

**EXECUTIVE  
BOARD  
MEETING**

SM/18/131

June 1, 2018

To: Members of the Executive Board

From: The Secretary

Subject: **St. Lucia—Climate Change Policy Assessment**

Board Action:	Provides background to SM/18/130—Staff Report for the 2018 Article IV Consultation
Prepared By:	The staffs of the Fund and the World Bank
Tentative Board Date:	<b>Wednesday, June 13, 2018</b>
Publication:	Yes*
Questions:	Ms. Cheasty, FAD (ext. 38706) Mr. Bonato, WHD (ext. 36712)
Document Transmittal in the Absence of an Objection and in accordance with Board policy:	Monday, June 11, 2018—WTO After Board Consideration—Caribbean Development Bank, European Investment Bank, Food and Agriculture Organization, United Nations Development Programme, United Nations Economic Commission for Latin America and the Caribbean

**\*Unless an objection from the authorities is received prior to the conclusion of the Board's consideration, the document will be published.**





# ST. LUCIA

## CLIMATE CHANGE POLICY ASSESSMENT

June 1, 2018

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

Prepared by Leo Bonato, Adrienne Cheasty, Miria Pigato, Kassia Antoine, Annette De Kleine Feige, Alejandro Guerson, Shruti Lakhtakia, Ian Parry, Gonzalo Salinas, and David Stephan

### CONTENTS

Glossary	5
<b>EXECUTIVE SUMMARY</b>	<b>7</b>
A. Recommendations—Summary	9
<b>INTRODUCTION</b>	<b>11</b>
<b>ST. LUCIA'S CLIMATE CHANGE RISKS AND EXPECTED IMPACTS</b>	<b>12</b>
A. Impact of Climate Change Risks on the Macro-Framework/Long-Term Outlook	13
<b>GENERAL PREPAREDNESS FOR CLIMATE CHANGE</b>	<b>15</b>
A. The NDC and Other National Resilience-Building Strategies	16
B. Disaster Planning and Other Contingency Plans	18
<b>CONTRIBUTION TO MITIGATION</b>	<b>20</b>
A. Clean Energy Plans	20
B. Carbon Pricing	21
C. Other Macro-Relevant Green Tax Possibilities	25
D. Other Carbon-Pricing Strategies	26
<b>ADAPTATION PLANS</b>	<b>27</b>
A. Policy Framework and Sectoral Strategies	27
B. Public Investment	28
C. Sectoral Priorities	30
D. Other Public Programs	30
E. Financial Sector Preparedness	31

<b>FINANCING STRATEGY FOR MITIGATION AND ADAPTATION PROGRAMS</b>	<b>32</b>
A. Current State of Financing	32
B. Consistency of Climate Change Spending and Financing Plans with Fiscal and External Debt Sustainability	33
C. Other Macro-Considerations	36
D. Institutional Issues	36
<b>RISK MANAGEMENT STRATEGY</b>	<b>37</b>
A. Risk Assessment Procedures	37
B. Self-Insurance and Risk Retention	38
C. Risk Reduction and Transfer	40
<b>NATIONAL PROCESSES</b>	<b>44</b>
A. Integration of Climate Change into National Planning Processes	44
B. Adequacy of the Public Investment Management System	45
C. Adequacy of PFM Systems for Managing Climate Financing and Outlays	46
<b>TAKING STOCK: PRIORITY NEEDS TO BE MET</b>	<b>49</b>
<b>BOXES</b>	
1. Priority Needs to Be Met	10
2. The Foundation for Carbon Taxation in St. Lucia	22
3. Macro-Modeling the Impact of Mitigation Policies	26
4. The Caribbean Catastrophe Risk Insurance Facility	42
5. The Cat DDO	43
<b>FIGURES</b>	
1. Climate Change and Macroeconomic Performance	15
2. Articulation of St. Lucia's Climate Change Strategy	17
3. Fuel Prices Augmented by Carbon Taxes	24
4a. CO <sub>2</sub> Reductions from Alternative Mitigation Policies	25
4b. Revenue Gains from Alternative Mitigation Policies	25
5a. Losses of Total Annual Household Consumption in 2030	26
5b. Average Burden on Total Annual Household Consumption in 2030	26
6. Growth and Debt with Climate Change Policies	34
7. A Saving Fund for Natural Disasters	40

**TABLES**

1. Expected Climatic Developments and Consequences _____	12
2. Major Natural Disasters _____	13
3. Envisioned Mitigation Measures in St. Lucia's NDC _____	20
4. Adaptation Projects in the Capital Program of the 2016–17 Budget _____	29
5. Key Planned Capital Expenditures (2017–18) to Mitigate the Impact of Natural Disasters _____	29
6. Financing Needs and Sources for Climate Change _____	32

**ANNEXES**

I. Renewable Energy in St. Lucia _____	50
II. Assessing the Impact of Alternative Mitigation Policies—IMF Spreadsheet Model _____	52
III. NDC-Based Scenarios to Achieve GHG Emission Reduction Targets— World Bank Model _____	56
IV. PIMA Institutional Questionnaire—Interview Responses from St. Lucia _____	62

**APPENDIX**

I. CCPA Template _____	67
------------------------	----

This report was prepared by joint IMF and World Bank teams in collaboration with the authorities of St. Lucia.

The IMF team was led by Adrienne Cheasty (Deputy Director of the IMF's Fiscal Affairs Department (FAD)) and Leo Bonato, (mission chief for St. Lucia, Western Hemisphere Department), together with Ian Parry (the IMF's Principal Environmental Fiscal Policy Expert, FAD), Alejandro Guerson (mission chief for Dominica, WHD) and Gonzalo Salinas (desk economist for St. Lucia, WHD).

The World Bank team was led by Miria Pigato (Practice Manager), with Annette de Kleine (Senior Economist for the OECS and Barbados); Kassia Belo da Silva Antoine (Research Analyst); Andrew Burns (Lead Economist); David Stephan (Economist); Charl Jooste (Economist); May Olalia (Senior Public Sector Specialist); Onur Erdem (Public Sector Specialist); Karina Ramirez Arras (Research analyst); Raul Alfaro Pelico (Lead Climate Change Specialist), Wei Jen Leow (Senior Economist); Rashmin Gunasekera (Disaster Risk Management Specialist); Tiguist Fisseha (Senior Disaster Risk Management Specialist); Mary Boyer (Disaster Risk Management Specialist); and Shruti Lakhtakia (Consultant).

The authorities consulted in the preparation of this report included Ministers Raymond (Ministry of Finance) and Rigobert (Ministry of Sustainable Development) and their staff; staff in the Ministries of Economic Development, Energy and Infrastructure, and Fisheries; LUCELEC; Executive Director Leon (Financial Services Regulatory Authority), and Mr. D'Auvergne (Disaster Risk Management Coordinator, OECS). The teams much appreciated the authorities' support in developing this pilot report, and the thoughtful collaboration of public and private sector representatives. The team is especially grateful to Embert St. Juste, Head of Research at the Ministry of Finance, whose guidance and organization contributed immensely to the success of the discussions.

## Glossary

BAU	Business As Usual
CARICOM	Caribbean Community
Cat DDO	Catastrophe Deferred Drawdown Option
CCCCC	Caribbean Community Climate Change Centre
CCPA	Climate Change Policy Assessment
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster Emergency Management Agency
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CERC	Contingency Emergency Response Component
DANA	Damage Assessment and Needs Analysis
DRM	Disaster Risk Management
DVRP	Disaster Vulnerability Reduction Project
ECERA	Eastern Caribbean Energy Regulatory Agency initiative
EDF	Emergency Disaster Fund
FSRA	Financial Services Regulatory Authority
GCCA	Global Climate Change Alliance
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	Greenhouse Gas
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IPSAS	International Public Sector Accounting Standards
JICA	Japan International Cooperation Agency
LUCELEC	St. Lucia Electricity Company
MoE	Ministry of Infrastructure, Ports, Energy and Labour
MoF	Ministry of Finance, Economic Growth, Job Creation, External Affairs and Public Service
MTDS	Medium-Term Development Strategy
MCII	Munich Climate Insurance Initiative
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NEMAC	National Emergency Management Advisory Committee
NEMO	National Emergency Management Organization
NEMS	National Environmental Management Strategy
OECS	Organization of Eastern Caribbean States
PEFA	Public Expenditure and Financial Accountability (Assessment)
PFM	Public Financial Management
PIMA	Public Investment Management Assessment
PPP	Public-Private Partnership
PSIP	Public-Sector Investment Program
RCP	Representative Concentration Pathways
SNC	Second National Communication

## ST. LUCIA

SPCR	Strategic Programme for Climate Resilience
TSA	Treasury Single Account
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development



## EXECUTIVE SUMMARY

**St. Lucia has been a leader among vulnerable Caribbean states in prioritizing a response to climate change, both nationally and in international fora.** Its Nationally Determined Contribution (NDC) submission to the Paris Agreement outlines a balanced mitigation strategy backed by costed investment plans, and a qualitative adaptation strategy with identified priority sectors. A National Adaptation Plan (NAP) process was launched in April 2018.

**This paper takes stock of St. Lucia's plans to manage climate change, from the perspective of their macroeconomic implications.** It suggests macro-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.** St. Lucia has a good foundation for climate change response, with strong government commitment and high public awareness. The key next step is to build on this by updating strategic plans and legislation, to fully align the country's development framework with its resilience-building goals. Important milestones will include the update of the Development Strategy and Coastal Zone Management Strategy, and passage of the Climate Change Bill, Sustainable Building Code, and other core legislation. National and sectoral plans should specify costed priority projects for inclusion in the pipeline for the public-sector investment program (PSIP) and eventually the budget. Disaster preparedness is a relatively strong point, but the economic impact of disasters needs to be better understood, and more planning would be important to ensure that disaster-financing is available quickly when needed.

**Mitigation.** St. Lucia plans to meet its emission reduction targets mainly by increasing use of renewable energy (wind, solar and geothermal) and improving energy efficiency. These plans have many important benefits—including energy security and a lower import bill—and should be promoted through flexible policies. But renewables policies also entail risks. Plans for wind and solar energy are considered feasible by the team, though reforms to grid access may be needed to bring in private investors. Development of geothermal energy is less assured. Introducing a carbon tax as a supporting measure would make the achievement of emission reduction targets more likely, by changing a wider range of behavior; it would also help offset declining fuel tax revenue if emissions are contained successfully; and the bulk of the burden would be borne by better-off households. Reforms to vehicle taxation (a 'feebate' system) could efficiently lower vehicle emission rates without undermining fiscal objectives.

**Adaptation.** The adaptation strategy in the NDC falls short of articulating priority investments or other specific supportive reforms. Filling this planning gap is a high priority, and work is already underway. In fact, St. Lucia already allocates about one-quarter of its capital budget to adaptation spending, meaning that it will gain some fiscal space to implement important adaptation projects as current projects finish. Resilience-building investments are likely to be most urgently needed for critical infrastructure, water supply (including desalination plants), land use (including coasts), and

food security. While the financial sector so far is involved little with climate change funding, St. Lucia's automatic access to its ECCB reserves in case of disaster is a helpful buffer.

**Financing.** Financing options are limited by a high public debt, but there is a feasible way forward. Well-designed renewables projects should attract private investors, and some adaptation projects could conceivably also be designed to be bankable. Given St. Lucia's existing high budget costs for disaster recovery, merely maintaining (rolling-over) current financing levels would support around 2 percent of GDP in future budgetary adaptation investment. Moreover, successful resilience-building should generate a growth dividend (and ease debt pressures), by better preserving St. Lucia's capital stock and its efficiency. For further scaling-up, grant financing or equity would be needed to keep St. Lucia's budget sustainable. Therefore, efforts should focus on developing an investment promotion strategy and getting access to grants from climate funds.

**Risk management.** St. Lucia has established some key elements of a disaster risk management strategy, but needs better risk assessment, more self-insurance and more risk transfer. Its contingency buffers are too small, given historic costs of disasters and their expected intensification. The contingency buffers should be built up, immediately to provide disaster-specific savings of US\$7–10 million. Over the medium term, a savings fund of around 5 percent of GDP would provide adequate coverage for all disasters with low probability of depletion. This coverage could also be achieved by a combination of savings, insurance, and resilience-strengthening investment. Citizenship-by-Investment revenues should contribute to building disaster funding, because their temporary and unreliable nature makes them unsuited to financing the current budget. St. Lucia participates in risk-transfer schemes, but there is room for improvement in its insurance of public assets. It is a member of the Caribbean Catastrophe Risk Insurance Facility (CCRIF), and is working with the World Bank towards a new Catastrophe Deferred Drawdown Option (Cat DDO). It also has a competitive insurance industry, including an innovative income protection scheme for small farmers. However, both public and private assets are under-insured.

