving energy efficiency (e.g., as older, less efficient capital is replaced by newer capital) and an assumption that the demand for electricity and fuels rises by less than in proportion to the rise in GDP. At the same time, the declining energy intensity of GDP implies a steady decline in fuel tax revenues relative to GDP, from 1.85 percent of GDP in 2018 to 1.6 percent in 2025 and 1.5 percent in 2030. The imported fuel bill also declines in the BAU in relative terms, from 4.4 percent of GDP in 2018, to 3.7 percent in 2025, and 3.4 percent in 2030.

**Table 2. Grenada: Comparison of Alternative Mitigation Policies**

| Metric | sector | year | Paris pledge | Business as usual | carbon tax | renewables subsidy | feebate--electricity | feebate --vehicles | combination |
|---|---|---|---|---|---|---|---|---|---|
| CO2 emissions | total | 2025 | 169 | 271 | 257 | 262 | 257 | 262 | 230 |
| | | 2030 | 145 | 279 | 253 | 266 | 257 | 263 | 211 |
| | electricity | 2025 | 84 | 134 | 125 | 125 | 120 | 134 | 105 |
| | | 2030 | na | 137 | 120 | 123 | 114 | 137 | 91 |
| | transport | 2025 | 77 | 123 | 119 | 123 | 123 | 114 | 111 |
| | | 2030 | na | 128 | 121 | 128 | 128 | 112 | 107 |
| Renewables share | electricity | 2025 | 0.1 | 0.04 | 0.08 | 0.10 | 0.04 | 0.04 | 0.14 |
| | | 2030 | na | 0.06 | 0.13 | 0.15 | 0.06 | 0.06 | 0.22 |
| Energy efficiency relative to 2015 | electricity | 2025 | 0.8 | 0.91 | 0.89 | 0.91 | 0.79 | 0.91 | 0.78 |
| | | 2030 | na | 0.86 | 0.83 | 0.86 | 0.69 | 0.86 | 0.68 |
| | transport | 2025 | na | 0.91 | 0.89 | 0.91 | 0.91 | 0.83 | 0.81 |
| | | 2030 | na | 0.86 | 0.83 | 0.86 | 0.86 | 0.73 | 0.71 |
| Fuel/carbon tax revenue, %GDP | total | 2025 | na | 1.61 | 2.19 | 1.61 | 1.61 | 1.50 | 2.01 |
| | | 2030 | na | 1.47 | 2.45 | 1.47 | 1.47 | 1.29 | 2.12 |
| Import bill, %GDP | total | 2025 | na | 3.75 | 3.57 | 3.64 | 3.58 | 3.61 | 3.21 |
| | | 2030 | na | 3.39 | 3.09 | 3.24 | 3.14 | 3.17 | 2.59 |

Source: IMF staff spreadsheet model, drawing on fuel use, price, and tax data from the Grenada authorities. See Annex 1.

[16] These projections are approximately consistent with those in Grenada's NDC.

***How Could Grenada's Tax System be Reconfigured for More Effective Carbon Pricing?***

25. **There are a number of options that can be considered to use the tax system for more effective carbon pricing**. This section outlines a few key options for the Grenadian authorities to consider. Each option would need to be analyzed before adoption to ensure that impacts on income distribution, competitiveness and other variables are understood.

26. **A carbon tax is a promising approach that is worth considering.** A carbon tax—that is, a charge on the carbon content of the major fossil fuels[17]—rising to ECD 95 (USD 35) per ton of $CO_2$ in 2025 and ECD 190 (USD 70) in 2030 is considered below.[18] The carbon tax could simply be added to existing fuel excise taxes, or as a new excise for fuel currently exempt from excise—where the extra excise per imperial gallon is the carbon tax rate per ton of $CO_2$ times tons of $CO_2$ emissions per gallon of fuel use.[19] The carbon tax would increase energy prices by:

- ECD 1.0 per imperial gallon for gasoline in 2025 and ECD 2.0 per gallon in 2030. Current gasoline prices are ECD 14.3 per gallon, including an excise of ECD 5.5 per gallon.[20]
- ECD 1.1 per imperial gallon for diesel fuel in 2025 and ECD 2.3 per gallon in 2030. Current diesel prices are ECD 13.1 per gallon, including an excise of ECD 5.5 per gallon, applying to road diesel.
- ECD 0.06 per kilowatt hour (kWh) in 2025 and ECD 0.12 per kWh in 2030. Current electricity prices are ECD 0.90 per kWh.[21] They are set based on the cost of diesel generation and consist of a fixed cost[22] and a variable fuel cost (currently ECD 0.4 per kWh).

[17] LPG is excluded here given its small contribution to emissions and that it tends to be consumed disproportionately by low-income households.

[18] For comparison, a carbon tax of USD 50-100 per ton in 2030 imposed globally would be broadly consistent with containing mean projected warming to 2°C (the target of the Paris Agreement is to keep warming to 1.5-2°C). Over 50 national or sub-national governments have implemented carbon pricing through carbon taxes or emissions trading systems with recent prices typically between USD 5 and USD 35 per ton in 2018, though prices have long been much higher in Scandinavian countries. Recent examples of carbon taxes include Argentina, Chile, Colombia, Singapore and South Africa. See World Bank Group, 2018, *State and Trends of Carbon Pricing 2018*, Washington, DC, and IMF, 2019, *Fiscal Policies for Paris Climate Strategies: From Principle to Practice*, Washington, DC.

[19] Combusting an imperial gallon of gasoline and diesel produces 0.0104 and 0.0121 tons of $CO_2$ respectively.

[20] Gasoline is not subject to value added tax (VAT). Ideally, from the perspective of principles for the efficient design of VAT systems, this anomaly would be removed.

[21] Prices vary modestly across residential, commercial, and industrial users.

[22] Normally the nominal fixed cost is indexed annually to a general consumer price index (excluding fuel) less 2 percent though this updating is currently suspended pending enactment of regulations for the Electricity Supply Act.

As indicated in Figures 7 and 8, the ECD 95 carbon tax would have modestly affected energy prices if it had applied in 2016. This could have had some negative distributional and competitiveness concerns and if implemented may need some compensating policy measures.

27. **A carbon tax would mobilize some extra revenue, but the emissions reductions would fall far short of what is needed for the Paris mitigation target**. The carbon tax described above would be cheap to implement as it utilizes existing tax administration structures and could raise extra revenues of 0.6 percent of GDP in 2025 (above BAU levels) and 1.0 percent in 2030. Economywide $CO_2$ reductions would be reduced by an estimated 5 percent below BAU levels in 2015 and 9 percent in 2030. This reflects the proportionate increase in fuel prices above BAU levels—7–9 percent for gasoline and diesel fuel (currently subject to excise) and 14 percent for diesel fuel (not subject to excise) in 2025—and a typical assumption (in energy models) that each 1 percent increase in the fuel price reduces fuel consumption by around 0.5 percent.[23] More aggressive carbon taxation would be the most economically efficient policy to achieve deeper emission reductions—this is because, by reflecting carbon charges across the board in energy prices, it promotes, and strikes the cost effective balance across, the full range of potential behavioral responses for reducing fuel use and emissions. Aggressive carbon pricing could be politically challenging however, not least if it made energy prices in Grenada among the highest in the Caribbean region. Analysis of potentially negative distributional impacts and the need for enhanced social safety nets would need to be assessed along with measures to ease transitions for firms and workers. Nonetheless, besides expanding renewables, there are some additional possibilities for using the tax system to mitigate fossil fuel $CO_2$ emissions, but without an increase in fuel prices.

28. **'Feebates' could play an effective role in progressing on mitigation commitments.** Feebates are sliding scales of fees/rebates designed to shift demand towards more energy-efficient (and lower-emitting) vehicles and products. They increase the price of products with relatively low energy efficiency while decreasing them for products with relatively high energy efficiency. In this way, they provide similar incentives to higher energy prices (and similar rewards/penalties for products with high/low energy efficiency). Feebates forgo the new revenues from higher energy taxes—the usual recommendation is to design them such that revenues from fees collected on low efficiency products balances outlays for rebates on high efficiency products. However, it may be more politically acceptable to provide much stronger incentives for improving energy efficiency under feebate schemes—through aggressive fees and rebates—than from raising fuel taxes, because they do not impose a new tax burden on the average household.

29. **Compared with regulatory approaches, feebates for energy-using products can be more flexible.** The regulatory alternative is energy-efficiency standards, for example, for the fuel consumption rate averaged across cars sold by a dealer. However, standards are difficult to design in a way that provides uniform rewards for improving efficiency across different product categories (e.g., cars, buses, trucks) and dealers, whereas feebates are straightforward to harmonize such that

[23] $CO_2$ emissions tend to be much more price responsive in countries that consume a lot of coal because carbon pricing causes a dramatically larger proportionate increase in the price of coal than for petroleum products.

they provide the same incremental reward for reducing energy consumption across different product categories and dealers. Feebates are in line with IMF and World Bank advice internationally, which is to generally favor more cost-effective, and flexible price-based instruments over regulatory approaches for meeting environmental objectives.[24]

30. **Feebates also have attractions over the current system of vehicle taxes related to engine size**. The excise component of current taxes on imported vehicles is related to engine capacity and vintage, with car excises varying from 5 percent on new vehicles with engine size less than 2,000 cc to 40–50 percent for used cars. Similarly, truck excises vary from 7.5 percent on new vehicles with engine size 2,001–3,000cc to 32–45 percent for used trucks. One problem with this system is that the more successful it is shifting consumers towards low-tax vehicles the less excise revenue is collected. In contrast, if the excise consists of: (i) a uniform percent tax on all vehicles with the rate set to meet revenue requirements; and (ii) a feebate designed to be revenue neutral, then as the feebate shifts people to more efficient vehicles there will be no revenue loss from the uniform tax component. Another problem is that the current excise tax system does not reward a switch towards more fuel-efficient vehicles within an engine size/vintage category defined by a given tax rate[25] whereas feebates provide continuous rewards for higher fuel efficiency vehicles within current tax rate categories. And because current excises are related to engine size rather than fuel consumption rates they do not encourage purchase of vehicles with other attributes that reduce gasoline or diesel consumption rates such as lighter body materials, reduced rolling resistance, smaller cabin size, and better aerodynamics.

31. **Feebates would not be a panacea however.** They are less environmentally effective than raising energy prices in that they do not encourage people to drive less, switch off the air conditioning and lighting, and so on.[26] In addition, regulatory approaches may be more suitable from an administrative perspective for the specific case of promoting more energy-efficient buildings, as building codes may combine, for example, requirements for walls, floors, ceiling insulation, windows, air leakage, duct leakage, rather than a single energy efficiency rating (which is amenable to fees and rebates). Annex II provides more details on practical design issues for feebates.

32. **A comprehensive system of feebates[27] applied to vehicles and electricity-using products, along with the renewables expansion and carbon taxation, would make significant progress on mitigation and energy efficiency goals, raise some revenue, and significantly cut**

[24] The incentive feebates create for shifting to more energy-efficient products can be strengthened by product labelling requirements informing consumers about the lifetime energy costs of different models.

[25] For example, the tax rate is the same 7.5 percent for new cars with 2001 cc as for new cars with 3,000 cc and all vehicles in between.

[26] In fact, by lowering average energy costs per unit of product use, feebates may encourage greater use of energy-consuming products, the so-called 'rebound effect'. Empirical studies suggest this effect is generally modest however. See, for example, Kenneth Gillingham and others, 2016, "The Rebound Effect and Energy Efficiency Policy," *Review of Environmental Economics and Policy,* 10: 68–88.

[27] Providing five times the price incentive as the carbon tax.

**the oil import bill**. This combination cuts economy-wide $CO_2$ emissions by an estimated 15 percent (below BAU) in 2025 and 24 percent in 2030; boosts energy efficiency by about 20 percent above 2015 levels by 2025 and 30 percent by 2030 (though some of this increase occurs in the BAU); raises revenues by 0.4 and 0.65 percent of GDP in 2025 and 2030 respectively; and reduces the oil import bill below BAU levels by 14 percent in 2025 and 23 percent in 2030 (Table 2). The deeper emission reduction targets in the NDC would require more radical penetration of zero-carbon technologies in the power and transport sectors.

## C. Complementary Pricing Policies

33. **Over the longer term (if the required capacity is developed), a feebate program targeted at marginal changes in sequestered forest carbon could provide nationwide incentives on private lands for carbon storage and other environmental objectives**. Carbon benefits from expanding forest coverage relative to baseline levels are potentially significant[28] and forest protection more generally can also prevent degradation of watersheds, soil erosion, flooding, and loss of biodiversity. A feebate applied to the forestry sector would provide a sliding scale of subsidies for increases in sequestered carbon relative to that in a baseline year and impose taxes on carbon releases relative to baseline storage. Feebates avoid the more limited effectiveness and higher transactions costs of project-based approaches and avoid large budgetary costs and complications posed by assessing 'additionality'. The first step however would be to develop carbon storage monitoring capacity under the REDD+ Readiness Program.[29] More discussion of the rationale for, and design of, feebate schemes for the forest sector is provided in Annex II.

34. **Grenada would benefit from a regional carbon price floor.** Unilateral increases in energy taxes in Grenada would raise concerns about competitiveness (e.g., for tourism and agricultural exports) and burdens on vulnerable households. However, benefits could best be reaped by a regional carbon price floor arrangement, based on the model for Canadian provinces and territories.[30] Regional policymakers should consider this possibility to reinforce their NDCs without incurring tax disadvantages.

[28] Increasing nationwide forest coverage in Grenada by 1 percent might sequester an extra 10,000 tons of $CO_2$ per year (though changes in forest practice might add significantly to this). 1 percent of land area in Grenada is about 1.3 square miles, or about 730 hectares. In moist tropical regions new forests can sequester up to about 11 tons of $CO_2$ per hectare per year in above-ground biomass and about another 3-4 tons below ground. See, for example, R. Mendelsohn, R. Sedjo and B. Sohngen, 2012, "Forest Carbon Sequestration" in I. Parry, R. de Mooij, and M. Keen (eds), *Fiscal Policy to Mitigate Climate Change: A Guide for Policymakers*, IMF, Washington, DC.