**National processes.** Traditional public financial management (PFM) processes in St. Lucia have been relatively transparent and disciplined. However, effective implementation of a government climate change response could now be impeded by difficulties in coordinating climate-related responsibilities spread diffusely across ministries, and by the recent sidelining of the PSIP (with investments being budgeted before PSIP screening and prioritization). Clear criteria should be set for including climate-related projects in the budget. Elements of program budgeting already introduced could, if enforced, help the budget to set climate-related targets and track progress.

**Priority needs.** To meet its renewable energy plans, St. Lucia will need to mobilize private investment, and external assistance will be needed to develop supporting infrastructure. Building capacity for project assessment and investment promotion is a high priority, to shape needed investments into bankable projects. Elsewhere, capacity-building would be most useful to help cost sectoral plans, complete the disaster-preparedness strategy, move toward carbon taxation, and strengthen skills in public investment management and PFM.

## A. Recommendations—Summary<sup>1</sup>

### **General Preparedness**

1. Strengthen the NDC, to provide a comprehensive strategy of St. Lucia's climate-change-related effort—particularly by adding costed adaptation plans.
2. Update the National Vision Plan and Medium-Term Development Plan, and develop supporting operational sectoral plans, with focus on costing and resource mobilization.
3. Ensure that all enabling legislation and standards relevant to climate, environment and energy are in place.

### **Mitigation**

4. Introduce a carbon tax by applying the announced road fuel tax increase to other diesel products (including for power generation) and synchronizing future tax increases across all fuels.

### **Adaptation**

5. Enact the amendments to the OECS Building Code for Saint Lucia.
6. Review and approve the Coastal Zone Management Policy and Strategy.
7. Consider rezoning flood areas.

### **Financing**

8. Articulate a strategy for raising climate-change financing; use the NDC forum as a catalyst.
9. Rely as much as possible on private sector and grant financing, to ensure continued fiscal and debt sustainability.
10. Fully implement the renewables strategy, not least because it will strengthen St. Lucia's balance of payments.

### **Risk Management**

11. Build a contingency funding buffer through:
  - immediate capitalization of a fund of USD 5-7 million
  - in the medium term, a savings fund with capitalization of 5 percent of GDP, replenished on a rolling basis, which would give St. Lucia a 95 percent probability of being able to cover the fiscal costs of disasters without incurring additional debt.
12. Use revenues from the Citizenship-by-Investment program to capitalize disaster funding.
13. Consider making insurance mandatory for key public buildings.
14. Study the value of making insurance mandatory for buildings in flood-risk areas.
15. Support the strengthening of the domestic insurance market, as well as *regional* initiatives for insurance, which are likely to be relatively cost-effective.

<sup>1</sup> This summary list of recommendations includes only priority actions that can/should be started immediately. A fuller list is included at the end of each chapter.

## National Processes

16. Ensure that responsibilities for climate action are logically assigned to relevant ministries, with clear responsibilities for developing sectoral strategies and costed investments.
17. Revive the PSIP, while addressing any problems that made it be considered inadequate.
18. Ensure that climate-related objectives and activities are systematically identified in the budget, and investment projects explicitly linked to these.
19. Build capacity for effective public investment appraisal and monitoring, in the Ministry of Finance and other relevant ministries.

### Box 1. Priority Needs to Be Met

#### Government Financing or External Support

- Completion of the disaster-preparedness strategy
- Government program costs to support private investment in mitigation (US\$23 million)
- Public investment in road construction and rehabilitation (US\$91 million)
- Public investment needed to supplement private involvement in adaptation projects (see list below)
- Backing for contingent financing
  - E.g., emergency contingency fund and savings fund

#### Private Investment

- Mitigation investment of an estimated US\$218 million by 2030 (\$183 million by 2025) in:
  - Energy-efficient buildings and appliances
  - Geo-thermal, wind and solar energy generation
  - Improvements to grid distribution and transmission efficiency
  - Water distribution and network efficiency
  - Efficient vehicles
  - Expanded public transit
- Adaptation investment in: water supply systems; land use planning and management, including coasts; agriculture and food security

#### Capacity-Building

- Completion of the disaster-preparedness strategy
- Integration of climate-related activities into costed sectoral plans
- Carbon taxation (especially to spread fuel tax hikes across a broader base, and possibly for vehicle taxation and congestion pricing)
- Support for investment promotion
- Revival of PSIP management skills
- Further strengthening of program budgeting and other public financial management skills

# INTRODUCTION

*This report for St. Lucia is the second pilot Climate Change Policy Assessment 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 St. Lucia.** It reviews the government's plans for mitigating and adapting to the effects of climate change, in line with St. Lucia's Nationally Determined Contribution (NDC), and gives recommendations on how to strengthen policies while maintaining a sustainable macroeconomic framework.
2. **St. Lucia has been a lead voice for Caribbean countries facing climate change.** It led CARICOM negotiations for the Paris Accord, and was the first Caribbean country to sign an NDC ([St. Lucia Intended Nationally Determined Contribution Under the UNFCCC](#)). It is organizing the 2018 NDCs Forum with the UNFCCC, to help mobilize climate financing for OECS countries, and is piloting the Eastern Caribbean Energy Regulatory Agency initiative (ECERA), both of which are expected to provide early benchmarks for NDC development in other Caribbean small states.<sup>2</sup>
3. **The CCPA pilot program is also supporting the development of the Bretton Woods institutions' analytical toolkit for confronting climate change.** The report draws on results of a World Bank macro-fiscal model that simulates the effects of climate-change policies, and Bank estimates of the distributional impact of implementing the NDC. It also applies the IMF's spreadsheet tool for assessing the implications of mitigation policies on emissions, its estimates of optimal disaster funds, and its first effort to reflect feedback effects from resilience-building policies to growth and debt sustainability. These exercises are described below.

## ***An overview of the report***

4. **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.<sup>3</sup>

<sup>2</sup> See Government of St. Lucia, *Economic and Social Review 2017*, Box 4, for an overview of ongoing initiatives.

<sup>3</sup> The CCPA will be attached to the papers for the IMF's 2018 Article IV Consultation, and—since the Government of St. Lucia has agreed to publication—will be available for public distribution after the Article IV Board meeting.

**Table 1. St. Lucia: Expected Climatic Developments and Consequences**

Temperatures	<ul style="list-style-type: none"> <li>St. Lucia is projected to be warmer by up to 1.1°C–1.5°C between 2020 and 2039, with more pronounced increase in warm/wet seasons (June–November).<sup>1</sup></li> <li>Sea surface temperatures in the Caribbean are projected to go up by as much as 2 degrees Celsius by the end of the century.</li> <li>Rising temperatures could exacerbate both the activity of and the damage caused by tropical cyclones. Average annual damages in the Caribbean could increase between 22 and 77 percent by 2100.<sup>2</sup></li> <li>Disruption to marine ecosystems (including coral bleaching, seaweed invasion, and fish populations), with cost to the tourism and fisheries sectors.</li> </ul>
Precipitation	<ul style="list-style-type: none"> <li>General Circulation Models (GCMs)<sup>3</sup> predict a median decrease of up to 22 percent for annual rainfall between 2020 and 2039.<sup>4</sup></li> <li>Changes in rainfall patterns are projected to increase the likelihood of water shortages and heighten the risk of drought.</li> </ul>
Sea level rise <sup>5</sup>	<ul style="list-style-type: none"> <li>A 1 m rise in sea level would put one of the two airports, all ports, and 7 percent of the major tourism properties at risk. Low-lying agricultural areas would also be affected.</li> <li>100 m of beach erosion would affect 30 percent of all major tourism resorts and 53 percent of sea turtle nesting sites.</li> </ul>
Extreme weather events	<ul style="list-style-type: none"> <li>Projections show increased inter-annual variability, with more intense effects of each severe weather event.<sup>6</sup></li> <li>Greater intensity could accelerate soil erosion, leading to the contamination of groundwater, the salinization of water sources, and the sedimentation of dams and reservoirs, adversely impacting the quality of the country's water resources.</li> </ul>
<p><sup>1</sup> World Bank Climate Change Knowledge Portal (<a href="http://sdwebx.worldbank.org/climateportal/">http://sdwebx.worldbank.org/climateportal/</a>).</p> <p><sup>2</sup> Acevedo, S., "Gone with the Wind: Estimating Hurricane and Climate Change Costs in the Caribbean," IMF WP/16/199.</p> <p><sup>3</sup> General Circulation Models are climate models used to simulate the response of the global climate system to increasing greenhouse gas concentrations.</p> <p><sup>4</sup> World Bank Climate Change Knowledge Portal.</p> <p><sup>5</sup> CARIBSave Climate Change Risk Profile for St. Lucia, March 2012.</p> <p><sup>6</sup> World Bank Climate Change Knowledge Portal, St. Lucia.</p>	

## ST. LUCIA'S CLIMATE CHANGE RISKS AND EXPECTED IMPACTS

*St. Lucia lies in a hurricane belt, so would suffer human and output losses if extreme weather intensifies, as well as likely damage to tourism and fishing from rises in sea level and temperature. Fiscal costs would worsen, in a country already threatened by unsustainable debt.*

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

### *How Vulnerable is St. Lucia's Economy to Climate Change?*

Table 2. St. Lucia: Major Natural Disasters			
Event (year)	Disaster type	Number of people affected	Damages and losses (in % of GDP)
Hurricane Allen (1980)	Storm	80,000	69.3
Unnamed (1983)	Storm	3,000	0.8
Hurricane Gilbert (1988)	Storm	...	0.7
Tropical Storm Debbie (1994)	Storm	750	14.2
Landslide (1996)	Landslide	175	...
Hurricane Lenny (1999)	Storm	200	2.2
Hurricane Ivan (2004)	Storm	...	0.3
Hurricane Dean (2007)	Storm	...	3.5
Hurricane Tomas (2010)	Storm	172,370	28.4
Flood (2010)	Flooding/landslide	2,000	...
Christmas Eve Trough (2013)	Storm	19,984	8.0

Sources: EM-DAT, NEMO, and ECLAC.

5. **As a small island in the Atlantic hurricane belt, Saint Lucia is exceptionally vulnerable to climate change and its associated costs.**<sup>4</sup> It faces high risks of cyclones and landslides, and a medium risk of coastal floods.<sup>5</sup> Among small states, St. Lucia ranks 5<sup>th</sup> at risk for natural disasters.<sup>6</sup> Of the 182 countries in the Climate Risk Index, St. Lucia was in the top 10 percent for losses to climate-related natural disasters during 1997–2016 and in the top 15 percent of climate-related disaster fatalities.<sup>7</sup> St. Lucia's annual average loss from of wind-related events and floods averages just under US\$49 million, or 3.4 percent of GDP. Once every 100 years, on average, these costs are expected to exceed US\$882 million, or more than 61 percent of GDP—i.e., even before climate change, there is a 1 percent probability in any year that a natural disaster will impose national costs of more than 61 percent of GDP. St. Lucia's primary climate-change concerns are damage from intensified extreme weather (floods and landslides, with associated loss of life, infrastructure, housing and output), threats to water supply, and economic costs to tourism and primary sectors from rises in temperature and sea level.

<sup>4</sup> *Disaster Risk Management in Latin America and the Caribbean Region: GFDRR Country Notes, St. Lucia*. World Bank and Global Facility for Disaster Reduction and Recovery.

<sup>5</sup> Think Hazard: <http://thinkhazard.org/report/209-St.-lucia>.

<sup>6</sup> *Small States' Resilience to Natural Disasters and Climate Change – Role for the IMF*. IMF, November 2016.

<sup>7</sup> Global Climate Risk Index 2018. <https://germanwatch.org/en/14638>.

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

6. **Intensified natural disasters would reduce output and worsen fiscal performance, as would climate change more generally.** Expected capital depreciation would worsen, as would the uncertainty of investment returns, ultimately depressing output. Tax revenues would decline, and additional expenditure would be needed for social support, infrastructure rehabilitation, and reconstruction. Figure 1 shows simulations of the impact of a natural disaster on St. Lucia's output and fiscal aggregates, with and without further climate change.