[29] Grenada is not currently participating in the REDD+ Readiness Fund that is helping 47 tropical and sub-tropical developing countries prepare for a future, large-scale system of incentives for promoting forest carbon storage, most notably by establishing capacity for measuring forest carbon inventories. See www.forestcarbonpartnership.org/redd-countries-1.

[30] See I. Parry and V. Mylonas, 2018. "Canada's Carbon Price Floor," IMF Working Paper 18/42.

***Recommendations for Reducing $CO_2$ Emissions***

1. Consider a moderately scaled carbon tax applied across fossil fuels (including those currently exempt from excise).

2. Progressively, and cost effectively, expand renewable power generation and energy efficiency through integrated resource planning and clarifying regulations under the Electricity Supply Act.

3. Consider creating a market for the private sector to scale renewable energy penetration through well-structured public private partnerships (PPPs) backed by clear regulations.

4. Modify the excise tax system for vehicles to include a feebate with the implicit CO2 price rising over time, and an ad valorem component set to maintain revenue.

5. Introduce a system of feebates for electricity-using products with the reward for energy efficiency rising over time and an ad valorem component set to maintain revenue.

6. Consider a feebate system to promote carbon storage in the forestry sector, following completion of the forest carbon inventory.

7. Discuss with other countries the possibility of introducing a carbon price floor arrangement for the Caribbean region to support the NDC process.

# ADAPTATION PLANS

*Grenada has made good progress in developing adaptation plans and has begun executing some major projects, including through significant support from the Green Climate Fund. However, progress is hindered by capacity constraints, particularly in investment project execution. Progress is being made on supporting policies and regulations. But there is room to improve particularly in the agricultural sector on land use policy, and with regard to social protection.*

***Has Grenada Developed an Adequate Strategy to Adapt to Climate Change?***

## A. Policy Framework and Sectoral Strategies

35. **Grenada has a well-articulated policy framework and sectoral strategies for resilience-building and has made good progress in costing them**. Climate change adaptation is a priority for the Government of Grenada (GoG), as has been reflected by the creation of the Ministry for Climate Resilience (MoCR) in 2017. That Ministry oversaw the development of the National

Adaptation Plan (NAP) (2017-2021) which provides a strategic, coordinating framework for building climate resilience in Grenada, recognizing the need to develop the enabling environment for climate change adaptation as well as programmatic priorities. It is an umbrella document, based mainly on prioritized climate change adaptation activities taken from existing sectoral and local area plans that have been developed through larger consultative processes in the past months and years. It also provides the framework for further integration of climate change considerations into planning and budgetary processes to "climate-proof" public and private investments. The NAP consists of 12 programs of action with 14 the corresponding goals, and 20 indicators with each having costed initiatives associated with them.

36. **While goals and strategies have been clearly outlined at a national level, some gaps remain in translating these goals to sector specific-strategies**. Where sectors have outlined comprehensive climate change adaptation strategies, the main hurdle to implementation lies in access to funding and human resources to implement the necessary activities. Additionally, high turnover in government positions has led to inconsistency in leadership, technical skills and ownership of climate change adaptation strategies. Sector staff have cited that this lack of consistency in a specific skill set has been a stumbling block in implementation of technical projects. Progress is being made in a number of areas on supporting climate adaptive policies and regulations, with the hope that this can facilitate increasing investment in adaptation. Key highlights are below:

- The Ministry of **Agriculture and Land** has a strategy for Climate Smart Agriculture (CSA) but lacks human and financial resources for implementing projects. Grenada's agriculture sector has been severely impacted by two hurricanes which disrupted production and damaged productive assets such as the stock of plants used in treecrop production. The number of farmers is declining, driven by a greater number of ageing farmers exiting the sector than young people willing to enter it. Despite public support to agriculture producers, the sector is not seen as attractive. Additional constraints include an increase in tree diseases, a lack of planting materials, and uncertainty around the economic impact of future extreme weather events. [31] The GoG has made efforts to improve risk management in the sector to reduce the sector's risk profile and increase its attractiveness through measures that would help to mitigate, reduce or transfer risk as well as support coping capacities when risks materialize. An increase in the adoption of CSA technologies and policies would have the potential to address these aspects and concrete implementation-ready technology have been identified[32]. Grenada has allocated USD 370,000 (EC$ 999,000) to an Emergency Relief Fund to help affected farmers in the event of losses. Other such tools included in the draft NAP could be developed, including increasing farmer access to accurate and timely hydrometerological information, improving the climate smartness of agricultural extension

[31] World Bank. 2012. "Agricultural Risk Management in the Caribbean: Lessons and Experiences." World Bank Latin American and Caribbean Region

[32] World Bank; CIAT; CATIE. 2015. Climate-Smart Agriculture in Grenada. CSA Country Profiles for Latin America Series. 2nd. ed. Washington, D.C.: The World Bank Group.

or an improvement in the disaster-resilience of propagation stations where strategic germplasm is conserved. Another such tool is agriculture risk insurance, which the government has been pursuing with regional and international partners. To make it functional, technical capacity building in agriculture insurance would be helpful as local insurers may require additional technical capacity in contract design and monitoring and to access reinsurance markets

- The Ministry of **Tourism and Civil Aviation** has a well-documented and costed plan for increasing resilience of airports, including building resilience in the runway and buffering it from sea level ride. Current constraints are in lack of financing and competing priorities within the country's three airports. Tourism is a clear revenue draw, but the minister notes the lack of cohesive approach or consistent government priority places on protecting state-owned tourism assets.

- The Ministry of **Health and Social Security** has identified a strategy to retrofit hospitals, and has made some progress in implementing in some facilities. However, further progress is currently constrained by lack of financing.

- Ministry of **Trade** is taking incremental steps in both climate change mitigation and adaptation, and for example instituted ban on single-use plastic and styrofoam imports, effective February 1, 2019. However, the ministry is somewhat limited in changes it can enact to individual policies because it is bound by CARICOM regulations. A key action the ministry can take is advocating for more climate change-responsive regional tariff policies

- Ministry of **Social Development** has implemented a comprehensive information management system through the SEED program that works to reduce fragmentation and duplication in existing social safety net programs. However, its inability to georeference beneficiaries and keep updated lists of vulnerable people limit its ability to scale up specific programs in response to impacts of natural hazards.

- Grenada is also embarking on a concept of **blue economy** which is cross-sectoral in its nature. Considering the importance of ocean issues and their role in both mitigating and adapting to climate change, major efforts have begun to build coastal resilience in Grenada. In this regard and in order to preserve, enhance, and strengthen resilience of coastal ecosystems while enabling social and economic development, Grenada has completed its integrated coastal zone policy in 2015 and is about to enact (expected in mid 2019) the Integrated Coastal Zone Management (ICZM) Act to further regulate the integrated use, development and protection of the coastal zone. Other efforts on the way include the improvements in the institutional and technical capacity for integrated coastal zone management, including those towards establishment of Coastal Zone Unit and development of a Coastal Zone Management Plan, among others.

## B. Public Investment

***Has the Country Developed an Adequate Strategy to Adapt to Climate Change?***

37. **Grenada has been increasing adaptation investments which are mainly financed by donors.** Adaptation investments have increased from a budgeted EC$37.9 million, 1.2 percent of GDP in 2018 to EC$62.1 million, 1.8 percent of GDP in 2019 (Table 3). This is broadly similar to the levels found in CCPAs for Belize and St. Lucia. In Grenada, they account for almost one-third of overall 2019 capital budget. Resilient infrastructure, disaster risk management, and sustainable natural resources are the biggest components of adaptation investments. However, due to the difficulties in implementing capital budget (the execution rate of adaptation investment budget was around 30 percent in 2018), actual adaptation investments may be lower than the budget.

**Table 3. Grenada: Climate Resilience Projects in Capital Program (in EC$ millions)**

| | Est 2018 outturn | 2018 Budget | Budget 2019 | | | |
|---|---|---|---|---|---|---|
| | | | Total | Domestic &NTF | External Grants | Loan |
| **Total Capital Budget** | **118.9** | **171.3** | **196.4** | **82.5** | **104.3** | **9.7** |
| **Climate Resilience Projects** | | | | | | |
| Climate Smart Agriculture | 0.2 | 3.8 | 8.3 | 0.0 | 8.3 | 0.0 |
| Disaster Risk Management | 6.3 | 8.2 | 11.3 | 0.0 | 11.3 | 0.0 |
| Human Resource Capacity | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 |
| Resilient Infrastructure | 2.5 | 11.7 | 19.0 | 1.5 | 14.5 | 3.0 |
| Sustainable Energy | 0.4 | 4.6 | 7.6 | 0.3 | 7.3 | 0.0 |
| Sustainable Natural Resources | 1.7 | 7.6 | 14.1 | 0.1 | 14.0 | 0.0 |
| Other | 0.5 | 2.1 | 1.6 | 0.0 | 1.6 | 0.0 |
| **Subtotal of Climate Resilience** | **11.6** | **37.9** | **62.1** | **2.1** | **57.0** | **3.0** |
| **Percent of GDP** | **0.4** | **1.2** | **1.8** | **0.1** | **1.7** | **0.1** |

Source: Estimates of Revenue and Expenditure for the Year 2019; IMF staff estimates.

## C. Other Public Programs (Regulation Reform, Zoning, etc.)

38. **Grenada lacks a comprehensive land use policy that takes into account hazard risk, as well as an updated, digitized and geolocated national cadaster**. A national land use policy was submitted to Cabinet in 2018 led by the Ministry of Agriculture. There is no urban development policy.

39. **Legislating and enforcing policies will continue to be an issue**., For example, the enforcement of building codes and proper drainage maintenance is weak in part due to shortages in staffing. There are only 3 building inspectors for the entire country in the Physical Planning Unit, and 2 are nearing retirement with no succession plan for staffing underneath to replace them. Drainage maintenance is both a technical and financial issue – on one hand the Ministry of Public Works does not have the required maintenance budget needed, and there is no overall asset management of infrastructure to program routine and required maintenance.

## D. Financial Sector Preparedness

***How is the Financial Sector Contributing to the Climate Response Effort?***

40. **The ECCU financial system has not been much involved with the climate change strategy, and awareness of issues is relatively low**. Local banks could play an important role in supporting investment in resilience by engaging with small and medium enterprises, mobilizing innovative financing, and being a positive force in disaster preparedness. However, the indigenous financial system does not generally participate in innovative financing. Some commercial banks may have infrastructure in their loan portfolio, but mainly focus on consumer lending. Nonbanks do not participate in big-project financing.

41. **Grenada has a comfortable level of imputed international reserves in the regional central bank (ECCB) that can be used as financial buffers**. For ECCU countries, the automatic availability of ECCB reserves has been a key and timely source of resilience after disasters in the past. Grenada's net reserves at the ECCB have reached four and a half months of imports and some 26 percent of broad money, which are deemed adequate against the benchmarks of 3 months and 20 percent, respectively.

***Recommendations for Adaptation (continued)***

1. Develop an Inventory of public assets and power infrastructure in Grenada that follows an updated and finalized land use policy and links to an updated geo-referenced cadaster.

2. Map infrastructure assets to areas that are vulnerable to climate risks and natural disasters and take actions to enhance resilience such as land raising, segmentation of transmission lines, relocation of assets, and building barriers.

3. To mitigate, reduce, or transfer risk and increase coping capacity supported by improved hydrometeorological information service delivery for farmers.

4. Draft and implement a nationwide vegetation management plan.

5. Strengthen the enforcement of building codes and draining maintenance.

6. Strengthen institutional and further advance enabling policy environment for building coastal resilience and advancing the blue economy approach.

# FINANCING STRATEGY FOR MITIGATION AND ADAPTATION PROGRAMS

*Grenada faces huge financing challenges to meet its ambitious climate change policy. Amendments to the fiscal responsibility law may provide some space for increasing resilience investment while safeguarding fiscal responsibility. Grenada has begun to be successful in accessing global climate*

*financing but accessing available grant financing is crucial for Grenada to ramp up investment while ensuring long term fiscal sustainability. Increasing private sector participation will also be important.*

## A. Current State of Financing

***Does Grenada Have Adequate Financing to Meet the Needs of Its Climate Change Strategy?***

42. **Grenada's ambitious climate change policy requires significant increases in financing**. The overall cost of the policy is estimated to be around US$500 million, equivalent to 42.2 percent of its 2018 GDP (Table 4).

- **For mitigation, the financing needs identified in the NDC amount to US$161.4 million, equivalent to 13.6 percent of 2018 GDP.** If US$100 million could be financed by private sector, and the rest can be spread evenly over ten years, the annual cost borne by government would be around 0.5 percent of 2018 GDP. However, these costs may increase as the NDC is updated and refined, including to take into account the analysis in the mitigation section above. A clear strategy for mobilizing the private sector will be required together with the development of an enhanced framework for PPPs.

- **For adaptation, the financing needs identified in NAP and updated by the MoCR come to around US$340 million, equivalent to 28.6 percent of 2018 GDP**. Public investments are the biggest component of the NAP. Infrastructure and land, water availability, food security, ecosystem resilience, and coastal zone management are the priorities. In the NAP, they consume more than 96 percent of total investments. Since the establishment of the Ministry of Climate Resilience, the government has further mainstreamed adaptation plan and added additional US$77 million investments. The estimated average annual cost would be around 2.9 percent of 2018 GDP, assuming the adaptation plan will be delivered in ten years (of which around 2¼–2½ percent of GDP would take place at the central government level).[33]

43. **Grenada's fiscal situation has improved in recent years but fiscal space to implement the strategy remains constrained.** Grenada has significantly reduced its debt levels, central government debt has dropped from 108 percent of GDP in 2013 to around 63½ percent of GDP in 2018. The budget is in a strong position, with a primary surplus of around 7 percent of GDP in 2018, in part due to the continued strong performance of Citizenship by Investment (CBI) revenues.[34] This strong performance has been assisted by the 2015 Fiscal Responsibility Law (FRL)—discussed below—which will continue to guide the fiscal space available for increasing non-grant-financed climate-related investment.

[33] Part of the indicated scale-up would take place at the level of public enterprises for example as is currently occurring with the water project, for which grant financing from the Green Climate Fund has already been secured.

[34] Around 4.6 percent of GDP in 2018. This is based on officially-published data on the CBI inflows, which are reported on the committed-amount basis.