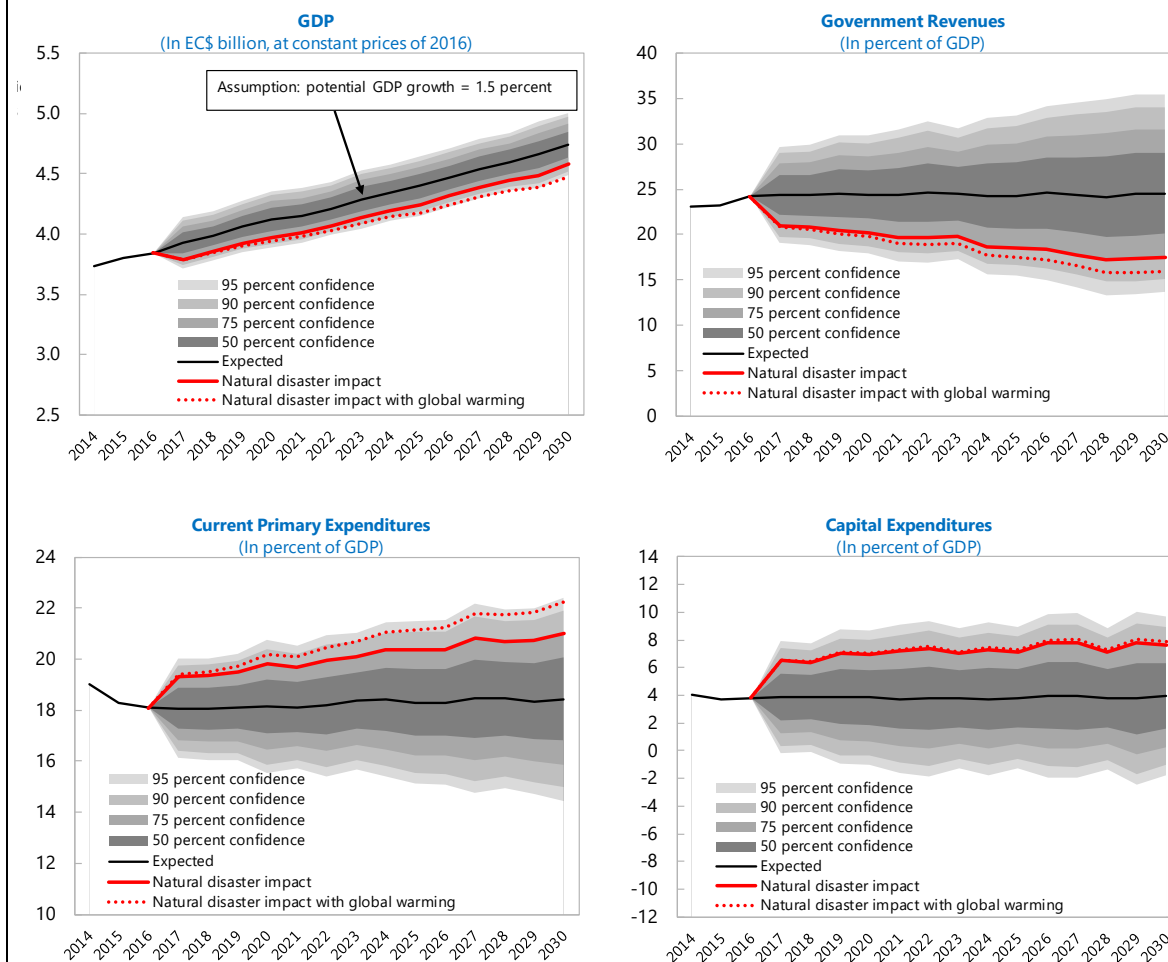
- Without further global warming (i.e., based on historical patterns), output would decline by 3.5 percent (i.e., a one-time level loss) on average when St. Lucia is hit by a hurricane or a tropical storm.<sup>8</sup>
- In a scenario with extensive climate change, output would decline by over 5 percent on average after a hurricane, assuming the impact on public and private infrastructure is in line with the predicted increase in damages.<sup>9</sup>
- Fiscal performance would worsen commensurately, mitigated only by a possible increase in grants if historical patterns continue to hold.
- While the exercise in Figure 1 simulates only the toll of *disasters*, it is important to note that climate change is expected to have important economic effects beyond disasters: land fragility and coastal floods are also expected to intensify, and agriculture production, health, energy and water infrastructures are expected to be adversely affected.

---

<sup>8</sup> The model used in the simulations is a VAR estimated on historical data—i.e., disasters affect St. Lucia with the same intensity and frequency observed in the past. Endogenous variables include the cyclical components of output, and government non-grant revenues, current primary expenditures, and capital expenditures. Natural disasters are identified after controlling for other sources of shocks (the US real effective exchange rate for competitiveness; the US output gap for tourism demand; oil prices; and a dummy for September 11, 2001). The simulations are based on a Monte Carlo experiment that draws probability distribution functions for each endogenous variable through 2017–2030, with the same volatility, persistence and co-movement as in the data. For a detailed description of the methodology used, see Guerson, A. "Assessment Government Self-Insurance Needs Against Natural Disasters: An Application to the ECCU," Eastern Caribbean Currency Union, 2016 Discussion of Common policies of Member Countries, Annex VIII, IMF Country Report No. 16/333.

<sup>9</sup> These simulations assume an increase in the intensity of natural disasters, but they do not include an increase in their frequency, a prediction for which there is currently no full scientific consensus. The impact of global warming is based on estimates of the increase in damages from natural disasters in Acevedo, S. "Gone with the Wind: Estimating Hurricane and Climate Change Costs in the Caribbean," IMF WP/16/199 for the RCP8.5 greenhouse emissions scenario of the Intergovernmental Panel on Climate Change (IPCC) 2014 report.



**Figure 1. Climate Change and Macroeconomic Performance**

Source: Fund staff calculations based on authorities' data.

## GENERAL PREPAREDNESS FOR CLIMATE CHANGE

*St. Lucia's commitment to resilience-building is strong and its NDC has a fully specified mitigation strategy. However, adaptation plans remain to be fully articulated and legislation needs updating. Disaster planning is well underway but funding remains inadequate.*

## A. The NDC and Other National Resilience-Building Strategies

### *Does the NDC Present a Comprehensive and Costed Strategy for Climate Change Response?*

7. **St. Lucia's NDC has a fully-specified and costed mitigation strategy, but only general information on adaptation.** The NDC includes a commitment to emissions reduction and an (indicative) quantified mitigation strategy to meet the reduction target. It identifies key sectors/areas for climate-change adaptation, but the government is still in the process of developing sector-specific strategies, so priority adaptation projects are not specified (see Chapter V below). Financing needs are identified only for mitigation.

### *Is the Climate Change Strategy Consistent with Broader Development Goals?*

8. **Yes. St. Lucia's climate change strategy is consistent with the priorities outlined in its national strategic documents.** There is a broad consensus in favor of the Paris Accord and a commitment to action on climate change across the political spectrum. Two of the six pillars in the program of the government that took power in 2016 are building capacity in renewable energy and adapting to climate change.<sup>10</sup> National plans have long prioritized resilience-building, including the 2007 National Vision Plan, the 2011 Strategic Program for Climate Resilience,<sup>11</sup> and the Medium-Term Development Strategy 2012–16<sup>12</sup> (see Figure 2). However, all these plans need to be updated—for instance, to reflect the specific implications of the Paris Agreement.

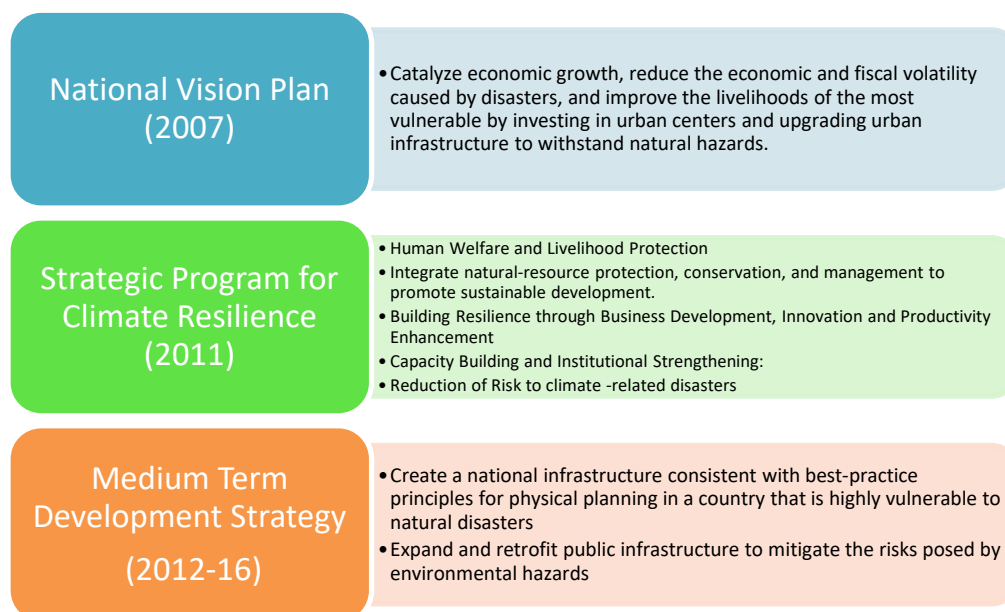
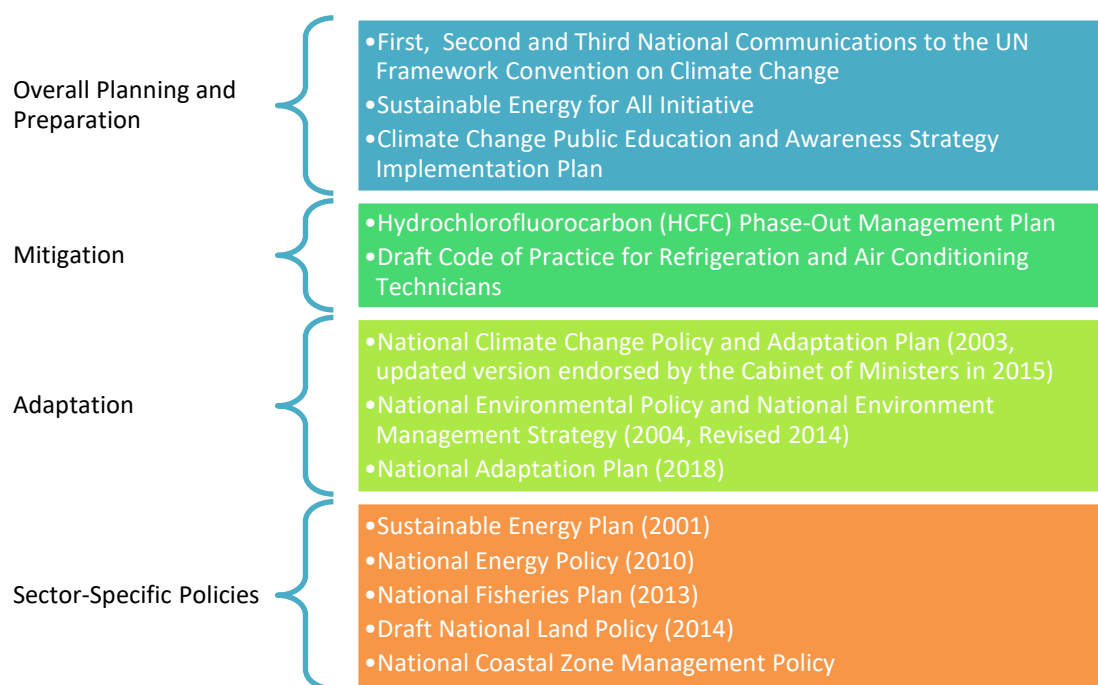
9. **A necessary process of updating plans and legislation is getting underway.** The Government is preparing a new National Vision Plan to update the 2007 Plan and the 2012–16 Development Strategy. It is also drafting a new Climate Change Bill covering both mitigation and adaptation and revising the Environmental Management Bill, which it expects to complete in 2018.

---

<sup>10</sup> The 2018–2019 Budget Address “Building Resilience Today to Secure our Future,” envisages building physical, social, and financial resilience, by: (a) upgrading physical infrastructure with climate-resilient standards; (b) enhancing social protection strategies for vulnerable groups and provision of affordable housing to high-risk communities; (c) “insuring for resilience,” using diverse ex-ante disaster risk financing (DRF) instruments, including the CCRIF and the Cat DDO, and (d) managing the cost of debt, including public debt related to disaster response.

<sup>11</sup> [https://www.climateinvestmentfunds.org/.../saint\\_lucia\\_spcr\\_0.pdf](https://www.climateinvestmentfunds.org/.../saint_lucia_spcr_0.pdf).

<sup>12</sup> Ministry of Finance, Economic Affairs and Social Security, “St. Lucia: Medium Term Development Strategy 2012–2016,” September 2012.

**Figure 2. Articulation of St. Lucia's Climate Change Strategy****Priority Objectives in Strategic Development Documents****List of Existing Climate Change-Relevant Policies**

Source: Climate Policy Team, World Bank Group

## B. Disaster Planning and Other Contingency Plans

### *How Well-Prepared Is the Country to Cope with Possible Intensified Disasters?*

10. **St. Lucia has well-developed institutions for responding to disasters, but challenges remain.** The government has invested heavily in risk mitigation over the last two decades.<sup>13</sup> The Emergency Powers Disaster Act in 1995 and the Disaster Preparedness and Response Act No. 13 (2000) and its Amendment Act, the Disaster Management Act No. 30 of 2006 are the governing legislation for DRM. In 2006 the National Emergency Management Organization (NEMO) was set up. A national agency under the prime minister's office, NEMO is responsible for overseeing all aspects of disaster-risk management, including planning, mitigation, disaster response, damage assessments, and reconstruction. The 2007 National Disaster Management Plan guides risk assessment, prevention and post-disaster response activities. The World Bank, the Caribbean Development Bank (CDB), the Japan International Cooperation Agency (JICA) and others have funded a sequence of projects to strengthen emergency preparedness, enhance early warning systems, and build communities' capacity to manage disasters.<sup>14</sup> These efforts are deemed to have reduced human vulnerabilities, but could not prevent 8 deaths in Hurricane Matthew, which also brought severe problems for water supply and agriculture. In light of progress made, and lessons from recent disasters, current World Bank and EU support is putting more weight on making infrastructure resilient (e.g., school buildings and bridges).<sup>15, 16</sup>

11. **St. Lucia has a system to collect information on damage and losses of sectors from extreme events.** Eighteen district-level Damage Assessment and Needs Analysis (DANA) teams are coordinated by NEMO. These local DANA teams feed a national DANA team to report on risk reduction before a disaster, and assess damages after. However, the Government needs a national assessment methodology to be able to quantify the economic impacts of all disasters consistently.