44. **Further mobilizing external grant financing is therefore crucial to implement the climate change strategy while maintaining fiscal sustainability.** The FRL may soon allow some increase in domestic revenue and loan financing of climate investment (see below). This could open possibilities for using innovative financing options such as blue bonds. Nevertheless, maximizing access to available grants in particular from climate and environmental funds, is crucial to maintain fiscal sustainability while achieving adaptation goals. Given the limited availability of grants, they will need to be combined with enhanced domestic revenue mobilization and full utilization of concessional IFI financing.

## B. Institutional Issues

45. **Grenada has made good progress in unlocking access to climate funds.** In early-2018, the country secured a US$43 million (some 4 percent of GDP) grant from the Green Climate Fund (GFC) for a sustainable water project that would be implemented in cooperation with the public water company (NAWASA) over the next four years. GIZ has significantly assisted in attracting the grant, including using its accreditation with the GFC and contributions to fulfilling the GFC's project-specific requirements as well as collaborating on the government's policy documents that govern the response to climate change. Grenada also secured an engagement with the New York University's program of climate-smart cities for its capital St. George's. The program is also financed by a grant from the GFC. This program is seen by the GFC as a prototype for other Caribbean and small island countries.

46. **The fiscal responsibility law (FRL) provides a critical organizing framework for overall fiscal sustainability and financing that can facilitate accommodation of adaptation policies.** The law mandates maintenance of significant primary surpluses until the public debt is reduced below 55 percent of GDP. The better fiscal position and lower debt level would help reduce interest rates and financing needs, thereby facilitating access to funding on sustainable terms. Other FRL parameters such as the primary expenditure rule and the wage bill rule help support fiscal prudence by generating fiscal savings in good times and addressing the key sources of fiscal pressure. In this context, grant-financed capital spending is exempt from the primary expenditure growth cap, thereby helping incentivize the execution of grant-financed projects, including those related to climate change. The FRL also envisions pre-determined escape clauses for the occurrence of natural disasters. With respect to financing, the FRL requires that 40 percent of the CBI revenue be allocated to the Contingency Fund, whose balance could be used for debt repayment and addressing natural disasters. It also envisions comprehensive planning and reporting requirements, including presentation of the medium-term fiscal framework and the debt management strategy during the budget process.

**Table 4. Grenada: Financing Needs for Climate Change 1/**

| Needs | Indicative cost (US$ m) | o/w Private Sector | Average Annual Cost (US$ m) | Annual Cost/Percent of 2018 GDP |
|---|---|---|---|---|
| **Mitigation (NDC)** | **161.4** | **100.0** | **6.1** | **0.5** |
| **Adaptation (NAP and latest updates)** | **339.1** | | **33.9** | **2.9** |
| Institutional improvement | 0.3 | | 0.0 | 0.0 |
| Policy development | 0.7 | | 0.1 | 0.0 |
| Water availability | 50.2 | | 5.0 | 0.4 |
| Food security | 46.0 | | 4.6 | 0.4 |
| Ecosystem resilience | 26.6 | | 2.7 | 0.2 |
| Coastal zone management | 15.0 | | 1.5 | 0.1 |
| Infrastructure and Land | 112.9 | | 11.3 | 1.0 |
| Disaster and disease management | 0.2 | | 0.0 | 0.0 |
| Climate data | 7.0 | | 0.7 | 0.1 |
| Public education | 1.7 | | 0.2 | 0.0 |
| Adaptation financing management | 1.4 | | 0.1 | 0.0 |
| Monitoring and evaluation | 0.2 | | 0.0 | 0.0 |
| Not in NAP | 77.0 | | 7.7 | 0.6 |
| **Total** | **500.6** | **100.0** | **40.1** | **3.4** |

Sources: Grenada Intended Nationally Determined Contribution (2015); Grenada National Climate Change Adaptation Plan (2017); Ministry of Climate Resilience; IMF staff estimates and projections.
1/ Assumes the plans will be implemented in 10 years

47. **Revisions to the FRL currently under consideration would provide some space for increasing climate-related investment.** The FRL has been crucial in putting Grenada's public finances on a sound footing, and it is critical not to depart from the prudent principles it has put in place. However, with the transition to Phase III approaching, now is a good time to consider limited

**Table 5. Grenada: Fiscal Responsibility Law**

| | Phase I | Phase II | Phase III |
|---|---|---|---|
| **Period/Milestone** | **2015-2016** | **2017 until Debt/GDP reaches 55%** | **After Debt/GDP reached 55%** |
| **Primary Balance Rule** | ECF-supported program targets | 3.5% of GDP surplus | 0.7% of GDP deficit [1] |
| **Primary Expenditure Rule** [\2] | 2% real growth cap | 2% real growth cap | 3% real growth cap |
| **Wage Bill/GDP** | 9% of GDP ceiling | 9% of GDP ceiling | 9% of GDP ceiling |

1/ Staff assessment of debt-stabilizing primary balance based on current projections once the public debt-to-GDP target of 55 percent is reached

2/ Excludes grants and NTF funded capital spending. The expenditure rule of 2 percent was based on potential output growth estimated in 2014 and the 3 percent estimate is based on staff assessment at end 2018. Under the FRL, upon reaching phase III and every 5 years thereafter, potential growth and the debt stabilizing primary balance are to be re-estimated or recalibrated.

amendments to ensure the FRL remains appropriate, including in the context of the increasing urgency of climate adaptation. Amendments under consideration, based on IMF technical advice, would provide more space for climate-related investment by exempting this from the expenditure rule. At the same time, they would strengthen the fiscal strategy process to ensure that fiscal policy targets the building of further fiscal buffers enabling the government to manage risks, including those stemming from climate change.

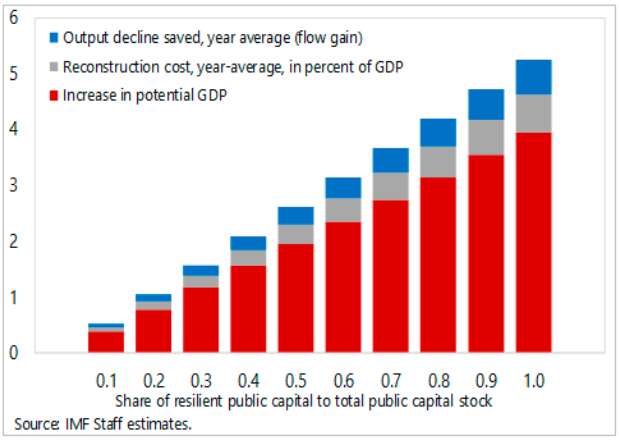
## C. Climate Change Spending Effects and its Consistency with Financing Plans and Fiscal and External Debt Sustainability

***Are Grenada's Climate Changes Plans Consistent with Fiscal and External Debt Sustainability?***

48. **Implementing the resilience-related spending plans should boost growth over the medium term (Figure 9).** In the short term, an increase in spending boosts growth through fiscal multiplier effects. In the medium and longer term, more resilient public infrastructure raises returns to private investment and labor supply, increasing private capital accumulation and labor contribution to growth. Staff's DSGE-based simulations show that in Grenada this works through several channels. Assuming historical cost of natural disasters and, for illustration, achieving a public capital stock that is 80 percent resilient would imply a steady state level of potential output 3 percent higher than without the investment in resilient infrastructure. This would be achieved through reduced net emigration and higher supply of private labor and capital. In addition, there would be further beneficial effects on long-term output from lower reconstruction costs and reduced output losses in the event of hurricanes.

**Figure 9. Grenada: Long-term GDP Return of Resilient Investment**

(Percent change relative to no resilient investment)




49. **However, even these ambitious investment plans may still not fully protect growth in the longer term.** Augmenting the DSGE model for climate change provides additional insights on the benefits and trade-offs involved in building resilient capital (figure 10). Assuming that 80 percent of annual public investment is continually allocated to resilient public capital,[35] by 2050 the negative effects of climate change on most economic variables would be more than offset. In particular,

[35] The scale-up in capital spending assumed by the DSGE model is around 2 percent of GDP annually, which is broadly consistent with the magnitude of the increase in climate change adaptation spending at the central government level as discussed in section [A].

output, private employment, private investment, and tax revenues would be higher with resilient capital than in 2018 (instead of being lower without resilient capital), and there would be net immigration instead of emigration. By contrast, by the year 2100 the modelled qualitative benefits of greater resilient investment would be reversed, with falls in steady-state output, private investment and employment that accompany a significant out-migration and drop in tax revenue relative to 2018 levels. This result suggests that the costs of climate change could overtake the benefits of resilient public investment over this longer-term horizon.[36] Such a conclusion occurs in the model because, on the one hand, the incremental benefits of resilient investment are assumed to be significantly smaller during 2050-2100 than 2018-50 (by 2050 the capital stock will have reached levels that are close to the benchmark 80 percent resilience ratio). On the other hand, the costs of climate change would continue to grow rapidly, particularly since private capital would remain non-resilient, as well as due to that the resilience of the public capital stock would remain partial at 80 percent. This result underscores the importance of measures to incentivize resilience of private capital in addition to forcefully implementing plans to boost the resilience of the public capital stock.

50. **Accommodating climate change spending without a significant step up in grant financing could be unsustainable.** While fiscal policy has been prudent and anchored by the FRL, its key parameters will be soon subject to a regime-change. In particular, once the public debt ratio reaches 55 percent of GDP (now projected for 2020 or 2021, depending on the exact coverage of debt), the FRL calls for recalibrating the primary balance target to a debt-stabilizing level. This would create scope to reduce the fiscal balance significantly over the next few years. In this context, the fiscal and economic outcomes would crucially depend both on specific policy choices and the pace of absorptive capacity improvements in key areas of public spending. Several Illustrative medium-term scenarios underscore this point:

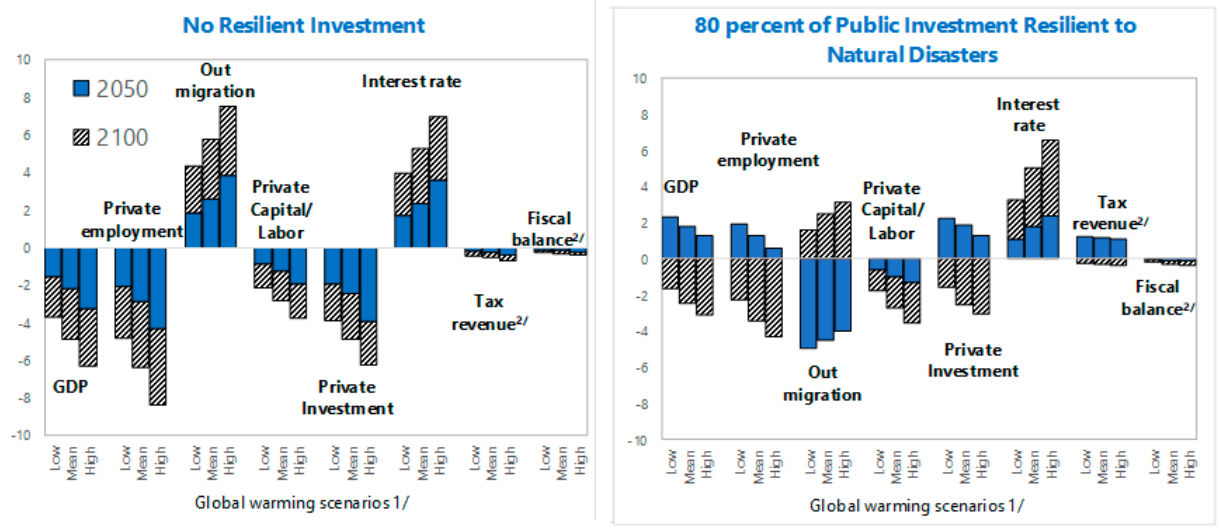
- The **baseline scenario** assumes modest reforms and capacity improvements, whereby the significant fiscal expansion permitted by the FRL would result in spending on inefficient (predominantly non-climate-related) projects or initiatives, with limited benefits for growth. While the public debt ratio trajectory would broadly stabilize, it would be difficult to accommodate substantial climate-related spending because of difficulties in executing grant-financed projects due to low capacity and poor cost-benefit trade-offs for debt-financed projects.

- In a **pro-active scenario**, capacity improvements would be aggressively pursued in parallel with using the fiscal space to address general infrastructure and resilience-building objectives.[37] The investment spending would be supported by moderate essential increases

[36] Still, resilient investment would entail better economic outcomes than under the counterfactual of no resilient public investment by 2100.

[37] It is assumed that in the pro-active scenario the resilience-building objectives would be pursued incrementally through enhanced maintenance spending and better resilience characteristics of regular infrastructure projects as opposed to new projects.

**Figure 10. Grenada: Economic Impact of Global Warming**
(In percent change relative to 2018, unless otherwise indicated)




Source: staff calculations based on authorities' data.
1/ Based on increase of athmospheric temperatures in the RCCP8.5 scenario, the IPCC 2014 report:
Low: 1.2 and 3.0 degrees Celsius by 2050 and 2100 respectivelly.
Mean: 1.7 and 4.3 degrees Celsius by 2050 and 2100 respectivelly.
High: 2.2 and 5.6 degrees Celsius by 2050 and 2100 respectivelly.
2/ In percentage points of GDP.

in current spending (e.g., additional hiring of engineers) and well-targeted increases in social protection spending. Staff's simulations illustrate that this scenario will have a higher payoff in terms of sustained growth than the baseline scenario and will; eventually result in a lower debt trajectory.

- In the **CCPA scenario**, the climate change spending scale-up based on NAP-related projects would be implemented on top of the pro-active scenario. As can be seen in the charts if all of the scale-up is financed by new borrowing, this will result in up-trending debt dynamics despite the additional positive effects on economic growth. These results reinforce the need for the authorities to seek grant financing and private sector participation for the bulk of additional CCPA-related spending. Additional fiscal space would be needed to back-stop the uncertainties, timing delays, and other mismatches that are associated with grant financing.

51. **Similar implications hold for external debt sustainability.** When the borrowing for the scale-up in the climate change spending comes from external sources (this is the more realistic scenario, as small domestic financial markets limit capacity to extend financing for the extra public investment), it would worsen the external debt sustainability.

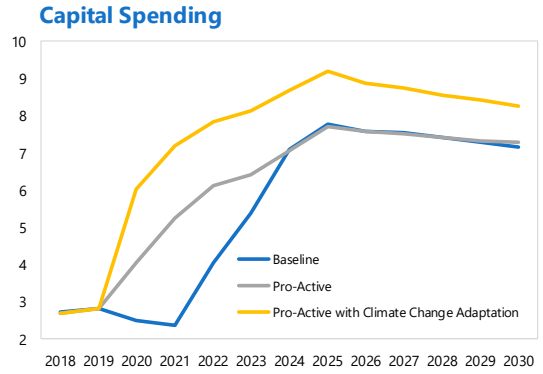
## D. Other Macro-Considerations

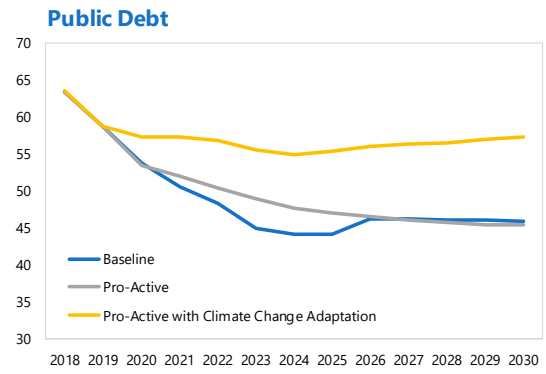
52. **Implementation of climate change mitigation policies via carbon taxes, renewables subsidies, and feebates could also have other positive macroeconomic effects.**

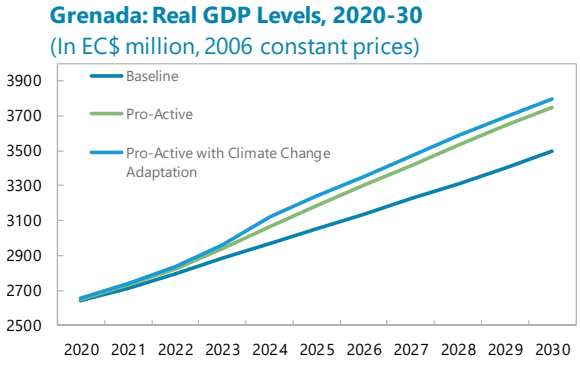
- **Balance of Payments.** A shift to renewable energy for power generation and a wider use of energy-efficient vehicles and products could reduce energy imports and improve the balance of payment. Depending on the combination of mitigating policies, the import bill could decrease by up to 0.8 percent of GDP by 2030 (Table 2).

- **Revenue**. A coordinated action on carbon taxes and relevant feebates could moderately increase revenue by up to 1 percent of GDP, depending on the combination of mitigating policies (Table 2).

**Figure 11. Grenada: Climate Change Spending Scale Up and Macroeconomic Implications**




Source: IMF Staff projections.

1. Baseline – uses current parameters of the FRL including a 3-year transition to Phase III with full upward adjustment in spending levels to achieve a debt-stabilizing balance. Assumes a modest implementation of the Public Sector Modernization Strategy and that general grant financing is sustained through 2024 before declining.
2. Pro-Active -- assumes a more gradual 5-year transition period to Phase III, which allows for implementation of fiscal reforms including (i) significantly improved quality of capital spending, (ii) stronger implementation of the Public Sector Modernization Strategy, (iii) greater well-targeted social protection schemes; and (iv) improved revenue efficiency and unproductive spending savings that helps generate savings for increased social protection. 3. Multipliers – draws on WP/19/72 that calculates fiscal multipliers for small states (investment shock), using the upper range and longer-horizons for the pro-active scenario due to improved efficiency of its spending relative to other scenarios.
4. Note: For comparability, the differences between the scenarios have concentrated on capital spending path. Also for comparability, the baseline and pro-active scenarios do not assume additional impact of CCPA-related spending, which is a separate scenario based on the pro-active scenario.

***Would Implementation of the Climate Change Plans Have Any (Good or Bad) Spillover Effects to the Macro-economy?***

***Recommendations for Financing***

1. Clarify remaining financing needs, by updating the NAP.

2. Prioritize the maintenance of the foreign-financing pipeline, with emphasis on ensuring maximum concessionality.

3. Well use available fiscal space, guided by the FRL, to invest in infrastructure and resilience-building.

4. Ensure all relevant policy and legal frameworks are in place for attracting private investment in the energy sector and other relevant sectors (e.g., sustainable tourism).

# RISK MANAGEMENT STRATEGY

*Grenada has put in place a number of elements of a comprehensive risk layering strategy, including establishing contingency funds, participating in regional parametric insurance for budget support schemes and including a hurricane clause in debt restructuring agreements. However, indemnity and catastrophe insurance is under-used and Grenada has not established contingent lines of finance. Fiscal buffers also fall short of prudent levels. Grenada could enhance its risk management approach by putting in place a National Disaster Risk Financing Strategy as a central element of the broader DRS. This would guide future policy making with regard to risk transfer and retention, including trade-offs between options and provide a framework for seeking increased international support.*

## A. Risk Assessment Procedures

53. **Grenada has well-identified natural disaster and climate risks, but this falls short of a comprehensive risk and contingent liability assessment**. Work on risk identification has been undertaken in partnership with development partners and regional climate change entities like the Caribbean Community Climate Change Center, Grenada, however, lacks a framework that defines government's contingent liabilities in case of a disaster.[38] While the government has in its arsenal various approaches to model the economic costs of disasters provided by or jointly created with development partners, the government does not yet have ownership in the process of quantifying risks associated with climate-related hazards. The fiscal risk statement prescribed by the FRL has been prepared for the 2017 and 2018 budget presentation. However, it does not as yet provide any

[38] The World Bank has developed a risk-layered framework for optimizing disaster financing strategies. Countries need a mix of complementing financial instruments addressing their contingent liabilities at the lowest economic cost. In practice, this means that—having taken stock of their risks—governments should provision for the costs of small, frequent disasters through reserve funds and budget reallocation; moderate disasters will require financing beyond reasonably-sized domestic savings and can be financed by ex-ante contingent financing arrangement and sovereign insurance instruments; the largest disasters can be partially covered by insurance, and remaining risk will be addressed by ad hoc grants and loans from the international community, reducing the need for increasing debt and/or taxes. See *"Financial Protection Against Natural Disasters: An Operational Framework for Disaster Risk Financing and Insurance,"* World Bank, 2014.

detailed analysis of the potential implications of natural disasters and the effects of climate change or discuss how these would be met. The World bank has provided TA for assessment and quantification of fiscal risks arising from contingent liabilities in the SOE sector which will be included in subsequent Fiscal Risk Statements.

54. **Annual average fiscal costs of natural disasters are estimated to be in the range of 0.3-0.5 percent of GDP**. A recent World Bank study combining actuarial analysis and probabilistic modeling found that on average, in the long term, the government would need to cover losses of approximately USD 3.5 million (EC$ 9.5 million) annually –0.3 percent of Grenada's gross domestic product (GDP) – to address its contingent liabilities related to hydrometeorological events. This amount is equivalent to 1.4 percent of the government's total expenditure for 2016. IMF assumptions of the future fiscal cost of natural disasters are broadly consistent with these estimates putting those at around 0.5 percent of GDP, as there are additional risks from other types of disasters, the effects of progressive climate change, and potential for government's financing pressures that can extend beyond its contingent liabilities.

55. **Costs to the wider economy are greater**. Disasters also have serious impacts on the private sector and built infrastructure; damage to public and private commercial, residential and government buildings combined will amount to USD 10 million (EC$ 27 million) on average each year in the long run, or 1.1 percent of GDP. For any given year, Grenada has about a 1 percent chance of losses from hurricanes exceeding USD 246 million (EC$ 664 million) for the economy as a whole[39]

## B. Self-Insurance and Risk Retention (Government Financial Buffers Including Contingency Provisions, Reserves, and Beyond)

***To What Extent Does the Government Self-insure Against Risks?***

56. **Grenada can adjust its approach to disaster financing to be more timely and cost-effective and to minimize opportunity costs.** Funds for short-term disaster relief and some recovery expenditures are currently reallocated from existing recurrent or capital expenditures and accounted for in a supplementary budget. The government is forced to reallocate funds from essential development activities to crisis response. Financing for long-term reconstruction takes the form of International assistance and loans secured on an ad hoc basis after disaster strikes, further limiting fiscal space and exacerbating the country's sovereign debt challenges.

57. **Grenada has a number of buffers that act as self-insurance against risks, including from natural disasters**. These have been increased in recent years in recognition of the importance of ex-ante planning for financing post-disaster response. The buffers reduce the need to divert spending away from other high priorities, or incur additional debt, in the event of a natural disaster.

[39] The World Bank 2017 report, *Advancing National Disaster Risk Financing in Grenada*, includes quantification of the potential costs of earthquakes, hurricanes, and floods.

However, none of these buffers must be reserved for responding to natural disasters and the institutional and regulatory procedures surrounding their use is often unclear.

- **Budgetary contingency**. Consistent with the PFM act the budget each year includes a contingency provision equal to 2 percent of revenues, in 2018 this was EC$15 million. This reserve is available for unexpected expenditures but requires a supplementary budget. It has not historically been used for natural disasters, and would rapidly be depleted at the onset of a disaster. The appropriated amounts are not capitalized into a fund, rather they just form part of the government's regular cash reserves.

- **National Transformation Fund (NTF) Contingency Fund**. The NTF is established by law and funded by CBI revenues. It provides grant financing to the budget for capital projects. The FRL requires that, while debt remains above a threshold level (55 percent of GDP), the first 40 percent of CBI inflows be placed into a contingency fund for arrears repayment, debt reduction, and contingency financing for disaster relief. Up to now, these resources have been saved within the NTF but have not been physically placed into a contingency fund. The current value of the contingency fund, after several arrears and debt reduction operations, is around EC$40 million. The GoG is in the process of drafting the necessary implementation regulations to operationalize the NTF Contingency Fund (with World bank support). The main objective of the Fund is to provide financial resources to cover medium-size natural disasters, where the budget reserve might be insufficient and where insurance relief is not available. The regulation defines: (i) the objectives of the Fund, in particular putting emphasis on the use of resources for relief from a National Disaster; (ii) the rules of accumulation of the Fund, (iii) the rules of use of the Fund in line with the objectives of the Fund and the Fiscal Rules. The regulation also establishes the governance structure of the Fund and develops the transparency and accountability framework for the Fund. Drafting of the regulations and adoption by Cabinet should be completed in mid-2019.

- **Sinking fund**. The government also maintains a sinking fund with the ECCB, of around EC$37 million. These funds are intended for debt reduction, but are freely available to the government and thus could be drawn down in the event of a major natural disaster.

58. **The GoG accessed the National Insurance Scheme (NIS), a pension program, to respond to Hurricane Ivan's impact on short-term unemployment.** The program's mandate was expanded to pay benefits in the form of unemployment insurance. This Temporary Unemployment Program assisted employees displaced as a result of the hurricane. The program budgeted for USD 3.7 million (EC$ 10.0 million) but disbursed only USD 2.7 million (EC$ 7.3 million) to claimants, indicating a stronger recovery than expected.[40] The NIS currently does not offer unemployment insurance as a result of a natural disaster, only as a result of injury.

[40] World Bank, Latin America and the Caribbean Hazard Risk Management Unit. 2005. "Grenada: A Nation Rebuilding. An assessment of reconstruction and economic recovery one year after Hurricane Ivan."

59. **Grenada could also benefit from contingent financing from development partners.** For now, Grenada does not have any formal contingency financing agreements in place. In the event of a natural disaster, Grenada would be able to develop financing with the IMF (through an RCF) and development partners such as the World Bank and IADB or, at potentially high cost, through the private sector. However, official financing would take time to organize. Arranging contingent financing would mean that resources would be rapidly available, at affordable rates. The World Bank's CAT-DDO is one vehicle designed to serve this function by allowing the government to quickly access a portion or all of a predefined amount of concessional credit. The IADB Development Sustainability Contingent Credit Line and well as the World Bank Contingent Emergency Response Component (CERC) are two other options that allow the government to divert financing from ongoing development projects and turn it into flexible financing for post-disaster response.

60. **The government has also put in some measures to facilitate self-insurance by the private sector.** For instance, Grenlec is allowed to put aside some of its pre-tax profit into a reserve that can be used to replace non-insurable infrastructure. This reserve currently stands at around EC$25 million and serves to reduce the likely burden on government following a major natural disaster. Grenlec also contributes to and can benefit from regional arrangements between electricity companies for responses to natural disasters.

***To What Extent Does Grenada Transfer Risk?***

61. **Grenada has been a member of CCRIF SPC since 2007, with a parametric windstorm and earthquake insurance policy.** It has not yet qualified for a disbursement**.** In 2014, Grenada added excess rainfall insurance policy to its suite of coverage. In October 2014, Grenada experienced a rainfall event that triggered a "Covered Rainfall Event" according to CCRIF SPC's model. However, the loss calculated was below the policy's attachment point, so no payout was due. In 2013, the World Bank signed a 3-year, USD 2 million (EC$ 5 million) agreement with Grenada to pay almost all of its annual premiums to CCRIF SPC. Grenada's 2015–2016 fiscal year was the last year that this agreement stood. Grenada is still a member of CCRIF and is seeking donor assistance to purchase CCRIF insurance at an increased level of coverage to ensure that fiscal policies are not derailed by natural disaster shocks. While CCRIF payouts are transferred directly to the consolidated fund as budget support, other parametric products also offer customized coverage for vulnerable sectors (Box 2).

**Box 2. Parametric Insurance in the Fisheries Sector**

The government is exploring innovative coverage of the fisheries sector through The **Caribbean Oceans and Aquaculture Sustainability Facility (COAST**), expected to start in July 2019.