12. **Advance funding for disasters remains inadequate.** Historically, St. Lucia has depended heavily on ex-post financing from partners such as Australia, Canada, China, Kuwait, the EU and New

<sup>13</sup> This section draws heavily on *Advancing a National Disaster Risk Finance Strategy in St. Lucia*, World Bank, February 2018.

<sup>14</sup> The World Bank financed projects include: (a) the US\$7.65 million Emergency Recovery and Disaster Management Program (ERDMP-P070430), which supported physical and institutional efforts for disaster recovery and emergency preparedness and management (1998–2003); (ii) the US\$8.9 million Second Disaster Management Project (DMP II-P086469), a follow – up to the ERDMP which instituted structural and nonstructural risk reduction measures, such as retrofits of public facilities, construction of coastal protection works, an emergency operation center and community-level risk reduction interventions and capacity building activities (2004–2011); (iii) the US\$15 million Hurricane Tomas Emergency Recovery Loan (HTERP-P125205), which supported the recovery and reconstruction in St. Lucia in the aftermath of Hurricane Tomas (2011–2014); and (iv) the ongoing US\$68 million Disaster Vulnerability Reduction Project (DVRP-P127226), which is co-financed with IDA and PPCR Grant funds.).

<sup>15</sup> <http://www.worldbank.org/en/results/2013/09/06/St.-lucia-vulnerability-natural-disasters>.

<sup>16</sup> St. Lucia DVR project report PAD1667, October 2016.

Zealand. Officials commented that paying for a disaster burdens the national budget for several years, without ever achieving full replacement. The budget has a small contingency fund and

allocation to NEMO, but these fall short of optimal provisioning (see Chapter VII). St. Lucia partners with the Caribbean Disaster Emergency Management Agency (CDEMA) which provides regional assistance after disasters and is a member of CCRIF. A Cat DDO—a contingency credit line with drawdown in the event of an emergency—is under negotiation with the World Bank.<sup>17</sup>

13. **The institutional framework should be strengthened to enable it to systematically assess and quantify the economic and fiscal impact associated with disasters.** Priorities include better information collection and use, and a more strategic approach to disaster financing (as discussed further in Chapter VI). In 2018, the Cabinet has approved a National Disaster Risk Financing Strategy (2018), which should, among other things:

- Streamline and institutionalize damage and loss data collection and reporting systems across ministries for all severities of events.<sup>18</sup>
- Publish damage and loss information, with sectoral disaggregation, in a public online database that is updated after each assessment.
- Build capacity to ensure that institutional knowledge is preserved
- Assure financing is immediately available and accessible for early disaster response.
  - Increase contingency reserves to at least US\$7–10 million in the short term, and ensure the reserves can only be disbursed for disaster-related expenditure
  - Account for disaster-related contingent liabilities based on IPSAS standards.
  - Support development of parametric, indemnity and/or hybrid instruments in the private insurance market (including CCRIF) and build sovereign buffers (the Imprest Fund, the Contingency Fund, the Emergency Disaster Fund).
- Prepare a Manual for post-disaster financing, covering actors, systems, the sources of financing and the process to disburse to the Government of St. Lucia.

#### ***Recommendations for General Preparedness***

1. Strengthen the NDC, to provide a comprehensive strategy of St. Lucia's climate-change-related effort—particularly by adding costed adaptation plans.
2. Update the National Vision Plan and Medium-Term Development Plan, and develop supporting operational sectoral plans, with focus on costing and resource mobilization.
3. Put in place all enabling legislation relevant for climate change, environment, and energy.
4. Reduce vulnerability to natural disasters and climate change by:
  - a. Investing in disaster risk reduction measures, combining physical investments with improved regulations, planning, and enforcement.
  - b. Introducing a national assessment methodology to quantify the economic impact of disasters consistently.
  - c. Operationalizing a disaster risk financing strategy, including own reserves and insurance.

<sup>17</sup> St. Lucia Disaster Risk Management Development Policy Loan with a Catastrophe Deferred Drawdown Option, May 2017.

<sup>18</sup> This refers to direct damage and economic losses from disasters, as opposed to the UNFCCC definition, which covers irreversible, irreparable and permanent loss, including from slow onset events such as sea level rise and ocean acidification.

## CONTRIBUTION TO MITIGATION<sup>19</sup>

*St. Lucia plans to meet its emission mitigation targets principally by promoting renewable energy, energy efficiency, and low emission cars. It should also consider a carbon tax to better balance mitigation options and raise revenue, and other reforms to the tax treatment of vehicles and power.*

St. Lucia's NDC pledges (conditional on some external finance) to limit greenhouse gases (GHGs) to 634 and 628 kilo-tons (or Gg) of CO<sub>2</sub> equivalent in 2025 and 2030 respectively, reductions of 16 and 23 percent below projected 'business as usual' levels in those years.

### How Does St. Lucia Plan to Meet Its Emissions Reduction Targets?

#### A. Clean Energy Plans

14. **St. Lucia's mitigation plan envisages cutting emissions by:** (i) expanding the share of renewable power generation (currently 0.2 percent of installed capacity) to 35 percent by 2025 and 50 percent by 2030; (ii) improving energy efficiency (e.g., for buildings, appliances, and lighting); (iii) promoting fuel-efficient vehicles (including hybrid and electric); and (iv) other measures such as improving power grid efficiency and expanding public transport (Table 3). The NDC estimates that these steps will cost US\$241 million by 2030, including US\$23 million in government program costs.<sup>20</sup>

**Table 3. St. Lucia: Envisioned Mitigation Measures in St. Lucia's NDC**

Sector	Mitigation action
Energy	Energy efficient buildings Energy efficiency appliances Water distribution and network efficiency
Electricity generation	35 percent renewable (geothermal, wind and solar) generation share by 2025 and 50 percent by 2030 Improvements to grid distribution and transmission efficiency
Land transport	More efficient vehicles Improved and expanded public transit

Source: St. Lucia NDC.

15. **There would be important side-benefits to meeting these mitigation targets.** A successful shift to renewable energy would promote energy security (lessening the sensitivity of domestic energy prices to volatile oil markets) and create significant savings in the imported fuel bill (currently about 8 percent of GDP, given near universal dependence of energy supply on imported petroleum). The strategy therefore embodies worthwhile goals, even from a domestic perspective.

16. **The targets are within reach...** Meeting the 50 percent renewables target for 2030 would reduce CO<sub>2</sub> emissions about 25 percent below business-as-usual (BAU) levels in 2030. Indeed, meeting absolute GHG emissions targets may be less challenging if business as usual (BAU) emissions growth is slower than predicted in the NDC. The NDC projects BAU emissions in 2030 will be 27 percent higher than in 2015 but projected GDP growth is only 23 percent, and emissions may rise more slowly than GDP due to improving energy efficiency (as capital stocks turn over),

<sup>19</sup> This section draws on *Fiscal Reforms for Climate Mitigation and Other Environmental Objectives in Seychelles*, by I. Parry, IMF 2017.

<sup>20</sup> Costs by sector and investments are not disaggregated in the NDC; the numbers are indicative.

saturation of vehicle ownership, and fuel conservation in response to possibly rising international oil prices.

17. **... but, despite ongoing progress, challenges remain.** The feasibility of the large and rapid expansion of renewables remains to be tested and is subject to high uncertainty. For example, St. Lucia Electricity Services Limited (LUCELEC) is moving ahead with renewable projects<sup>21</sup> but the scope for geo-thermal generation is uncertain (appropriate geothermal sites, and their costs and prospects for attracting international investors, are unclear at this point)<sup>22</sup> and for solar generation is limited by land constraints. Moreover, while cleaner vehicles are taxed at lower rates, and road fuel excises were increased in July 2017, this may not stem the surge in imports of fossil-fueled vehicles experienced in recent years, since alternatives to driving are limited and electric vehicles remain expensive. Finally, the cumulative investment costs for mitigation are substantial—US\$241 million by 2030 is EC\$651 million, or around 14 percent of FY2016 GDP—though much of this investment might come from private sources with the right incentives in place.

18. **Supporting legislation will need to be put in place.** The National Environmental Management Strategy (NEMS), revised in 2014 (but not yet approved by Cabinet), indicated several pieces of legislation needed to support mitigation in key sectors. To avoid holding up new investments, these laws should be finalized. An important recent achievement was the amendment of the Electricity Supply Act to allow independent power producers to access the grid. An Electricity Services bill is in draft.

## B. Carbon Pricing

19. **Carbon pricing could support the clean energy strategy, allaying concerns about technological and funding uncertainties.** Carbon taxes are far more effective at exploiting emissions mitigation opportunities than other policies like incentives for energy efficiency or fuel-efficient vehicles, because they exploit the full range of behavioral responses across all households and firms (conserving energy, shifting to cleaner fuels, driving less, and so on) and would reinforce measures to boost renewables by raising the costs of diesel generation. Administratively, a carbon tax is simple to implement through integrating surcharges into existing fuel taxes. This is in line with IMF and World Bank staff's advice internationally, which is to favor more effective and cost-effective price-based instruments for meeting environmental objectives while providing valuable new revenues.

<sup>21</sup> LUCELEC is working to bring a 3 megawatt (MW) solar plant and a 12 MW wind farm to commercial operation.

<sup>22</sup> St. Lucia has potential to produce more than 75 MW of geothermal energy, relative to the 60.3 MW of peak demand in 2016. With sufficient financing and incentives, St. Lucia could develop a 30 MW geothermal facility, to be operational by 2023. McIntyre et al (2016) report that total investment needed for geothermal development in St. Lucia is US\$66 million, based on 2015 estimates. See Annex I for more detail.

### Box 2. The Foundation for Carbon Taxation in St. Lucia

*Carbon tax base.* Road transport accounts for about 40 percent of current CO<sub>2</sub> emissions. Power generation—which is taxed more lightly—is the largest source of emissions (50 percent) and these emissions tend to be more responsive to pricing.<sup>1</sup> Direct fuel consumption by households and firms accounts for a further 10 percent.

*Current carbon-related taxes.* Revenue yields from fossil fuel taxes as of 2016, and tax rates as of 2016 and 2017, are shown in the table below. The road fuel excise is the most important, raising EC\$43 million in revenue in 2016 (about 1 percent of GDP). Road fuel excise rates were increased from EC\$2.50 per gallon in 2016 to EC\$4 per gallon in July 2017. However, if needed, the tax is lowered to prevent fuel prices exceeding a current cap of EC\$12.75 per gallon—in November 2017 this price cap was binding for both fuels, resulting in excises of EC\$3.02 and 3.60 per gallon respectively for gasoline and diesel. Fossil fuels outside of the road sector are subject to a lower levy of EC\$1 per gallon.<sup>2</sup>

**St. Lucia: Rates of, and Revenue from Fossil Fuel Excises and Levies, Latest Year**

Product	2016		2017	
	Consumption, million gallons	Excise/levy, EC\$/gallon	Excise/levy, revenue, EC\$mn	Excise/levy, July-November
Diesel--power generation	19.9	1.00	19.9	1.00
Diesel/gasoline for road fuels	17.0	2.5	42.6	3.0-4.0
Diesel--households/industry	4.0	1.00	4.0	1.00
Total/average	41.0	1.6	66.6	

Source. MOF, LUCELEC, IDB and staff calculations.

Notes. All fossil fuels are also subject to a service charge surcharge, currently 6 percent of the landed import price. And EC\$7 million of fuel excise revenues cross-subsidize LPG (a fuel consumed intensively by low-income households).

<sup>1</sup> Higher diesel taxes would encourage both switching to renewable generation fuels (as they raise the costs of diesel generation relative to renewable generation) as well as reductions in electricity demand (as taxes are passed forward in higher electricity prices).

<sup>2</sup> Higher rates for road fuel excises have some justification as they help to (albeit bluntly) reduce road congestion and accidents.