The Government of Grenada (GoG) is acquiring parametric insurance from CCRIF SPC (formerly the Caribbean Catastrophe Risk Insurance Facility), to protect the food security and livelihoods and to promote the resilience of the fisheries sector against extreme weather. Parametric insurance for the fisheries sector will allow the GoG to transfer contingent liability arising from natural disasters that impact food security and livelihoods. COAST will promote long term policy objectives in the fisheries sector by harmonizing government plans for disaster risk management as well as ecosystem management, incentivizing climate smart fisheries best practices, and

**Box 2. Parametric Insurance in the Fisheries Sector (concluded)**

ensuring fishers meet minimum levels of shared governance as a prerequisite for coverage as a beneficiary of insurance. Coastal communities in Caribbean countries are particularly vulnerable to climate change related hazards (Calil et al., 2017). Studies have shown that on one hand climate change is modifying fish distribution and the productivity of marine and freshwater species. This has impacts on the sustainability of fisheries and aquaculture, on the livelihoods of the communities that depend on fisheries, and on the ability of the oceans to capture and store carbon. Simultaneously, on the other hand many Caribbean fisheries are faced with diminishing fish stocks due both to unsustainable fishing practices and overuse of coastal habitats as well as shifts in the distribution of fish species due to long-term climate change effects (i.e., coral bleaching, nearshore temperatures, and ocean acidification).

Projections of future climate scenarios include an increase in annual mean temperatures as well as increased variability in rainfall (i.e., more extreme droughts during the dry season and more intense rainfall in the wet season). Increased frequency and or severity of storm surges – exacerbated by sea-level rise – are also expected. These factors are expected to contribute to flooding, landslides and erosion in coastal areas that lie in the direct path of severe weather events including tropical storms and hurricanes. In the absence of significant adaptation efforts, severe weather events will increasingly impact fisheries resources and the sector in general, but also the health and status of coral reefs, water resources, land resources, the agriculture sector, forests and other ecosystems. Recent hurricanes in the Caribbean and their devastating effects demonstrate the need for a climate risk insurance product to effectively provide a level of financial protection to fishing communities and countries allowing them to increase their financial response capacity so that they can recover from the inevitable damage of such events; returning to fishing activities with minimal disturbance and reducing the impacts on their livelihoods.

The **Caribbean Oceans and Aquaculture Sustainability faciliTy (COAST)** is an innovative climate risk insurance mechanism to promote: food security; livelihoods of fisherfolk; resilient fisheries; sustainable management of coastal infrastructure; and disaster risk reduction in the Caribbean. COAST is a partnership among the US Department of State, the World Bank, CCRIF SPC, and the Caribbean Regional Fisheries Mechanism (CRFM). The facility - that will drive sustainable finance for Caribbean fisheries - was envisioned as a parametric insurance product at a scale relevant to vulnerable fishing communities. Leveraging existing models for tropical cyclone and excess rainfall, the COAST insurance product support governments efforts to rapidly put money into the hands of those impacted by extreme weather providing immediate economic relief and promoting a culture of building-back-better after a disaster to enhance coastal community resilience after an extreme weather event.

62. **Grenada has also negotiated a reduction in its debt service in the event of a natural disaster.** As part of its 2015 debt restructuring, Grenada agreed hurricane clauses with its creditors, whereby debt service on the restructured debt (mainly to 2025 private bondholders, but also to Taiwan and the Paris Club) would be automatically re-profiled following a hurricane and in some cases other types of natural disasters. The agreed period of a pause in debt service is up to one year, depending on the severity of the event. The key trigger was parametric and tied to a verification by an independent insurance body (CCRIF), whose payout for modelled losses had to exceed US$15 million. This clause could release up to EC$45 million in funds in the event of a major natural disaster (the amounts would be smaller for smaller events, depending on the triggers).

63. **Most public assets, including critical assets such as hospitals and schools, are not currently insured against natural disasters**. The GoG can more cost effectively mitigate natural disaster risk by insuring public assets and consolidating coverage into larger policies that reduce

rates. Current soft market conditions mean that premiums are lower, coverage is broader, and underwriting is easier.

64. **The private sector is also insufficiently covered by insurance (Box 3).** While Grenada has slightly higher insurance market penetration than the Caribbean as a whole, it is only marginally better insured than other jurisdictions in the Eastern Caribbean. In 2015, life and non-life insurance penetration (comprising total GWP as a percentage of GDP) was 6.1 percent, slightly above that of the Pan-Caribbean region (5.8 percent). The non-life insurance penetration was 3.8 percent in 2015. Grenada has been a leading jurisdiction among the Organization of Eastern Caribbean States (OECS) in trying to harmonize regional insurance laws. Grenada has approximately one insurer for every 7,000 inhabitants, which, in fact, is a better ratio than other OECS jurisdictions, where there is approximately one insurer for every 3,700 inhabitants. The Grenadian insurance market is moderately concentrated, with the top 10 insurers writing more than 90 percent of the general insurance business in 2015. The insurance sector in Grenada mirrors those of many other Caribbean islands in that insurance companies comprise a proliferation of general agency operations sharing the market with a relatively small number of largely Caribbean-owned companies, although the presence of non-Caribbean insurers is very limited. The number of agencies and companies is disproportionately large for the small volume of business in the region. Furthermore, any insurer wishing to operate on more than one island must apply for a separate license.

### Box 3. Private Sector Insurance Coverage

**In 2013, Grenada's per capita spending on property insurance was USD 310 (EC$ 837)**. Gross written premium (GWP) increased slightly between 2012 to 2013, while there was a modest regression in 2014 and2015. Property premiums have actually stagnated or contracted recently, along with the automobile business, which is feeling the effects of increased competition and rate reductions. The 2009 collapses of the Colonial Life Insurance Company and the British American Insurance Company, while mainly affecting the life and health insurance sectors, has fueled a lack of confidence and trust in insurance companies in the region. Insurance premium collection issues have become a current and serious concern to insurers and will likely continue./[1]

**Market observers comment that when mortgages in Grenada end and banks no longer require insurance on mortgaged properties, many insureds lapse their policies**. In recessionary times, these lapses are not replaced in the same numbers by new mortgages being contracted and so the market shrinks. The situation is compounded in the commercial sector by the closure of businesses and by fewer construction projects being undertaken.

**Underinsurance remains common, even in the aftermath of Hurricane Ivan**. In the current economic climate, local sources report that, even if insureds understand the average clause, they will still often underinsure purely for reasons of cost. United Kingdom-style average clauses apply to property policies on either an 85 percent basis (usually for homeowners) or a 100 percent basis and may only be deleted under exceptional circumstances.

**Market sources indicate that only 20 percent to 40 percent of homeowners are estimated to have windstorm insurance,** often conditioned on borrowing money. Insurance is generally limited to mortgage holders, a minority in Grenada. Many individuals insure only the value of their loan and will cancel coverage when the loan has been repaid. Furthermore, insurance settlements are not always sufficient due to such factors as underinsurance and the rise in construction prices following hurricanes.

### Box 3. Private Sector Insurance Coverage (concluded)

**Low-income individuals in Grenada are eligible for insurance from wind and excess rain through the Livelihood Protection Policy (LPP**), a weather index-based insurance policy designed by the Grenada-based Trans-Nemwil Insurance Ltd., together with Grenada Co-Operative Bank Ltd. and Grenville Co-Operative Credit Union. The LPP helps low-income individuals recover from the damage caused by strong winds and/or heavy rainfall during hurricanes and tropical storms. Targeted at all low-income individuals irrespective of occupation, the LPP provides timely cash payouts soon after a weather event. The product is available across the island through local distribution channels, including cooperative banks, credit unions, and farmer associations. The LPP was developed through the "Climate Risk Adaptation and Insurance in the Caribbean" project implemented by the Munich Climate Insurance Initiative in partnership with CCRIF SPC, MicroEnsure, and Munich Re.

/1 Regional property insurance rates are higher for homeowners than for commercial enterprises, although both are subject to downward pressure. Market sources indicate that the average commercial insurance rate for the overall market is 0.54 percent of the total sums insured, or USD 5.40 per USD 1,000 (EC$ 14.58 per EC$ 2,700) of insurance coverage. Homeowners' rates (including contents) tend to be 0.25 percent to 1.00 percent higher than commercial rates. Rates were historically USD 7.50–USD 8.50 per USD 1,000 (EC$ 20.25–EC$ 22.95 per EC$ 2,700) of coverage several years ago, and USD 6.00–USD 6.50 per USD 1,000 (EC$ 16.20–EC$ 17.55 per EC$ 2,700) over the last couple of years. However, in Grenada's domestic market, commercial rates between USD 6.00 and USD 7.00 per 1,000 (EC$ 16.20 and EC$ 18.90 per EC$ 2,700) of insurance coverage are higher than homeowner rates.

***Improving Risk Layering in Grenada.***

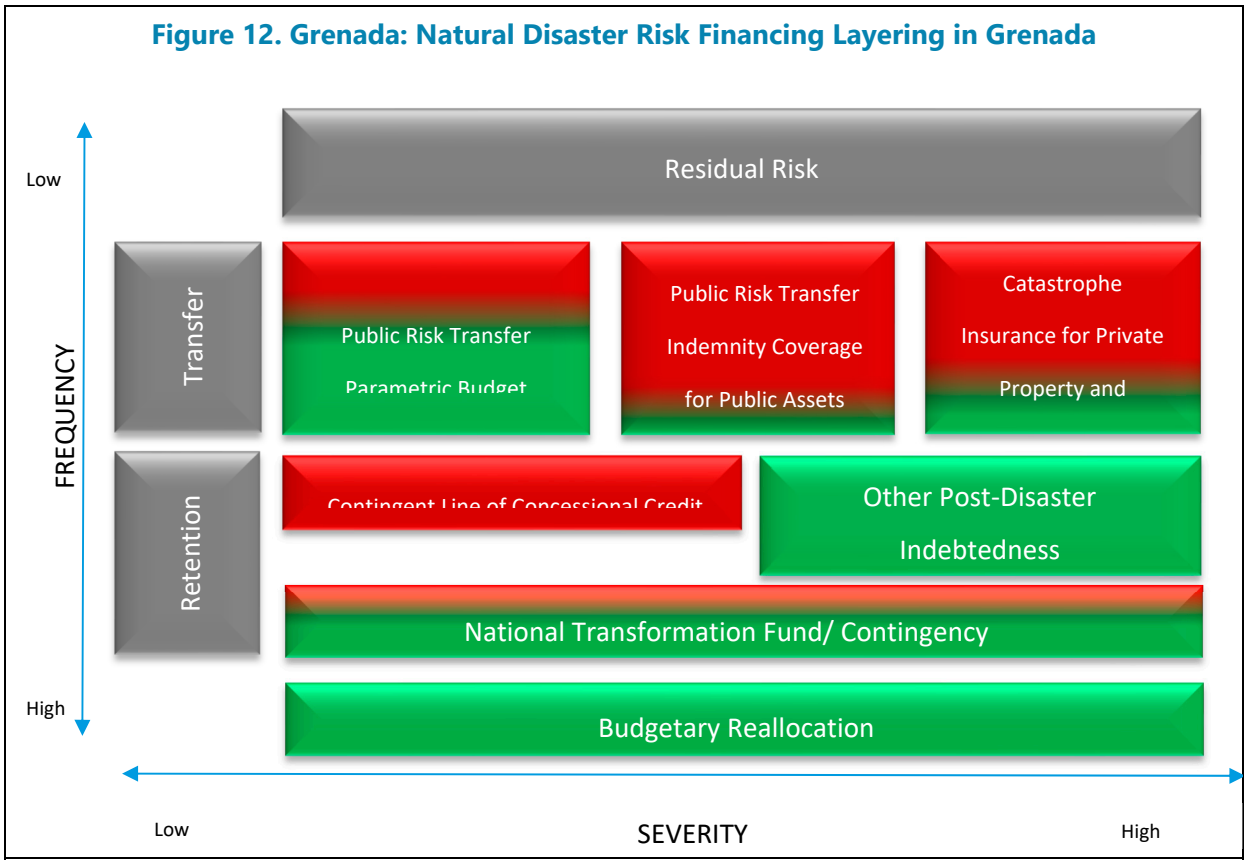
65. **Good progress has been made in implementing a natural disaster risk financing management strategy in Grenada although some gaps remain**. Figure 12 summarizes the key elements of the World Bank's risk layering framework as currently applied in Grenada and described above. The red areas in the chart are options not utilized, or only partially utilized by Grenada and which more progress could be made.

66. **A National Disaster Risk Financing Strategy should be developed to close these gaps.** This would require the drafting and Cabinet or Parliamentary approval of the strategy and a corresponding implementation plan**.** This strategy would build upon the strong foundation of the Disaster Risk Management Act that is currently in draft and expected to be presented to Parliament in 2019. Disaster risk financing (DRF) is a key pillar of DRM and strengthening financial protection mechanisms fills the existing critical gap of how to cost-effectively plan for operationalizing robust disaster response and serves a dual purpose of limiting the impact of natural hazards on the economy.

67. **A disaster risk financing strategy should focus on building complementarity between the various risk retention and risk transfer instruments.** It should also make sure policies are in place that support their best use and performance**.** IMF estimates suggest that the overall amount of protection offered by the various layered financing instrument should be around 10 percent of GDP in Grenada.[41] Drawing on global climate finance to increase investment in resilient

[41] See IMF Country Report No. 19/62 and 19/63.

**Figure 12. Grenada: Natural Disaster Risk Financing Layering in Grenada**




infrastructure would over time reduce the needed size of this buffer as would building further space below Grenada's debt ceiling of 55 percent of GDP. The layered buffer should include risk retention mechanisms, in particular a natural disaster contingency fund, risk transfer mechanisms such as CCRIF cover, the hurricane clause, and private sector insurance mechanisms. It can also include contingent financing mechanisms such as a World Bank CAT DDO.

68. **Building buffers and improving regulations on their usage should be an integral part of the strategy.** This will add to the financing estimates set out above. Currently available buffers amount to around 5 percent of GDP, still somewhat short of the 10 percent of GDP target implied by IMF analysis. Key short-term priorities to build buffers towards the optimal level are to further optimize insurance coverage, in particular through optimizing CCRIF coverage by and broadening the use of indemnity and catastrophe insurance. It will also be important to further build and strengthen the contingency fund by establishing regulations for its use. These should clearly specify the circumstances in which it can be used (linked to the escape clauses in the FRL) and clearly ringfence an amount for natural disasters. PFM regulations will also need to be modernized to ensure the fund can be accessed quickly without diminishing accountability. Finally, GoG should enhance access to rapid and cheap contingent financing that can be triggered in the event of a natural disaster.

***Recommendations for Risk Management***

1. Formalize a national disaster risk financing strategy, including improving availability of data on losses from disaster, inventorying public assets, clarifying budget processes and engaging with development partners on financing modalities and focusing on building a comprehensive risk buffer.

2. Clarify regulations for accessing the National Transformations Fund's Contingency Fund in the event of a natural disaster.

3. Optimize Caribbean Catastrophe Risk Insurance Facility (CCRIF) coverage by and broadening the use of property indemnity insurance.

4. Enhance insurance coverage for public assets and incentivize private uptake. Explore with private insurers the options for expanding the traditional market, both for housing and socially-desirable services such as flood and agriculture insurance, which may require public sector involvement.

5. Adopt parametric insurance policy to help protect the financial assets of coastal fishing communities.

# NATIONAL PROCESSES

*Grenada has been effective in mainstreaming climate-related projects into national planning mechanisms, but weak project management capacity has considerably affected implementation. Further improvements in public investment management and public financial management, such as enhanced fiscal risk analysis, more rigorous project prioritization, improved budget classification and chart of accounts, and the establishment of an asset registry, will support the effective implementation of climate resilience policies.*

## A. Integration of Climate Change into National Planning Processes

***Have Climate-related Projects Been Mainstreamed into National Planning?***

69. **Yes; Grenada has integrated climate resilience into national planning.** As discussed above Grenada has developed a NAP and several sectoral plans covering different parts of climate resilience. Grenada is currently developing an overarching national plan, National Sustainable Development Plan 2035 (NSDP), and one pillar of this plan is climate resilience. It is expected that NSDP will consolidate all climate resilience policies and projects.

70. **The establishment of Ministry of Climate Resilience (MoCR) was key in strengthening the mainstreaming of climate-related projects.** The Government of Grenada established this new ministry in 2017 by combing relevant functions of climate resilience, environment, forestry, fisheries, disaster management and information. Twenty-five climate change focal points of relevant ministries, statutory bodies and utility companies have also been appointed to further strengthen the coordination climate resilience. MoCR uses this network of focal points to support mobilization

of funds for implementation of resilience programs and assist in preparing projects. Given a broad mandate and the cross-sectoral nature of climate change, there is a need to further identify the opportunities for streamlining the Ministry's functions, improving institutional set-up and governance arrangements and enhancing inter-ministerial coordination on climate change

71. **Climate resilience has been built into the public sector investment program (PSIP) framework as a key screening element.** Climate change relevance is required information in project proposals. Ministries need to use the Caribbean Climate Online Risk and Adaptation Tool (CCORAL) to assess whether projects proposed are of high/medium or low climate change relevance. The assessments are then reviewed by the National Climate Change Committee (NCCC) before the Priority and Planning Consultative Committee (PPCC) conducts final screening of PSIP. However, in practice the weight given to climate resilience in the project prioritization and selection process it is not clear. For example, in 2019 budget, the domestically financed capital budget has only 2.5 percent allocated to climate related projects.

## B. Adequacy of the Public Investment Management System

***Are Adequate Public Investment Management Systems in Place (Effective Procedures for Identifying, Evaluating, Selecting and Implementing Projects), to Ensure Climate-Related Investments Will be Well-spent?***

72. **Grenada's public investment management (PIM) has strengths, but there is scope for further improvement.** Recent reforms of its public financial management framework have strengthened the institutional and legal frameworks for PIM as well as improved the operational frameworks for medium term fiscal frameworks and expenditure classifications (see section C). Additionally, given the heavy reliance donor funding, many components of PIM reflect donor project procedures. Notwithstanding the reform effort, project execution rates between 2016 and 2018 was weak, averaging less than 50 percent annually (Table 6). This partly reflects inadequate staffing capacity for project preparation and implementation. For example, there is currently only one staff responsible for capital project design within the Ministry of Infrastructure which is the agency responsible for overseeing all public sector investment projects.

**Table 6. Grenada: Execution Rates of Capital Budget**

| Year | Execution Rates (%) |
|---|---|
| 2018 | 50.0 |
| 2017 | 52.2 |
| 2016 | 40.8 |

Source: MOF and IMF staff calculation.

73. **A summary assessment of Grenada's PIM using the IMF's evaluation tool, PIMA, is reported below (see Annex III):**[42] Grenada scores 4.6 compared to low income developing country average 4.3 and a top score of 10 which indicates a considerable gap existing in its public investment management.[43] Key elements of the PIM system are outlined below.

**Planning**

- Grenada's Fiscal Responsibility Law (FRL) provides a fiscal framework that guides fiscal policy and is geared at reducing debt and encouraging fiscal sustainability. However, capital spending is constrained when consolidation is necessary to meet the real primary expenditure rule.
- GPRS 2014/18, a national plan, identifies investment priorities which are incorporated in the plans and financing of donor agencies that fund most investment expenditure. However, information on measurable targets for outputs is limited and costings are not included.[44]
- The FRL stipulates the reporting of contingent liabilities. Government guaranteed debt for borrowing by Public Corporations is reported and reflected as public debt. However, there is some ambivalence about the existence of PPP's and none is reported.
- There is a standard methodology and central support for project appraisal. Cost-benefit analysis and risk assessments are conducted mainly for major projects financed by donors using their project appraisal processes.
- A legal and regulatory framework to support competition and private sector involvement in telecommunications was recently upgraded but the Public Utilities Regulatory Commission (PURC) is not operational. Regulations for the Electricity Supply Act (2016) are not compete and the uncertainty about pricing may be deterring private sector involvement in the sector.
- The government has a PPP policy framework and a strategy which draws on the FRL for its legal framework but the requirements for PPPs is limited.
- The government monitors the financial performance of infrastructure SOEs and reviews their investment plans but does not publish a consolidated report. The government monitors the

[42] The PIMA tool is a detailed questionnaire covering 15 aspects of public investment management and seeks to identify the institutional features that minimize major risks and provide an effective process for managing public physical investments (see http://www.imf.org/external/np/fad/publicinvestment/pdf/PIMA.pdf). The assessment described in the text was not a full PIMA evaluation, because it did not take stock of the effectiveness of the procedures but used interviews to determine what has/has not been put in place.

[43] Based on the 14 low-income developing countries assessed by May 2018. This does not include those desk assessments.

[44] The National Climate Change Adaptation Plan (2017) covers outputs and costings to guide related investment projects but these are not reflected the national plan which sets priorities.

financial performance of infrastructure SOEs and reviews their investment plans but does not publish a consolidated report. Under the new World Bank DPF, the GoG has committed to enhancing the transparency and accountability of the SOE sector (including infrastructure SOEs) by: (i) making SOE annual aggregate financial information publicly available; and (ii) introducing an annual SOE scorecard. In terms of financial information, the Government will make public data related to SOE turnover, profit, cash flow from operating activities, gross investment, return on equity, equity/asset ratios and dividends. In parallel, the Government has also developed a scorecard system for SOEs. Starting in June 2019, the Government will share individual scorecards with SOEs. The scorecards will rate SOE performance with regards to: (i) financial outcomes vs. planned; (ii) key performance indicators vs. goals; (iii) financial soundness, and (iv) timeliness of reporting. The scorecard was established as a feedback mechanism to strengthen the Government's oversight and motivate improvements in performance.

**Allocation**

- The use of three-year budgeting systems reflects multi-year planning although this does not adequately show the full and annualized costs of projects with longer life. The total costs of major projects are highlighted elsewhere in the budget document. Additionally, the projected ceilings on capital expenditure are indicative.

- The central government's capital expenditure envelope, composition and sources of finance are transparently reflected in budget documentation. Capital and recurrent budgets are presented in budget documentation but the former incorrectly includes some maintenance expenditures.[45] There is significant capital spending by extra-budgetary entities which is reviewed by the ministries responsible for oversight but is not disclosed in budget documentation.

- Although appropriations are annual, funding for ongoing projects is protected over the medium term including through virements within capital expenditures. Virements from capital to current expenditure is allowed but requires parliamentary approval.

- There isn't a standard methodology for determining maintenance needs nor for major improvements, which reduces the certainty that the capital stock is optimally maintained. Routine maintenance and major improvements are identifiable in budget documents.

- Major projects are reviewed by the staff of the Ministry of Finance and since 2017 have been vetted by the Priorities Planning Consultative Committee (PPPC) before submission to the Cabinet. This has facilitated the maintenance of a pipeline of approved projects some of which may be bypassed by projects not vetted through the required process.

[45] The Chart of Accounts was upgraded in 2016 and the distinction between recurrent and capital expenditure became operational in the 2017 budget. However, some recurrent expenditure is still classified as capital.

**Implementation**

- Open competitive bidding is the default procurement method, but information on procurements is not public and it is unclear whether the procedure is widely used for domestically financed projects. Major projects financed by donors are tendered competitively, following donor procedures. A committee to review procurement complaints was established in 2016 but there has not been any.

- Significant progress has been made in strengthening Grenada's public procurement system, including the institutional reforms necessary for making the system more transparent and efficient. Reforms to increase transparency, strengthen the private sector's confidence and make systems less bureaucratic and more oriented towards results and value-for-money was a priority for the success of Grenada's strict fiscal adjustment program. A new Public Procurement Law, consistent with international best practices, was approved by Parliament in August 2014 to increase efficiency by centralizing procurement in select government agencies, leveraging economies of scale, reducing transaction costs and alleviating capacity constraints at the decentralized level. The law provides for electronic and regional procurement, and includes provisions related to conflict of interest debarment, whistle-blower protection and due process for bidders. A Public Procurement Board is responsible for policy advice and operational oversight, and an independent Review Commission is tasked with addressing bidder complaints. In June 2015, the Cabinet approved regulations governing: (i) public procurement and the disposal of public property, including setting monetary thresholds for the application of various procurement methods and providing detailed procedural rule for the operations of institutions set up under the law; (ii) the activities of the Review Commission, including the procedural rules for the submission and handling of appeals by bidders, and (iii) the activities of the Disposal Committee and procedures for disposing of state-owned assets. Subsequently, the Government through the MoFE: (i) appointed the Chief Procurement Officer in the MoFE, and (ii) fully staffed and operationalized (a) the Public Procurement Board; (b) the Public Procurement Review Commission, and (c) the Public Procurement Disposal Committee. A website for the publication of procurement information was launched in May 2018 (www.procurement.gd). Contract notices, contract awards and the annual procurement plan are published on the website. In addition, the Bank is supporting the adoption of a policy on sustainable public procurement, due to be adopted by end May 2019.

- Cash flow forecasts are updated monthly, and commitment ceilings are established for the full year. And, although cash for project outlays is sometimes released with delays, agencies can plan expenditures. Although. Donor funds appear to be reasonably well-protected, although a few [including the EU and World Bank] are outside of the Single Treasury Account (TSA).

- Project costs and physical progress are centrally monitored during implementation, but inadequate implementation plans and staffing in line ministries and executing agencies, prior to budget approval, has contributed to the government's inability to meet conditions

precedent to donor disbursements in a timely manner. Consequently, realized investment often falls short of estimates.

- Standardized rules and procedures for project adjustments do not exist. Nor are ex-post reviews of the rationale, costs and expected outputs of completed projects, which could potentially be used to update procedures, undertaken. Lastly, ex-post audits are rare unless required by donors.

- Except for some equipment, there is no registration or valuation of public physical assets, which limits physical asset planning and management. Additionally, depreciation of fixed assets is not recorded in the government's operating statements.

## C. Adequacy of PFM Systems for Managing CC Financing and Outlays

***Are Adequate Public Financial Management Systems in Place, to Protect Climate-related Funding?***

74. **Grenada has made substantial progress in improving its PFM systems in recent years.** A PEFA assessment was undertaken in 2015 found some important improvements since the 2010 PEFA and some deterioration. A robust suite of PFM legislation and regulations including the Public Financial Management Act and Regulations and the Public Procurement and Disposal of Public Property Act and Regulations has been established since 2014 which are now operational.[46] A medium term fiscal framework where rolling forward estimates are conducted, and fiscal risks are summarized has been put into place. There is also orderliness in the budget calendar and the involvement of the Cabinet in setting commitment ceilings. Financial oversight of SOEs has been strengthened with Ministry of Finance (MOF) closer monitoring of their financial performance. The 2016 chart of accounts (COA) is largely compliant with GFSM 2014 which enables the users of fiscal reports to analyze fiscal accounts on a more comprehensive and coherent basis.

75. **However, the PFM system needs further development to facilitate implementation of the climate resilience strategy.** The budget classification and chart of accounts need to be updated to easily track climate resilience expenditures.[47] Macroeconomic analysis of climate change has not yet been effectively included in the MTFF and fiscal risk statement. Guidelines for the use of the NTF Contingency Fund under development should be finalized to ensure transparent and smooth application after natural disasters. Establishing a NTF board following the requirements of NTF regulation would strengthen capital budgeting. This enhancement can present fiscal situation in a more comprehensive manner and support decision making. The initiative of establishing a physical

[46] Others include the Fiscal Responsibility Act, Public Debt Management Act and Regulations, National Transformation Regulations.

[47] Some climate-change related projects can be distinguished by project title in capital expenditures in the 2019 budget.

asset registry should be implemented as soon as possible. This registry would facilitate management of the public wealth and the assessment of losses following natural disasters.

***Recommendations for National Process***

1. Enhance technical capacity and coordination mechanisms within the Ministry of Climate Resilience (MoCR), to mobilize climate finance and enhance its project implementation capacity.

2. Enhance the medium-term fiscal framework (MTFF) and fiscal risk analysis by including macroeconomic analysis of natural disasters and climate change.

3. Develop more rigorous project prioritization criteria to better align public investment with policy priorities. Establish National Transformation Fund (NTF) board to strengthen project screening.

4. Improve COA and budget classification to identify and track mitigation and adaptation spending. Ensure they clearly differentiate capital and current budget and continue cleaning up the current expenditures existing in capital budget.

5. Strengthen staff capacity in public investment management and improve capital project preparation with a focus on large projects to ensure timely delivery of capital projects.