20. **Ideally, carbon would be priced sufficiently high to change behavior, lessening the needed reliance on other direct measures or promotion of any single technology.** In practice, however, many countries are using a mix of carbon-pricing and clean energy policies (e.g., incentives for energy efficiency and renewables) to achieve their emissions targets.<sup>23</sup> While likely to be less cost effective, this limits energy price increases that are politically difficult and could raise concerns about competitiveness and growth (though the revenue from a carbon tax can be an important source of growth-enhancing investment). To the extent that other measures are used they should be flexible,

<sup>23</sup> By November 2017, 67 jurisdictions had some form of carbon-pricing instruments (both taxes and trading systems), with China planning to follow later.



for example, a fixed subsidy per kilowatt-hour of generation from renewable sources provides a level playing-field for all potential renewable projects.<sup>24</sup>

21. **St. Lucia is already improving its carbon pricing.** The Government is already taking steps toward better carbon pricing with the recent increase in road fuel excises; similar tax increases could be phased in for other petroleum products and fuels for power generation. At the same time, however, the government announced a cap on road fuel prices currently set at EC\$12.75 per liter, which was binding (in November 2017) for gasoline and road diesel—the excise tax is adjusted downward as needed to meet the cap when oil prices increase. See Box 2.

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

22. **Current fuel taxes fall short of delivering appropriate carbon pricing.**

- *Fuel tax rates.* The recent increase in road fuel tax excises would (if the fuel price cap does not become binding) reduce projected (fuel-related) carbon dioxide (CO<sub>2</sub>) emissions by around 2 percent.<sup>25</sup> More comprehensive fuel tax reform would be needed to induce the larger emissions reductions envisaged in the NDC.
- *Removing distortions would support better carbon pricing.*
  - For instance, it is anomalous that household consumption of electricity and road fuels is not subject to value added taxation (VAT); ideally VAT should be reflected in the prices of all consumer products to avoid distorting household choices.<sup>26</sup>
  - Also, vehicle taxes are designed to rise with engine capacity and age (both are proxies for emissions but such taxes are weaker deterrents than a carbon tax would be); hybrids and electric vehicles are subject to favorable rates.

### ***What Would St. Lucia's Tax System Look Like with Recommended Carbon Pricing?***

23. **A repeat of the recent fuel tax increase, and its extension across all fossil fuels, would—in conjunction with the renewables policy and removal of the road fuel price cap<sup>27</sup>—enable the mitigation targets to be reached with more certainty.** Figure 3 shows one possible strategy: extending the recent EC\$1.50 per gallon increase in road fuel excises to all diesel products, and then repeating the same increase across all fuels. The first tax increase—termed ‘modest carbon tax’ (defined to include the recent increase in road fuel excise) would raise diesel fuel prices for non-road purposes by 16.5 percent. With a further \$1.50 tax increase—termed ‘high carbon tax’—road fuel prices would rise by about 12.5 percent above current levels, and diesel prices for non-road purposes would exceed current levels by 33 percent.

<sup>24</sup> See, for example, Andreas Loschel and Oliver Schenker, 2017, “On the Coherence of Economic Instruments: Climate, Renewables, and Energy Efficiency Policies,” in I. Parry, K. Pittel, and H. Vollebergh (eds), *Energy Tax and Regulatory Policy in Europe: Reform Priorities*, MIT Press.

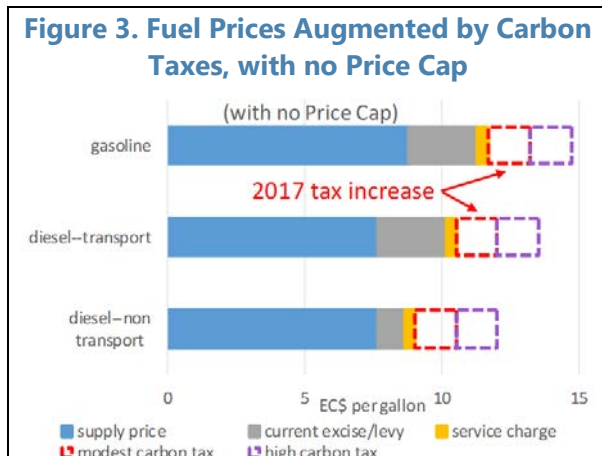
<sup>25</sup> Fossil fuel CO<sub>2</sub> accounts for about 80 percent of greenhouse gas emissions (GHGs) in St. Lucia and is potentially the easiest to measure and control, hence the focus on this gas in the NDC.

<sup>26</sup> Other preferences for energy products from the broader fiscal system, notably for solar water heating and efficient lighting, have recently expired.

<sup>27</sup> The IMF routinely recommends the removal of energy price regulations, for example, the Fund provided advice to Sri Lanka and Brunei Darussalam on energy price reform in 2017.

24. **The combination of a carbon tax and the renewables policy would be a powerful springboard for St. Lucia's climate action.**

Figure 4(a) shows that the emissions reduction target could not be met without the success of the renewables strategy outlined in the NDC. However, a carbon tax could accelerate the onset of emissions reduction and is much more effective than a range of other potential policy measures (e.g., energy efficiency for vehicles or electricity-using products, VAT reform)—the modest and high carbon taxes by themselves reduce CO<sub>2</sub> emissions by 7 and 12.5 percent respectively in 2030.



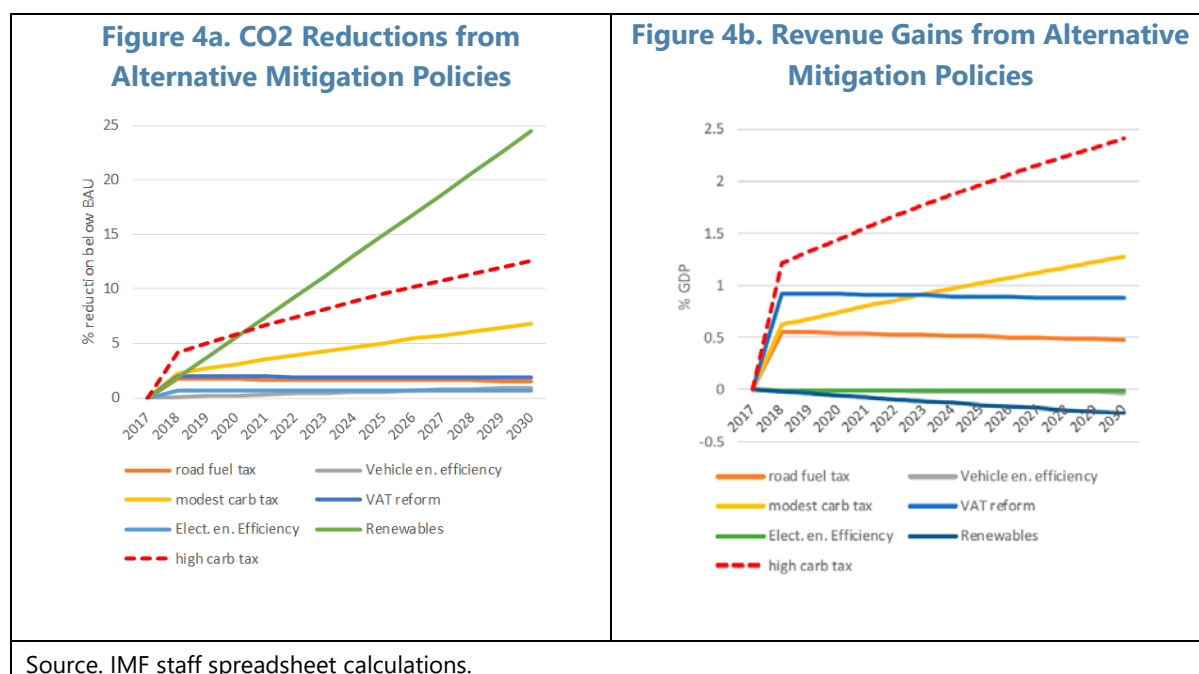
25. **Importantly, the carbon tax would provide substantial new revenues, which might be used for fiscal consolidation and resilience-building.** Modest and high carbon taxes raise additional revenues of 1.3 and 2.5 percent of GDP by 2030 respectively, about 3–5 times as much revenue as will be raised from the transport tax increase (with no price cap)—see Figure 4(b). Extending VAT to road fuels and electricity would also yield significant revenues (nearly 1 percent of GDP) and encourage energy efficiency, but would have only very blunt effects on emissions (as it would not promote fuel switching in power generation nor demand reductions for non-residential electricity consumption).<sup>28</sup>

26. **The distributional burden of the carbon tax increase falls mostly on better-off households, meaning a minor fraction (about 6 percent) of the carbon tax revenues would be needed in targeted compensation for the poor.** On average the road fuel tax imposes a burden on households of about 1.2 percent of their total annual consumption in 2030,<sup>29</sup> and this burden is fairly evenly spread—for example, the burden on the bottom and top income quintiles is 1.3 and 1.2 percent of their consumption respectively (Figure 5a). In contrast, the high carbon tax scenario has more regressive distributional consequences, imposing burdens on bottom and top income quintiles of 5.2 and 4.2 percent of total annual consumption in 2030.<sup>30</sup> Considering that households in richer quintiles have higher total consumption, simulation results indicate that 94 percent of the burden is borne by households other than those in the bottom income quintile (Figure 5b). Compensating the bottom income quintile (through targeted measures) need use only about 6 percent of the revenues raised.

<sup>28</sup> The base of the carbon tax would decline over time with the shift away from petroleum fuels but for the foreseeable future this could be more than compensated by gradually rising rates.

<sup>29</sup> This accounts for both the direct impacts of higher energy prices and the indirect effects through higher prices for goods in general due to higher energy costs.

<sup>30</sup> The loss in annual household consumption faced by household in the poorest quintile is US\$94 while the per capita loss averaged across all households is US\$307.



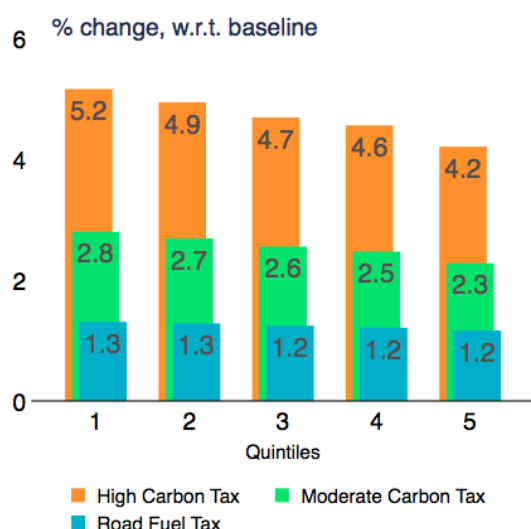
27. **Reform of the vehicle tax system, although less powerful than a broad-based carbon tax, could also support mitigation efforts and stabilize revenue.** The current tax system does not provide significant incentives to shift to low-emission vehicles—it does not reward vehicle characteristics beyond smaller engine size (like smaller vehicle size or lighter body materials) that lower emission rates nor cleaner vehicles within a given tax bracket. And as people shift to low-tax vehicles, excise collections decline. A shift in the design of vehicle taxation to a ‘feebate’ combined with an ad valorem tax would address both problems: this would mean a sliding scale of surcharges or rebates for cars with above/below average emissions provides comprehensive and continued rewards for cleaner vehicles while a uniform ad valorem rate could be chosen to meet fiscal needs. Denmark, France, Mauritius, Netherlands and Norway have recently adopted feebate systems.

## C. Other Macro-Relevant Green Tax Possibilities

### *What Other Tax Reforms Could Address Environmental Concerns?*

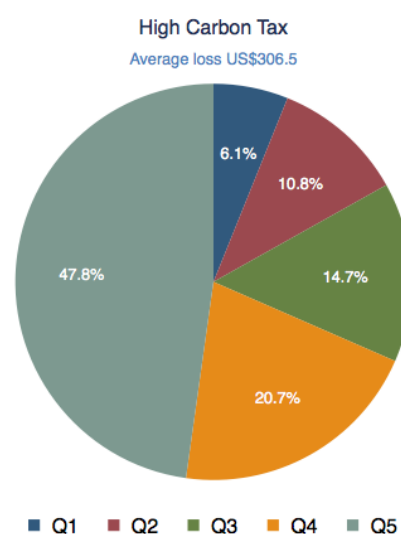
28. **Traffic congestion on St. Lucia’s road network is frequently severe and worsening with growth in the vehicle stock.** Higher road fuel taxes do not encourage people to drive at off-peak or avoid congested routes and the base of the tax erodes as people shift towards hybrid and more fuel-efficient vehicles. An electronically collected congestion fee (modelled on other cities and with schedules designed to smooth traffic flows over the course of the day) could more effectively manage road congestion around Castries and, in the longer term, applying these charges nationwide are a promising way to stabilize transportation revenues and manage pressure across the road network. More frequent, reliable, and extensive bus service could complement these efforts.

**Figure 5a. Losses of Total Annual Household Consumption in 2030, by Scenario and Quintile**



Source: World Bank staff calculations.

**Figure 5b. Average Burden on Total Annual Household Consumption in 2030, by Quintile**



Source: World Bank staff calculations.