# TAKING STOCK: PRIORITY NEEDS TO BE MET

*Grenada has made significant strides in climate planning since its 2013 Nationally Determined Contribution. Key actions have been the establishment of Ministry of Climate Resilience and the development of a detailed and costed National Adaptation Plan. However, executing this plan will require measures to improve implementation capacity and mobilization of grant financing and other domestic resources, including from the private sector, given the constrained fiscal space.*

***What Resources Does Grenada Need to Mobilize, to Achieve its Climate-change Strategy?***

76. **An indicative tally of the priorities identified in this Assessment points to resource needs of at least US$500 over the next 10 years.** These resource needs have been developed in the context of the Paris Agreement NDC and in the National Adaptation Plan. The Ministry of Climate Resilience, with the support of development partners, has subsequently revised these priorities into six key areas--"the big 6" – which it is using to actively engage in discussions with climate finance providers. Key priorities identified in this assessment are summarized below, most are already included in the big 6, but some, particularly in the risk financing area, are additional.

77. **General preparedness (see Chapter III for more detail)**

Development of a Disaster Resilience Strategy (DRS) (capacity building).

Development of a damage and loss data collection system systematized across all ministries (capacity-building).

Finalization and enactment of national overarching DRM legislation (capacity-building).

Formalization of a national disaster risk financing strategy (capacity-building).

78. **Mitigation (see Chapter IV for more detail)**

- Private investment of US$100 million within 10 years, mainly in:
  - Renewable energy generation, including solar, geothermal and wind.
  - Energy-efficient buildings and hotels.
  - Fuel efficiency for vehicles.
  - Waste collection, reduction, sorting and recycling.
- Possible government financial involvement to resolve problems impeding private investors, such as seed financing or guarantees (financial support)
- Development of a feebate scheme within the excise tax framework, adequate to achieve planned reductions in energy consumption, while calibrated to delivering required revenue (capacity-building) and a similar scheme for forestry.

79. **Adaptation (see Chapter V for more detail)**

- A public investment envelope of US$340 million, within 10 years (requiring concessional foreign financial support), mainly in:
  - Resilient infrastructure
  - Climate smart agriculture, including vegetation management
  - Disaster risk management, include communications systems
  - Sustainable energy
  - Sustainable natural resources
- Development and enforcement of an enabling legal framework such as land use policy, building codes, and draining maintenance. (capacity-building)

80. **Risk management (see Chapter VI for more detail)**

Development of a national risk financing strategy (capacity building)

Building of fiscal buffers, including a budget contingency fund (capacity building, contingency financing arrangements (contingent financial support) and expansion of insurance to cover (financial support, either contingent or to underwrite premia costs).

81. **National processes (see Chapter VII and Annex III for more detail)**

Institutional strengthening of the Ministry of Climate Resilience (capacity building)

Development of more rigorous project prioritization criteria, enhancement of staff capacity in managing public investment, and improvement of capital project preparation (capacity building).

Updates of budget classification and chart of accounts to identify and track mitigation and adaptation spending (capacity building).

# Annex I. Spreadsheet Model to Assess the Impacts of Mitigation Policies for Grenada

1. **The spreadsheet model of fossil fuel consumption used to assess mitigation possibilities for Grenada is similar to an IMF model applied recently to carbon mitigation policies for 135 countries and the reader is referred to this study[1] for a more detailed (mathematical) description on the model and data sources used to justify typical parameter assumptions (e.g., the price responsiveness of fuels and the responsiveness of energy products to higher income)—though some simplifications and other adjustments were made in applying the model to Grenada.** Basic data on fuel use, prices, and fuel excises were obtained from various documents and sources provided by the authorities. Many of the parameters are uncertain for Grenada, most notably the price responsiveness of fuel use, so the model results should not be taken too literally as they provide only a broad quantitative sense of the impacts of alternative mitigation policies—sensitivity analysis with the spreadsheet tool is straightforward however, and there is ample scope for more detailed modelling in future (e.g., on specific possibilities for technology adoption) to provide more refined analysis.

2. **The model specifies demand functions for electricity consumption by household, industrial, and commercial sectors,[2]gasoline, road diesel, marine diesel, and diesel used in power generation.** The model does not incorporate capital of different vintages (which would require considerable analytical complexity) and therefore does not distinguish between responses to fuel price changes in the shorter and longer term, but this may not be a major drawback given the focus on medium to longer term targets, and that the implications of more limited price responsiveness assumptions are transparent.

3. **The demand for electricity and fuels rises over time in the business as usual (BAU) case relative to 2018 levels[3] with increases in GDP, which expands by 39 percent between 2018 and 2030 based on IMF forecasts and extrapolation.** The income elasticities for these products (i.e., the percent increase in electricity or fuel demand in response to each one percent increase in GDP) are taken to be 0.6 based on empirical literature and judgement. However, electricity and fuel use

[1] See IMF, 2019, *Fiscal Policies for Paris Climate Strategies: From Principle to Practice*, Washington, DC.

[2] Electricity use in street lighting is also accounted for, though this is relatively modest.

[3] Total electricity consumption in 2018 is about 200 gigawatt-hours. And 2018 fuel use is 11 million imperial gallons for diesel used in power generation, 9 million for gasoline, 2 million for land-based diesel, and 1 million for other sources (not subject to excise).

are assumed to decline autonomously by 1 percent a year due to gradual retirement of older, less efficient capital.

4. **Electricity prices are constant in real terms over time in the BAU[4], as are retail fuel prices[5] (international oil prices are assumed fixed).** Higher electricity and fuel prices affect energy demand through changes in average energy efficiency (e.g., due to shifting of demand towards more efficient appliances and vehicles) and from reductions in the demand for fossil energy-using products (e.g., from less use of air conditioning, lighting, or vehicles). Each 1 percent increase in electricity or fuel prices is assumed to reduce electricity/fuel demand by 0.5 percent, with 60 percent of the response from efficiency improvements and 40 percent from reduced product use.

5. **In the BAU scenario, the share of renewable generation in electricity supply rises gradually from 0.02 in 2018 to 0.06 in 2030 due to faster assumed technological change for renewables.** Changes in electricity demand lead to changes in generation from diesel and renewables equal to the change in demand times the respective supply shares for these fuels. And higher diesel fuel prices lead to substitution away from diesel to renewables.

6. **$CO_2$ emission rates are taken to be 0.0104 (metric) tons per imperial gallon for gasoline and 0.0121 ton per gallon for diesel fuels.** Total emissions in a year is fuel use times the emission rate and aggregated over fuels. Revenues are computed by fuel use times the relevant fuel excise tax[6] and aggregated over fuels.

[4] Between ECD 0.80 and ECD 0.92 across households, industry, and commerce and averaging ECD 0.90 across all users.

[5] 2018 prices are ECD 14.3 per gallon for gasoline, ECD 13.1 for road diesel, and ECD 8.0 for diesel exempt from excise.

[6] Excises in ECD per gallon (which are fixed to 2030 in the BAU) are 5.5 for gasoline and diesel with exemptions/rebates for diesel used in power generation and fishing boats.

# Annex II. Applying Feebates to Key Sectors in Grenada

1. **This Annex provides some detail on how feebates might be applied in Grenada.** For Grenada, where large fuel tax hikes are likely to be politically difficult, and, if undertaken unilaterally, potentially damaging to competitiveness, the CCPA (Chapter IV) recommends introducing feebates—which achieve some of the price-incentive effects of good carbon taxation without an increase in energy prices. Feebates are potentially:

- *Effective* at reducing energy use, if they are: (i) comprehensively applied across imported products, such as cars, trucks, buses, washing machines, light bulbs, air conditioners, and refrigerators; (ii) set to provide continuous (rather than discrete) rewards for higher efficiency (see below); and (iii) appropriately scaled;
- *Cost-effective*, if there is a uniform reward for saving energy across different types of products;
- *Limit administrative burdens,* as they can be incorporated into existing procedures for collection of excise (or other taxes) on imported products;
- *Consistent with fiscal objectives*, as an ad valorem component of excises (unrelated to energy efficiency) can be retained to meet revenue needs;
- *Limit burdens on vulnerable households and firms*, as they do not involve a first-order pass through of new tax revenues in higher fuel, electricity, or product prices.

**Transportation**

2. **The current excise tax system for vehicles provides limited incentives for purchase of fuel-efficient vehicles**. Imported cars are put into one of five categories with excise rates of 5, 7.5 or 10 percent applied to new cars depending on engine size, 50 percent for all cars between 1 and 4 years old, and 40 percent for cars 5 years and older. Buses are put into one of four categories with tax rates varying between 7.5 and 45 percent depending on age and engine size. And trucks are put into one of six categories with excises also varying between 7.5 and 45 percent depending on age and engine size. This tax system does not provide comprehensive incentives for vehicles with small engine capacity and does not reward vehicle characteristics (including smaller cabin size, lighter body materials, better aerodynamics), that also lower emission rates.

3. **The standard Fund recommendation is to shift towards a vehicle excise tax system with an ad valorem and a feebate component**.[1] The proportional tax in the ad valorem component can be set to meet a revenue target and does so without distorting the choice among

[1] See, for example, I. Parry, 2011, "Reforming the Tax System to Promote Environmental Objectives: An Application to Mauritius," Working Paper11/124, International Monetary Fund, Washington, DC.

different vehicles (because it leaves the relative price of different vehicles unaffected). The feebate involves levying a tax on relatively fuel-inefficient vehicles in proportion to the difference between their fuel consumption rate (i.e., the inverse of fuel economy) and a 'pivot point' fuel consumption rate, and conversely providing a subsidy to relatively efficient vehicles in proportion to the difference between the pivot point and their fuel consumption rate (or, equivalently, the fees and rebates can be levied on $CO_2$ emission rates per mile). That is, a vehicle receives a fee/rebate according to the simple formula $t \cdot (gallons/mile - \overline{gallons/mile})$, where the bar denotes the pivot point fuel per mile, and $t$ is a charge per gallon per mile (which accounts for expected use of the vehicle—see below). The feebate component can be made (approximately) revenue-neutral by setting the pivot point equal to the average fuel consumption rate of vehicles sold in the previous year and updating it over time as the average fuel consumption rate of the vehicle fleet progressively declines. The tax/subsidy rates in the feebate can be set as aggressively as needed to induce shifting to more efficient vehicles without eroding the revenue base (which depends on vehicle prices). Implementing this tax change would require data on the fuel per mile (the inverse of fuel economy) for different models, but this is readily available for other countries.[2] Alternatively, the tax/subsidy rates can be levied on differences between a vehicle's $CO_2$ emission per mile and a pivot point $CO_2$ per mile.[3]

4. **A number of countries have recently introduced feebates, including Denmark, France, Germany, Mauritius, the Netherlands, Norway, Sweden, and the United Kingdom (and many others have elements of feebates).** The pivot points in these schemes are typically equivalent to between about 200 to 250 grams of $CO_2$ per mile, although the feebate prices differ significantly: for example, about USD10 per gram of $CO_2$ in France and up to USD155 in Norway.[4] In Mauritius, the feebate introduced in 2011 helped to lower the average fuel consumption rate of imported vehicles from 7 liters/100km in 2011 to 5.8 liters/100km in 2014, while new hybrid vehicle sales registrations rose from 337 to over 1,400.[5] For illustration, a feebate with a pivot point of 250 grams of $CO_2$ per mile, and a price of USD100 or ECD270 per gram of $CO_2$, would provide a subsidy of ECD $13,500 to a vehicle with fuel economy of 45 miles per (US) gallon while imposing a tax of ECD $27,000 on a vehicle with fuel economy of 25 miles per (US) gallon.

**Electricity Sector**

[2] See www.fueleconomy.gov. Some adjustments might be made for local driving conditions in Grenada.

[3] Fuel economy can be converted to $CO_2$ per mile by inverting and multiplying by $CO_2$ per imperial gallon—10,460 grams per gallon for gasoline and 12,114 grams per gallon for diesel.

[4] See, for example, Bunch, David S., David L. Greene, Timothy Lipman, Dr. Elliot Martin and Dr. Susan Shaheen, 2011, "Potential Design, Implementation, and Benefits of a Feebate Program for New Passenger Vehicles in California", pp. 59–61, prepared for the State of California Air Resources Board and the California Environmental Protection Agency; Cambridge Econometrics, 2013, "The Effectiveness of CO2-Based 'Feebate' Systems in the European Passenger Vehicle Market Context: An Analysis of the Netherlands and the UK," report for the International Council on Clean Transportation, Cambridge, United Kingdom. In some cases, however (e.g., Denmark), the implicit price on $CO_2$ is substantially higher for vehicles receiving rebates than for vehicles subject to fees, which results in net revenue losses from the feebate and violates the principle of providing the same reward for reducing emissions across all vehicle classes.

[5] Global Fuel Economy Initiative, 2016. "Fuel Economy State of the World 2016: Time for Global Action."

5. **An analogous excise to that described above for vehicles, with both ad valorem and feebate components, could be applied to imported appliances and other electricity-using capital.** Again, the ad valorem component could remain at any current excise tax rate to maintain revenue. The feebate would involve taxes on products with relatively low energy efficiency in proportion to the difference between their electricity consumption rate and a pivot point consumption rate and conversely provide a subsidy to relatively efficient models in proportion to the difference between the pivot point and their consumption rate. For example, refrigerators would receive a fee/rebate according to the simple formula $t \cdot (kWh/(cubic\ foot\ cooled) - \overline{kWh/(cubic\ foot\ cooled)})$, where *kWh/(cubic foot cooled)* is the electricity consumption rate, a bar denotes the pivot point consumption rate, and $t$ is the charge per kWh/(cubic foot cooled). To illustrate, if the pivot point consumption rate were 5 kWh/month, and the feebate price was ECD 80 per kWh/month, then a refrigerator with an energy consumption rate of 8 kWh/month would be subject to a tax of ECD240 while a refrigerator with an energy consumption rate of 2 kWh/month would receive a ECD240 subsidy.[6] And again the feebate component can be made (approximately) revenue-neutral by setting the pivot point equal to the average electricity consumption rate of models within a product class sold in the previous year, with updating over time as the consumption rate progressively declines. To minimize the cost of reducing electricity use across a range of different product classes, the same incremental reward on kWh (i.e., the tax rate $t$) should be uniform across products.

[6] To take another example, the fee/rebate for air conditioners would be $t \cdot (kWh/(BTU\ of\ heat\ removed) - \overline{kWh/(BTU\ of\ heat\ removed)})$.