### Box 3. Macro-Modeling the Impact of Mitigation Policies

A macro-structural model of the St. Lucian economy was built to provide a coherent framework for economic forecasts and for analyzing the distributional and other implications of meeting the climate commitments. The model, described in more detail in Annex II, allows for incentives associated with reforms to affect GDP and the structure of the economy. It explicitly models the energy sector and allows changes in the allocation of investments to affect the structure of the economy, wages and employment. An input-output table is used to capture the use of intermediate inputs of commodities, such as fuel, in each sector, as well as price changes.

The scenarios for renewables and carbon tax policies were calibrated using similar assumptions as in the spreadsheet model used to generate the results above; they yielded similar results in terms of reduction of CO<sub>2</sub> emissions.

The model's estimated macro level prices changes were converted into consumer prices changes, then CPI items were linked to specific budget allocations for households based on the 2016 Survey of Living Conditions and Household Budgets to estimate losses in household per capita income related to the mitigation policies. In addition, a microsimulation module was introduced to understand distributional impacts and explore mechanisms to minimize these.

## D. Other Carbon-Pricing Strategies

### *What Other Carbon-Pricing Strategies Could Usefully Contribute to Mitigation?*

29. **Carbon taxation is the most promising practical way for St. Lucia to price carbon.** Some countries rely on emissions trading systems applied downstream to large stationary emission sources (e.g., coal plants), but these systems are typically less comprehensive (applying to large industry and therefore omitting about 50 percent of emissions from vehicles, buildings, and small firms), require extensive trading markets and new monitoring capacity, forego revenue (through a narrower tax base and, possibly, free allowance allocation) and tend to have volatile prices (which may deter clean technology investments).

#### **Recommendations for Mitigation**

1. Introduce a carbon tax by applying the recent road fuel tax increase to other diesel products (including for power generation), then synchronizing future tax increases across all fuels, and removing the fuel price cap to allow these measures to work. Use a small portion of the revenues to compensate low-income households.
2. Supplement the carbon tax with flexible incentives for renewable generation fuels.
3. Change vehicle taxation to an ad valorem rate plus 'feebate' system.
4. Explore congestion fees and mileage-based tolls to keep traffic sustainable and maintain revenue (in light of progressively declining bases for fuel taxes relative to GDP).

## **ADAPTATION PLANS**

*St. Lucia has developed a policy framework for adaptation to climate change but has yet to specify and cost the reforms it will need. The nature of the probable high-priority investments suggests scope for bringing in private investors.*

### **Has St. Lucia Developed an Adequate Strategy to Adapt to Climate Change?**

#### **A. Policy Framework and Sectoral Strategies**

30. **There is a well-thought-out policy framework, but sectoral strategies need updating and costing.** The Climate Change Adaptation Policy (CCAP, 2015) is St. Lucia's most recent strategic framework for addressing the impacts of climate change in an integrated manner and across all key sectors.<sup>31</sup> It lays out goals for 2022 under three pillars (facilitation, financing, and implementation). The NDC gives a list of headline sectoral priorities. Building on St. Lucia's Second National Communication to the UNFCCC (SNC, 2012), which includes a good qualitative discussion of sectoral

<sup>31</sup> Adaptation activities are being pursued under the Strategic Programme for Climate Resilience (SPCR), as well as multiple other programs such as PPCR-DVRP, GCCA-CCCCC, GCCA-OECS, CCAP-USAID/CCCCC, and JCCCCP-UNDP, etc.), but without unifying these in a framework or specifying concrete costed action plans.

threats and needs, and a useful matrix of measures, prioritized and flagged as high or low cost, the Government has now submitted the Third National Communication. This will be an important step toward operationalizing the measures in the SNC, since it includes vulnerability and adaptation assessments in key sectors, measures taken to date and key recommendations.<sup>32</sup>

31. **Several key policies have recently been developed and approved by the Cabinet of Ministers, to facilitate the mainstreaming of disaster and climate risk analysis and consideration in infrastructure design and implementation, as well as decision-making, including in planning and budgetary processes and public investment projects.** These include:

- *The National Land Policy*, which guides risk-informed land use planning and mitigates development in disaster-prone location.
- *The Urban Transformation Policy*, which guides the revitalization of well-designed and well-managed urban centers, with well-maintained and resilient infrastructure, to unleash their economic potential for growth.
- *The National Healthcare Quality Policy*, which includes provision for mandatory technical regulations for granting operating licenses to health facilities by requiring resilience and energy efficiency design compliance.

32. **Some work on sectoral strategies is already underway.** Besides the Third National Communication, the government recently completed a ten-year National Adaptation Plan (NAP 2018), that outlines immediate, medium and long-term climate change adaptation needs and the process for the development of adaptation strategies and investment plans for priority sectors has already commenced. Moreover, the process for the development of sectoral strategies with costed investment plans for the Water, and Agriculture and Fisheries sectors, and a monitoring/evaluation plan has begun. An adaptation plan was developed for tourism in 2015 in a Global Climate Change Alliance (GCCA) project with the Caribbean Community Climate Change Center (CCCC), and, subject to funding, St. Lucia intends to also develop sectoral strategies and investment plans in infrastructure and spatial planning, natural resource management (coastal, marine and terrestrial biodiversity), education, and health.

## B. Public Investment

33. **St. Lucia is already undertaking adaptation investments, though these have tended to be reactive (disaster recovery) rather than strategic.** Adaptation spending is about one quarter of the overall (modest) investment envelope included in recent budgets, and in the pipeline of potential investments (Table 4). The capital budget has been in the range of EC\$250–300million (US\$92–111million) annually in the last few years, and a rough estimate of allocations to resilience and adaptation is between EC\$80–90million (US\$30–35million) a year, or around 2 percent of GDP (Table 5). Execution of the capital budget has been around 50–60 percent, suggesting actual spending on adaptation of around 1 percent of GDP a year. This suggests that, when St. Lucia elaborates a costed adaptation strategy, the net cost to the budget of scaling-up adaptation investment will be less than the gross sum of new projects—since completion of ongoing adaptation investment will open fiscal space for new projects.

<sup>32</sup> <http://www.climatechange.govt.lc/wp-content/uploads/2017/10/THIRD-NATIONAL-COMMUNICATION--SAINT-LUCIA-2017.pdf>.

**Table 4. St. Lucia: Adaptation Projects in the Capital Program of the 2016–17 Budget**

(in EC\$ millions and %)

<b>Capital Program Financing (2016–17)</b>	<b>Projects: All (1)</b>	<b>Adaptation Related (2)</b>	<b>(2)/(1)</b>
Capital Project Grants	97.2	22.8	27%
Capital Project Loans	170.8	50.1	60%
Government-financed	57.9	10.9	13%
<b>Total</b>	<b>325.9</b>	<b>83.8</b>	<b>1.9% of GDP</b>

Source: 2016–17 Expenditure Estimates (National Budget Document).

34. **Given the housing deficit and the sector’s vulnerability to disasters, the Government is currently undertaking reforms to make housing more affordable and resilient, with the aim of reducing implicit public disaster-related contingent liabilities.** It also aims to improve conditions for the private supply of affordable and resilient housing, in part by enabling the financial market so that more households, including those with informal incomes, could have access to loans to buy, build or improve their homes. To that end, the Government is making important strides toward the establishment of a disaster and climate risks reduction program for housing by implementing pilot programs such as the Climate Adaptation Financing Facility (CAFF), which provides households with concessional loans dedicated to pre-emptive investments, including retrofitting their homes.<sup>33</sup>

**Table 5. St. Lucia: Key Planned Capital Expenditures (2017–18) to Mitigate the Impact of Natural Disasters**

<b>Project</b>	<b>Estimated Amount (in EC\$ million)</b>
Construction of Retaining Wall-Police	0.16
Rehabilitation of Farms Post Tropical Storm Matthew	3.9
Dennerly Water Supply Redevelopment	10.6
Vieux Fort Water Supply	5.9
Disaster Recovery Programme	14.9
Sea Defense and Coastal Management	0.7
Slope Stabilization	2.0
Desilting of Rivers and Drains	2.0
Capital Contingency	14.0
Disaster Vulnerability Reduction Project-DVRP	27.5
Colombette Vending and Viewing Facility	0.3
Gaboo Lands Rationalization Project	0.37
<b>TOTAL</b>	<b>82.3</b>

Source: Discussion with national authorities.

<sup>33</sup> With a US\$4.5 million allocation to be managed by the Saint Lucia Development Bank, this first phase of the program will provide financing for structural retrofitting works to households. The CAFF provides technical and financial support to homeowners to help ensure reduced vulnerability to hurricanes and floods of their houses.



## ***What Is Missing from the Adaptation Investment Strategy?***

### **C. Sectoral Priorities**

35. **The new projects needed may be expected to come mainly from the following priority sectors:** (a) infrastructure, such as roadways and bridges; (b) water supply systems; (c) land use planning and management (including coasts); and (d) agriculture. Some of these, unlike adaptation needs in other small states, have the scope to attract private investment—important in St. Lucia’s fiscally constrained situation (see Chapter VI below.)

- **Roadways and bridges.** Climate-proofing existing infrastructure is of prime importance, in line with the stated objective of the Medium-Term Development Strategy (MTDS) to create resilience and reduce vulnerability to climate change by retrofitting infrastructure. Planned public investment on road construction and rehabilitation is an estimated US\$91 million (including investment funded by bilateral and multilateral partners), with US\$11.8 million in 2016–17.
- **Water supply system.** In the face of serious periodic flooding, parts of St. Lucia face acute challenges in accessing a reliable water supply due to poor infrastructure.<sup>34</sup> Water supply systems in Vieux Fort and Dennery are currently being redeveloped to address this problem. For example, the Dennery project is expected to give 8,000 people in Dennery North access to high-quality water supply.<sup>35</sup> Looking forward, further strengthening of drainage and desalination facilities is likely to be needed.
- **Agriculture and fisheries.** Disaster risk reduction in agriculture remains key, to maintain food security. So does the modification of agricultural techniques and processes, some of which has been undertaken as part of the Agricultural Transformation Program.

### **D. Other Public Programs (Regulation Reform, Zoning...)**

#### ***Adaptation Isn’t Just a Matter of Investment Spending; What Regulations Support It?***

36. **Adoption of appropriate legislation and regulatory frameworks is needed to support adaptation.** The National Environmental Management Strategy (NEMS), revised in 2014 (though not yet endorsed by Cabinet), indicated several pieces of legislation that are instrumental in supporting adaptation and mitigation in key sectors. While progress has been made in 2017–18 in the adoption of some elements of land policy, the Government should consider expediting and accelerating completion of outstanding legislation, including: (i) development and adoption of a Sustainable Building Code; (ii) review and approval of the Coastal Zone Management Strategy and Action Plan; and (iii) revision of the National Waste Management Strategy.

<sup>34</sup> Caribbean Development Bank Country Strategy Paper, St. Lucia: 2013–16.

<sup>35</sup> <http://www.caribank.org/news/cdb-approves-usd11-2-mn-st-lucia-water-supply-project>.



## E. Financial Sector Preparedness

### *How Is the Financial Sector Contributing to the Climate Change Effort?*

37. **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.<sup>36, 37</sup> However, the indigenous financial system is still recovering from the global financial crisis and 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.

38. **St. Lucia 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. St. Lucia's net reserves at the ECCB amount to four months of imports and almost 30 percent of broad money, which are deemed adequate against the benchmarks of 3 months and 20 percent, respectively.

#### **Recommendations for Adaptation**

1. Create and maintain a database that provides information on the progress in the implementation of adaptation projects as well as other projects that have a climate component.
2. Adopt the following plans, which incorporate disaster risk management and climate adaptation:
  - a. The revised National Environmental Management Strategy
  - b. The National Coastal Management Policy<sup>38</sup>
  - c. The National Spatial/Land Use Plan
3. Enact the Sustainable Building Code, and review and adopt the Physical Planning Regulations to integrate disaster risk management and adaptation considerations.
4. Verify that the National Waste Management Strategy has been approved.
5. Consider rezoning of flood areas.

<sup>36</sup> As propounded by Mark Carney, Governor of the Bank of England, in an influential 2015 speech (<https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability>).

<sup>37</sup> See also *After Paris: Fiscal, Macroeconomic and Financial Implications of Climate Change*, Farid et al, IMF (2016).

<sup>38</sup> The formally adopted Coastal Zone Management Policy of 2004, as well as the draft Strategy and Action Plan, are due to be revised under a World Bank initiative.

## FINANCING STRATEGY FOR MITIGATION AND ADAPTATION PROGRAMS

*St. Lucia's difficult fiscal situation should not preclude moving forward with resilience-building—though attracting private investors and grants will be key to mobilizing financing. A growth dividend and carbon tax revenues could help ease sustainability concerns.*

### A. Current State of Financing

#### ***Does St. Lucia Have Adequate Financing to Meet the Needs of Its Climate Change Strategy?***

39. **Financing challenges are significant, but not insurmountable.** St. Lucia's high debt leaves it little fiscal space for investment in mitigation and resilience-building. Hence, financing an adequate climate change response presents significant challenges. However, a feasible financing strategy can be identified, as described in what follows—though it will require international support.