# Annex III. PIMA Institutional Questionnaire—Interview Responses from Grenada

| | | |
|---|---|---|
| **1** | **Fiscal Principles or Rules: Are there permanent fiscal principles or rules that support sustainable levels of capital spending?** | |
| 1.a. | Is there a target or limit for government to ensure debt sustainability? | Yes. The Fiscal Responsibility Law (FRL) has explicit targets for public debt, with a debt brake mechanism and well-defined escape clause. |
| 1.b. | Is fiscal policy guided by one or more permanent fiscal rules? | Yes. The FRL also has primary balance, wage bill and real primary expenditure rules all geared towards reducing debt and encouraging fiscal sustainability. |
| 1.c. | Is there a medium-term fiscal framework (MTFF) to align budget preparation with fiscal policy? | The MTFF forecasts the budget year and 2 outer years. However, the outer years, though consistent with the FRL, are indicative and not expenditure commitments. |
| **2** | **National and Sectoral Planning: Are investment allocation decisions based on sectoral and inter-sectoral strategies?** | |
| 2.a. | Does the government prepare national and sectoral strategies for public investment? | While the Growth and Poverty Reduction Strategy, several sectoral strategies as well as climate change adaptation-related plans identify national priorities only some specify projects that should be included in the budget. Most plans are published and recently, there has been adherence to the requirement that all projects are consistent with priorities identified in the GPRS. |
| 2.b. | Are the government's national and sectoral strategies or plans for public investment costed? | Some plans/strategies identify costings for projects, but the lack of a national plan integrating costs prohibits the prioritization and rational allocation of projects. |
| 2.c. | Do sector strategies include measurable targets for the outputs and outcomes of investment projects? | Measurable targets for outputs are provided in some strategies and budget documents but there is significant scope for improvement. |
| **3** | **Coordination between Entities: Is there effective coordination of the investment plans of central and other government entities** | |
| 3.a. | Is capitalspending by SNGs, coordinated with the central government? | N.A. There are no autonomies entities. |
| 3.b. | Does the central government have a transparent, rule-based system for making capital transfers to SNGs, and for providing timely information on such transfers? | N.A. There are no autonomies entities. |
| 3.c. | Are contingent liabilities arising from capital projects of SNGs, PCs, and PPPs reported to the central government? | The FRL stipulates the reporting of contingent liabilities. Government guaranteed debt for borrowing by PCs is reported and reflected as public debt. Financial statements of PCs are generally presented to central government albeit with delays. There is some ambivalence about the existence of PPP's. |

| | | |
|---|---|---|
| **4** | **Project Appraisal: Are project proposals subject to systematic project appraisal?** | |
| 4.a. | Are major capital projects subject to rigorous technical, economic, and financial analysis? | Rigorous, technical, economic, and financial analysis are not systematically applied to major capital projects and may reflect the appraisal process of donor involved. |
| 4.b. | Is there a standard methodology and central support for the appraisal of projects? | A Project Cycle Manual (December 2015) and the Public Financial Management Regulations (January 2016) provide the methodology applicable to project appraisals. Central support is provided by the Project Coordination Unit and other agencies and project committees. |
| 4.c. | Are risks taken into account in conducting project appraisals? | Not generally. This is limited to donor-financed projects. |
| **5** | **Alternative Infrastructure Financing: Is there a favorable climate for the private sector, PPPs, and PCs to finance in infrastructure?** | |
| 5.a. | Does the regulatory framework support competition in contestable markets for economic infrastructure (e.g., power, water, telecoms, and transport)? | Telecommunications is regulated by the regional body, ECTEL and the local NTRC both of which are financially supported by government. The PURC which is legislated to regulate other utilities is currently (January 2019) being established. Legal infrastructure is strong, but effectiveness is weak. In general, regulators do not have price-setting autonomy nor do not have full organizational, financial and managerial autonomy. |
| 5.b. | Has the government published a strategy/policy for PPPs, and a legal/regulatory framework which guides the preparation, selection, and management of PPP projects? | A PPP policy has been published, and though the FRL provides the legal legal/regulatory framework the requirements for PPP's are limited. A PPP Unit has not been established. |
| 5.c. | Does the government oversee the investment plans of public corporations (PCs) and monitor their financial performance? | The government reviews the investment plans of PCs but does not systematically publish consolidated reports on their financial performance. |
| **6** | **Multiyear Budgeting: Does the government prepare medium-term projections of capital spending on a full cost basis?** | |
| 6.a. | Is capital spending by ministry or sector forecasted over a multiyear horizon? | Forecasts are provided over a three-year horizon. |
| 6.b. | Are there multiyear ceilings on capital expenditure by ministry, sector, or program? | There are indicative multiyear ceilings on capital expenditure by ministry in budget documents. |
| 6.c. | Are projections of the total construction cost of major capital projects published? | Budget documents often contain the total costs of major projects to commence in the budget year with indicative annual aggregated costs over a three-year period. |
| **7.** | **Budget Comprehensiveness and Unity: To what extent is capital spending, and related recurrent spending, undertaken through the budget process?** | |

| | | |
|---|---|---|
| 7.a. | Is capital spending mostly undertaken through the budget? | The extra-budgetary spending of PCs is not shown in the budget documentation. |
| 7.b. | Are all capital projects, regardless of financing source, shown in the budget documentation? | All capital projects, regardless of financing sources, are included in the budget documentation. |
| 7.c. | Are capital and recurrent budgets prepared and presented together in the budget? | Capital and recurrent budgets are prepared by a single ministry and presented together in the budget documents, using a program or functional classification. However, this does not conform fully to international standards (e.g., maintenance is included in the capital budget); the CoA is being revised. |
| **8.** | **Budgeting for Investment: Are investment projects protected during budget implementation?** | |
| 8.a. | Are total project outlays appropriated by the legislature at the time of a project's commencement? | Outlays are appropriated on an annual basis, and information on total project costs is included in the budget documentation. |
| 8.b. | Are in-year transfers of appropriations (virement) from capital to current spending prevented? | Virement from capital to current spending requires the approval of the legislature. |
| 8.c. | Is the completion of ongoing projects given priority over starting new projects? | There is a mechanism to protect funding for ongoing projects in the annual budget and over the medium term. |
| **9.** | **Maintenance Funding: Are routine maintenance and major improvements receiving adequate funding?** | |
| 9.a. | Is there a standard methodology for estimating routine maintenance needs and budget funding? | No. |
| 9.b. | Is there a standard methodology for determining major improvements (e.g. renovations, reconstructions, enlargements) to existing assets and are they included in national and sectoral investment plans? | No. |
| 9.c. | Can expenditures relating to routine maintenance and major improvements be identified in the budget? | Maintenance services are listed by Ministry and program as recurrent expenditure, but some maintenance expenditure is also reflected as capital expenditure. |
| **10.** | **Project Selection: Are there institutions and procedures in place to guide project selection?** | |
| 10.a. | Does the government undertake a central review of major project appraisals before decisions are taken to include projects in the budget? | Major projects are reviewed by the Ministry of Finance prior to inclusion in the budget. |

| | | |
|---|---|---|
| 10.b. | Does the government publish and adhere to standard criteria, and stipulate a required process for project selection? | The Project Cycle Manual (December 2015) and Appendix D of the PFM Regulations lists the criteria for the selection and prioritization of PSIP projects. Projects can be selected without going through the process. |
| 10.c. | Does the government maintain a pipeline of appraised investment projects for inclusion in the annual budget? | The government maintains a pipeline of appraised investment projects, but other projects may be selected for financing through the annual budget. |
| **11.** | **Procurement** | |
| 11.a. | Is the procurement process for major capital projects open and transparent? | The Public Procurement and Disposal of Public Property Act provides legal basis for an open and competitive process. This is also a requirement for most donor-financed project, but this may not be the general application for locally financed projects. |
| 11.b. | Is there a system in place to ensure that procurement is monitored adequately? | There is a procurement database with reasonably complete information, but no standard analytical reports are produced from the database. |
| 11.c. | Are procurement complaints review process conducted in a fair and timely manner? | Commissioners have been appointed to the independent committee, but no complaints have been reviewed. |
| **12.** | **Availability of Funding: Is financing for capital spending made available in a timely manner?** | |
| 12.a. | Are ministries/agencies able to plan and commit expenditure on capital projects in advance on the basis of reliable cash-flow forecasts? | Cash-flow forecasts are prepared or updated monthly, and ministries/agencies are provided with commitment ceilings for the full fiscal year. |
| 12.b. | Is cash for project outlays released in a timely manner? | Cash for project outlays is sometimes released with delays. |
| 12.c. | Is external (donor) funding of capital projects fully integrated into the main government bank account structure? | External financing is largely held in bank accounts outside the main government bank account. |
| 13. | **Portfolio Management and Oversight: Is adequate oversight exercised over implementation of the entire public investment portfolio?** | |
| 13.a. | Are major capital projects subject to monitoring during project implementation? | For all major projects, total project costs, as well as physical progress, are centrally monitored during project implementation. |
| 13.b. | Can funds be re-allocated between investment projects during implementation? | Funds can be re-allocated between projects during implementation, using systematic monitoring and transparent procedures. |

| | | |
|---|---|---|
| 13.c. | Does the government adjust project implementation policies and procedures by systematically conducting ex- post reviews of projects that have completed their construction phase? | Ex-post reviews of major projects are neither systematically required, nor frequently conducted. |
| 14. | **Management of Project Implementation: Are capital projects well managed and controlled during the execution stage?** | |
| 14.a. | Do ministries/agencies have effective project management arrangements in place? | Ministries/agencies systematically identify senior responsible officers for major investment projects, but implementation plans are not prepared prior to budget approval. |
| 14.b. | Has the government issued rules, procedures and guidelines for project adjustments that are applied systematically across all major projects? | There are no standardized rules and procedures for project adjustments. |
| 14.c. | Are ex-post audits of capital projects routinely undertaken? | Except for some donor-finance projects, major capital projects are usually not subject to ex-post external audits. |
| 15. | **Monitoring of Public Assets: Is the value of assets properly accounted for and reported in financial statements?** | |
| 15.a. | Are asset registers updated by surveys of the stocks, values, and conditions of public assets regularly? | Asset registers are neither comprehensive nor updated regularly. |
| 15.b. | Are nonfinancial asset values recorded in the government financial accounts? | This limited to some capital equipment. Plans are underway to do this. |
| 15.c. | Is the depreciation of fixed assets captured in the government's operating statements? | No. |
| A | **IT support.** Is there a comprehensive computerized information system for public investment projects to support decision making and monitoring? No. The Smart-Stream is mainly used for financial accounting and reporting. Public investment projects are managed with excel. | |
| B | **Legal Framework.** Is there a legal and regulatory framework that supports institutional arrangements, mandates, coverage, procedures, standards and accountability for effective PIM? Yes, Part XIII of the Regulations for the PFM Act No. 17/2015 is the legal framework. | |
| C | **Staff capacity.** Does staff capacity (number of staff and/or their knowledge, skills, and experience) and clarity of roles and responsibilities support effective PIM institutions? No, indications are that there is inadequate capacity and skills (architects, civil engineers, quantity surveyors, project managers, lawyers) to undertake the range projects identified in the budget. World Bank-sponsored projects are better equipped. | |

# Appendix I. CCPA Template

| **1. Climate change risks and expected impacts** |
|---|

Impact of climate change risks on the macro-framework/long-term outlook

- How vulnerable is the economy to climate change?
- What impact could climate change have on macro-sustainability?

| *Table of recent and expected climatic developments* |
|---|

| **2. General preparedness for climate change** |
|---|

The NDC and other national resilience-building strategies

- Does the NDC present a comprehensive and costed strategy for climate change response?
- Is the climate change strategy consistent with broader development goals?

Disaster planning and other contingency plans

- How well-prepared is the country to cope with possible intensified disasters?

| ***3*. Contribution to mitigation** |
|---|
| Statement of NDC pledge |

- How does the country plan to meet its emissions reduction target?

Clean energy plans

Carbon taxation and fuel subsidy policies

- Does the current tax/subsidy system deliver appropriate carbon pricing?
- What would the tax system look like with recommended carbon pricing?

Other carbon pricing strategies

- What other carbon-pricing strategies could usefully contribute to mitigation?

Other macro-relevant policies for mitigation

- Are any further large-scale mitigation policies relevant to the country?

| **4. Adaptation plans** |
|---|

- Has the country developed an adequate strategy to adapt to climate change?

Public investment plans

| *Table of Costed Climate Change Projects (if costing has been done)* | *US$* | *%GDP* |
|---|---|---|
| *Total* | | |
| *Mitigation* | | |
| *Adaptation* | | |

- What, if anything, is missing from the adaptation investment strategy?

Other public programs (regulation reform, zoning…)

- Adaptation isn't just a matter of investment spending; what regulations support it?

Financial sector preparedness

- How is the financial sector contributing to the climate change effort?

**5. Financing strategy for mitigation and adaptation programs**

Current state of financing

- Does the country have adequate financing to meet the needs of its climate change strategy?

Consistency of climate change spending and financing plans with fiscal and external debt sustainability

- Are the country's climate changes plans consistent with fiscal and external debt sustainability?

Other macro-considerations

- Would implementation of the climate change plans have any (good or bad) spillover effects to the macro-economy?

Institutional issues

**6. Risk management strategy**

Risk assessment procedures (e.g., fiscal risk statement)

- How well does the government assess risk?

Self-insurance (government financial buffers including contingency provisions, rainy-day funds, NIR …)

- To what extent does the government self-insure against risks?

Risk reduction and transfer (other insurance, pooling arrangements, …)

- To what extent does the economy transfer risk?

**7. National processes**

Integration of climate change into national planning processes

- Have climate-related projects been mainstreamed into national planning?

Adequacy of public investment management system (effectiveness of procedures for identifying, evaluating, selecting, and implementing projects)

- Are adequate public investment management systems in place, to ensure climate-related investments will be well-spent?

Adequacy of PFM systems for managing CC financing and outlays (transparent on-budget treatment of CC activities, multi-year budgeting, etc.)

- Are adequate public financial management systems in place, to protect climate-related funding?

**8. Taking stock: priority needs to be met**

- What resources does the country need to mobilize, to achieve its climate-change strategy?

***Annexes*** *contain information important to one or other institution, but which have not necessarily been fully reviewed by both.* *5/31/2019*