**Table 6. St. Lucia: Financing Needs and Sources for Climate Change**

	2018-30 EC\$m	Annual EC\$m	Annual % FY16 GDP	
<b>Needs</b>				<b>Sources</b>
Mitigation	651	50	1.1	
Investment costs	589	45	1.0	Private investors
Govt program costs	62	5	0.1	Budget
Adaptation				
Already ongoing		83	1.8	Roll-over from budget
Grant-financed		23	0.5	o/w grants
Loan-financed		50	1.1	loans
Scaling-up		?	?	Grants
				GDP dividend
Memo:				
<b>Total</b>		133+	2.9+	<i>i.e., annual 'bill' for CC</i>
<b>GDP (FY2016)</b>			4514	

Source: NDC for mitigation, staff estimates for adaptation (see chapter V).

- **The financing needs for the mitigation projects identified in the NDC amount to around 14 percent of FY2016 GDP between now and 2030** (see Table 6). If assumed to be spread evenly over 13 years, this implies investment and funding needs of 1.1 percent of GDP a year. Given the nature of the planned mitigation investments, the government's

intention to finance 90 percent of the cost from private sources seems appropriate—meaning the budget would have to bear only about 0.1 percent of GDP a year.

- **For adaptation, as discussed, significant investment is already ongoing**—an estimated 1.8 percent of GDP a year on a commitments basis (less in execution), with possibly one-third or more grant-financed. Maintaining this level of investment going forward would allow St. Lucia to make substantive advances in resilience-building by drawing on levels of financing shown to be historically feasible (though of course getting even roll-over financing will require continued effort), and without worsening its fiscal stance.<sup>39</sup>
- **That said, Chapter V pointed to significant unmet needs for adaptation.** When sectoral strategies are costed and priority projects identified, these are likely to exceed what can be financed by rolling over existing levels of financing. For scaling-up to become feasible, St. Lucia will have to rely on grant financing or package the adaptation investments in such a way as to create bankable projects for private investors. Carbon taxation would also generate additional revenues.<sup>40</sup>
- **St. Lucia is seeking accreditation to the Green Climate Fund (GCF).** In an effort to access grant funds for climate mitigation and adaptation investments, the Ministry of Finance is currently reviewing the institutional framework to improve St. Lucia's capacity to meet GCF requirements. To that end, the Ministry is undertaking steps under the GCF Preparatory Support Programme, with support from the Caribbean Development Bank.
- **There should be some growth dividend from successful resilience-building,** as discussed below. While this is difficult to quantify, and will depend on the quality of investments made, it could reduce the burden of financing as a share of GDP, making it more compatible with debt sustainability. Moreover, strong climate change policies may be expected to catalyze support from the international community, making grant financing more accessible.

## B. Consistency of Climate Change Spending and Financing Plans with Fiscal and External Debt Sustainability

### *Are St. Lucia's Climate Change Plans Consistent with Fiscal and External Debt Sustainability?*

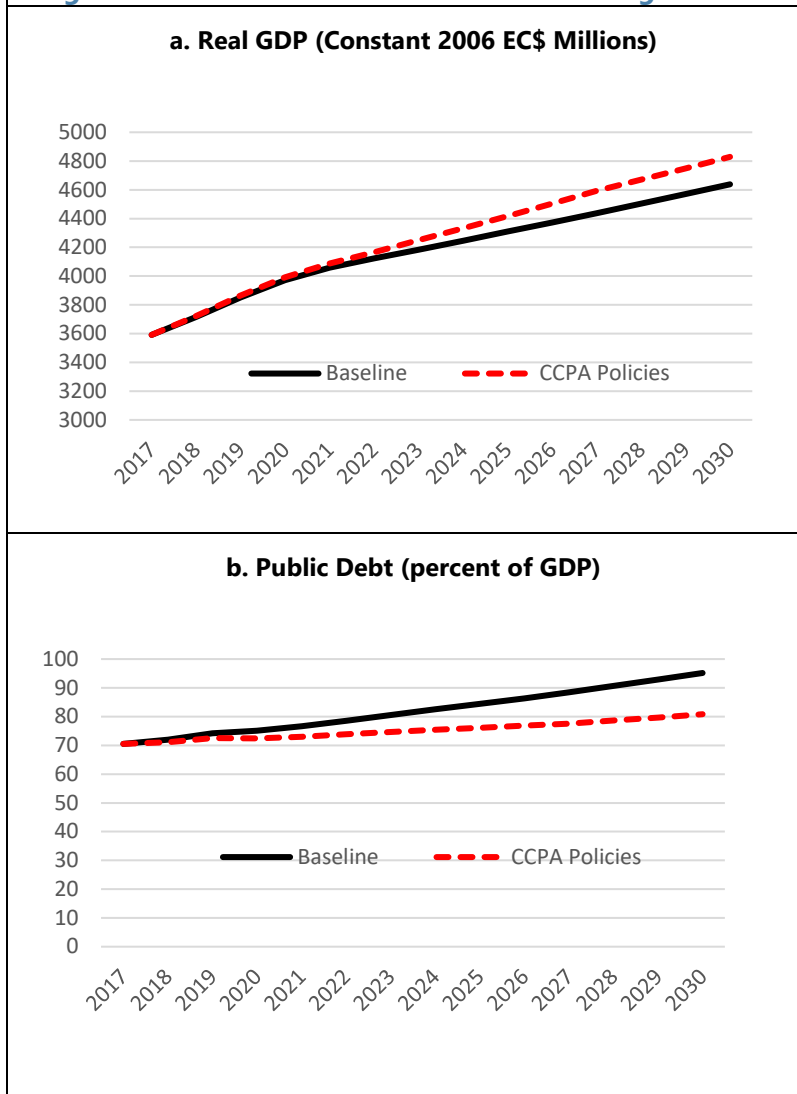
40. **St. Lucia's starting point for fiscal sustainability is poor, but successful spending on resilience-building should improve rather than worsen it.** Economists are beginning to understand better the drag on growth created by natural disasters, which repeatedly erode the

<sup>39</sup> The discussion in this section is consistent with achieving the sustainable fiscal path recommended by staff in the 2018 Article IV staff report—but it requires the current level of investment to be protected in the face of fiscal adjustment needed to meet the ECCU debt target of 60 percent of GDP. Moreover, if the private investment entailed contingent or direct government costs, these would have to be factored into the sustainability analysis.

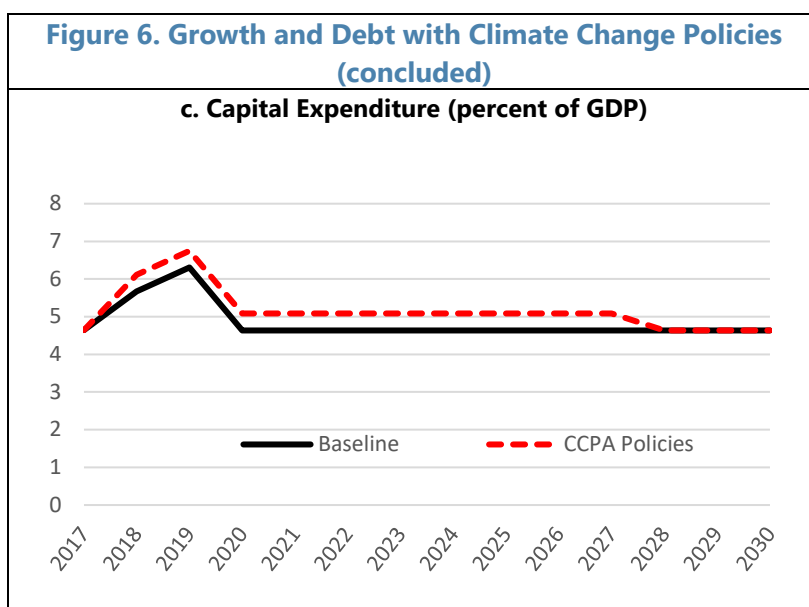
<sup>40</sup> St. Lucia should also look at other options for revenue mobilization, by containing exemptions and strengthening compliance.

physical capital stock while the government is forced to assume significant costs of relief and reconstruction.<sup>41</sup>

**Figure 6. Growth and Debt with Climate Change Policies**



<sup>41</sup> For St. Lucia, IMF staff estimates that annual fiscal costs of relief and reconstruction are c.1 percent of GDP.



- **The exercise in Figure 6 shows how, in a baseline scenario with insufficient investment to mitigate/adapt to natural disasters and climate change, growth continues to be eroded.**<sup>42</sup> These costs are contributing to the country's unsustainable debt dynamics, with public debt growing steadily above the ECCU target of 60 percent of GDP through 2030.
- **In an illustrative alternative scenario, the implementation of appropriate climate change policies would considerably improve the outlook.** The gradual increase in resilience from adaptation policies and adequate fiscal buffers would reduce the negative impact of natural disasters and climate change on the capital stock and its efficiency, boosting growth. Moreover, strong climate change policies would likely improve St. Lucia's access to grant finance, which would allow the envelope of capital spending to expand and further increase growth.<sup>43</sup> A further growth dividend could result from mitigation policies that increase energy efficiency and reduce costs.<sup>44</sup>

<sup>42</sup> The exercise is based on historical frequency and intensity of disasters; results would be more extreme if disasters worsened with climate change, or other adverse impacts of climate change were fully considered.

<sup>43</sup> Staff estimates that, in a scenario with adequate fiscal buffers and resilient infrastructure, GDP growth could be permanently higher by 0.3 percent (Bonato, Cantelmo, Melina, and Salinas "Policy Trade-Offs in Building Resilience to Natural Disasters," Selected Issues Paper, SM/18/\_\_). Appropriate mitigation and adaptation policies would help improve access to climate funds, which could finance additional investment in adaptation with grants of 0.5 percent of GDP through 2023. The demand effect of this investment would add a temporary boost of 0.3 percent to GDP growth. In the baseline scenario, growth would not experience the temporary boost from additional investment and would return to its potential of 1.5 percent after 2023. See the staff report for the 2018 Article IV consultation for the full set of macro data underlying Figure 6.

<sup>44</sup> McIntyre et al, *Caribbean Energy: Macro-Related Challenges*, WP/16/53, IMF (2016) estimate that an increase in energy efficiency of 1 percent has an impact of 0.2 percent on per capita GDP in the Caribbean.

## C. Other Macro-Considerations

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

#### **41. The implementation of the climate change agenda would have other positive macroeconomic effects.**

- **Balance of payments.** Success with the mitigation effort—in particular, the strategy of shifting to renewable energy—would substantially reduce St. Lucia’s import bill and reduce the economy’s exposure to oil price volatility. At current low oil prices, the net oil import bill is still nearly 3 percent of GDP; during the height of the oil price boom, it came to nearly 6 percent of GDP. Moreover, lower fuel imports and lower electricity prices would enhance St. Lucia’s competitiveness. Thus, improvements in energy self-sufficiency are a valuable investment in the economy’s future macro stability. Successful adaptation policies would help limit the adverse impact of climate change on tourism (for example, by containing coastal erosion).
- **Revenue.** As discussed in Chapter IV above, the gradual implementation of a broad carbon tax could bring significant additional revenues, which would help St. Lucia achieve its fiscal objectives.
- **Pressure on the real economy.** While the success scenario above envisages the economy growing above potential through 2030, risks of over-heating and inflation are unlikely to materialize, given St. Lucia’s high unemployment (24 percent in 2015), openness, and exchange rate peg.

## D. Institutional Issues

**42. A climate-change or disaster-related fundraising initiative should be a priority.** Success with the strategy above will depend on the government’s ability to mobilize grant financing and bring in private sector investors. It will need to strengthen capacity and vision to do this.<sup>45</sup> The NDC forum could be a key catalytic event for jump-starting investment, if objectives and targets are well-specified.

**43. Recently initiated explorations of innovative financing are a positive development—though these must provide value-for-money.** The Department of Sustainable Development has begun to examine the potential of climate-change-related instruments, similar to debt-for-nature swaps, to finance marine conservation. This type of innovative financing has been successful in Seychelles and shows promise for other small states—though innovative financing packages are worth constructing only if they are value-for-money or eliminate bottlenecks; care will be needed to avoid swapping an old liability for a new set of obligations that entail higher costs.

<sup>45</sup> The statutory body Invest St. Lucia is tasked with bringing in private investment. However, energy is not identified as a priority sector for investment (though infrastructure is).

44. **As in other small states, St. Lucia faces difficult hurdles in accessing climate financing** (such as the GCF and the Adaptation Fund).<sup>46</sup> Coordination of national efforts with regional efforts (OECS or CARICOM) is likely to be helpful in overcoming such hurdles. As one example, in January 2017 the Caribbean Community Climate Change Centre mobilized a US\$25 million project for implementation of a climate change adaptation program in ten Eastern and Southern Caribbean states, with USAID financing.

45. **Contingent financing can play an important supporting role.** The discussion of financing strategy above did not cover the possibility of a Cat DDO, currently under discussion with the World Bank. This is addressed in Chapter VII, below, as part of the risk management strategy. Cat DDO funds are not designed for long term reconstruction, but enhance disaster preparedness by pre-ensuring the availability of valuable immediate liquidity for relief and recovery.

### ***Recommendations for Financing***

1. Develop a comprehensive picture of financing needs to execute the NDC and address adaptation challenges, including contingency financing.
2. To ensure continued fiscal and debt sustainability while responding to climate change challenges, rely as much as possible on private sector and grant financing (and where possible on revenue mobilization).
3. Articulate a strategy for raising climate-change financing; use the NDC forum as a catalyst.
4. Success with the renewables strategy should be high-priority, not least because it will strengthen St. Lucia's balance of payments.

## **RISK MANAGEMENT STRATEGY**

*St. Lucia has established some key elements of a disaster risk management strategy, but needs better risk assessment and more self-insurance. It scores highly on its participation in risk-transfer schemes.*

### **A. Risk Assessment Procedures**

#### ***How Well Does St. Lucia Assess Risk?***

46. **St. Lucia needs to develop risk assessment capacity, as a first step toward provisioning adequately for risks.** St. Lucia needs a framework that defines government's contingent liabilities when a disaster occurs.<sup>47</sup> The government does not quantify risks associated with climate-related

<sup>46</sup> Though the GEF has had a small grants program in place since the 1990s.

<sup>47</sup> The World Bank has developed a risk-layered framework for optimizing disaster financing. Countries need a mix of financial instruments addressing their contingent liabilities at the lowest economic cost. In practice, this means that—

hazards, nor prepare a fiscal risk statement.<sup>48</sup> It does, however, track realized risks with a damage and loss reporting system (see paragraph 11 above) and has started a public asset registry which can inform the PSIP of the most urgently needed investments.<sup>49</sup>

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

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

47. **The Government is building a comprehensive approach to financial resilience against natural disasters, and recently approved a National Disaster Risk Management Strategy.** This provides a comprehensive framework for using multiple instruments and programs to strengthen financial capacity for disaster financing.

48. **St. Lucia has some contingency provisions for financing disasters, but these are small.** The Constitution established a Contingency Fund in 1997, but its balance is minor (around US\$300,000, less than 0.02 percent of GDP), and it has only been used for one disaster, a prison fire. NEMO is funded from the budget; its imprest account receives about US\$240,000 a year (0.01 percent of GDP), with provision for an additional allocation for the initial response to any declared disaster—which can be increased depending on impact and need.<sup>50</sup> The 2009 DRM Policy Framework required the Government to maintain an Emergency Disaster Fund (EDF) with a mechanism for quick release. Although the Fund was enacted into law, it never became operational.

49. **Current PFM practices do not facilitate rapid disbursement of funds for disaster response, or allow for easy tracking of disaster expenditures.** While there are constitutional provisions for parliament to establish a contingency fund if needed, there is no direct budget appropriation mechanism for explicit immediate disaster response. The Finance Ministry reallocates funds from its contingency vote or re-prioritizes its capital program to accommodate immediate

---

having taken stock of their risks—governments should provision for the costs of small, frequent disasters through reserve funds; 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. See *Financial Protection Against Natural Disasters: An Operational Framework for Disaster Risk Financing and Insurance*, World Bank, 2014.

<sup>48</sup>See, as one example, the Fiscal Risk Assessment in the 2017/18 Fiscal Policy Paper of the Government of Jamaica, which outlines the country's exposure to various risks, including natural disasters, and describes the government's intended response. The Government will continue to set aside a contingency reserve of c.1 percent of GDP to deal with unforeseen circumstances, including natural disasters and other fiscal shocks; and that it has renewed its coverage for Tropical Cyclone, Earthquake, and Excess Rainfall at a premium of US\$6.1mn.

<sup>49</sup> Also, the Ministry of Agriculture is developing an Agriculture Risk Management Strategy.

<sup>50</sup> St. Lucia National Progress Report on the Implementation of the Hyogo Framework for Action, 2009–2011.



needs.<sup>51</sup> This reallocation is accounted for outside of the regular budget cycle through Advances, which are not reconciled later through a supplementary budget.

**50. A larger fiscal buffer would be appropriate: a savings fund should be considered.**

As part of the government's risk management strategy, a saving fund for natural disasters would be useful, beyond the expansion of contingency funds for disasters already being considered. Accumulated savings would permit immediate financing after a disaster, ensuring that liquid resources are immediately available for social relief and infrastructure rehabilitation. But a larger fund would also support reconstruction investments, reducing threat of disruption of ongoing projects. Given the link between recurring natural disasters and fiscal problems, a saving fund would improve sustainability by keeping necessary resources on hand and thus reducing the need to issue public debt to finance post-disaster needs.<sup>52</sup>

**51. The savings fund may need to be built up gradually (though the sooner the better), and should complement existing insurance coverage.** If the saving fund were the sole source of disaster financing, a simulation indicates that 'capitalization' of 8 percent of GDP would be needed to keep it sustainable over the long run with a low probability of depletion. After its establishment, annual budget savings of around 0.9 percent of GDP into the saving fund would be required for its replenishment in years with no natural disasters (see sample simulation in Figure 7), depending on the intensity and frequency of natural disaster shocks.<sup>53</sup> In a more nuanced approach, however (see further discussion of risk-layering below), governments are encouraged to combine different sources of financing and risk transfer (as well as reducing risk by investing in resilience) to achieve an adequate portfolio of buffers. From this perspective, taking into account also the coverage already provided by CCRIF to St. Lucia (see below), a capitalization of 5 percent of GDP and annual budget savings of 0.6 percent would combine to provide a sufficient buffer.<sup>54</sup>

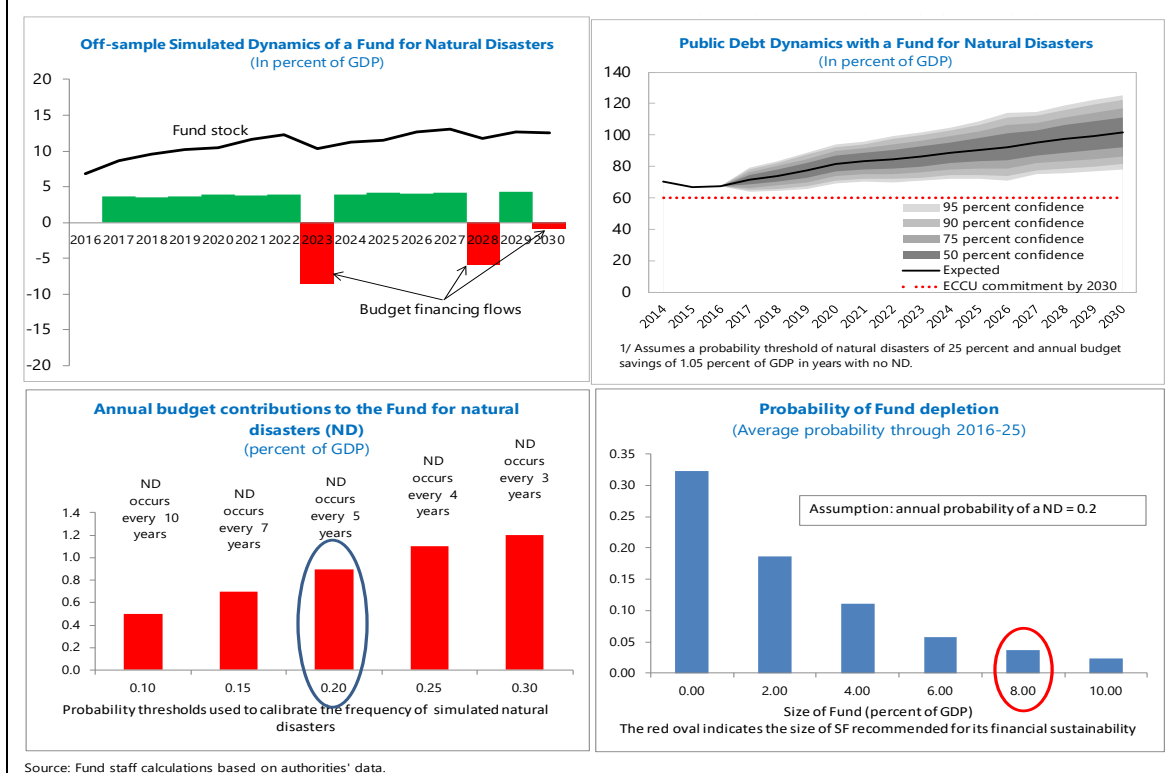
<sup>51</sup> Questionnaire response from Deputy Chief Economist, Dept of Planning and National Development, Feb. 2016.

<sup>52</sup> Using a dynamic general equilibrium model, Bonato, Cantelmo, Melina, and Salinas "Policy Trade-Offs in Building Resilience to Natural Disasters," Selected Issues Paper, SM/18/\_\_, compare the output payoff of two different strategies of building resilience to natural disasters: investing in adaptation capital and insurance (both self-insurance and market-provided insurance). While investment generally has the highest payoff, insurance becomes the superior strategy when financial frictions are present.

<sup>53</sup> This annual saving takes into account the likely re-prioritization of public investment projects that is typically observed in the wake of a natural disaster. The methodology for the simulation is explained in Guerson, A. "Assessment Government Self-Insurance Needs Against Natural Disasters: An Application to the ECCU," Eastern Caribbean Currency Union, 2016 Discussion of Common policies of Member Countries, Annex VIII, IMF Country Report No. 16/333.

<sup>54</sup> The methodology for estimating the appropriate size of the savings fund is described in Annex VIII of IMF Country Report 16/333, <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Eastern-Caribbean-Currency-Union-2016-Discussion-on-Common-Policies-of-Member-Countries-44349>.

As the fund should be kept in liquid assets, its cost of the fund would be equivalent to the opportunity cost of reducing public debt, on which the government pays an average interest rate of 5 percent, higher than the 4 percent premium paid to CCRIF (see below). While increasing CCRIF seems a better option, room maybe limited by CCRIF capital and the already high coverage of St. Lucia.

**Figure 7. A Saving Fund for Natural Disasters**

52. **A savings fund would preserve any windfall gains from the Citizenship by Investment program.** Financing the capitalization cost from revenues from the Citizenship by Investment Program would be particularly appropriate, given the one-off uncertain nature of these revenues, which means they cannot be used to cover recurrent spending (since they may disappear as competition increases and international scrutiny rises). Locking them into a savings fund of a revolving nature would best preserve their benefits to society. A strong institutional framework in support of the integrity of the saving fund would be key to its durability, including a robust governance structure, full transparency of its operations, and clear and verifiable withdrawal rules for budget financing.

### C. Risk Reduction and Transfer (e.g., Other Insurance and Pooling Arrangements)

#### *To What Extent Does St. Lucia Transfer Risk?*

53. **St. Lucia has been innovative in utilizing some risk transfer instruments.**

- St. Lucia is a member of the Caribbean Catastrophe Risk Insurance Facility. CCRIF offers parametric insurance, which provides immediate post-disaster liquidity to governments when triggered by pre-defined thresholds for hazards such as hurricanes, earthquake and excess rainfall (see Box 4). St. Lucia pays an annual premium of US\$2.42 million for a potential maximum payout of US\$66.6, close to 4 percent of GDP. To date, St. Lucia received

payouts of US\$1 million for an earthquake of magnitude 7.4 in 2007 and US\$3.2 million for Hurricane Tomas in 2010.<sup>55</sup>

- The Government can also access up to US\$1 million immediately after declaration of a state of emergency, as part of the Contingency Emergency Response Component (CERC) of the World Bank's Disaster Vulnerability Reduction Project (DVRP) in St. Lucia.<sup>56</sup>
- Additionally, St. Lucia is working with the World Bank to devise a Development Policy Loan with a catastrophe deferred drawdown option (Cat DDO) of US\$20 million (Box 5). The Cat DDO could give immediate liquidity to the Government in the relief and response phases of a disaster. Similar to CCRIF products, the proposed Cat DDO is an ex-ante financial instrument that provides rapid disbursements of funds in the aftermath of a disaster. While CCRIF SPC is a parametric instrument<sup>57</sup> triggered by predefined and agreed-upon parameters related to wind-speed, rainfall amount and earthquake magnitude), the proposed Cat-DDO has a "soft" trigger, meaning funds become available for disbursement after the declaration of a state of emergency due to a natural disaster and/or health emergency.

54. **St. Lucia has a well-developed insurance industry, although (as in most other countries) under-insurance is the norm.** All mortgaged properties must carry property and life insurance. Most insurers issue natural catastrophe coverage as extensions or endorsements of existing fire and allied perils policies. However, the majority of the residential property stock (80 percent) is currently not insured against natural disasters, given the perceived high cost.<sup>58</sup> For businesses, the FSRA considers that under-insurance is also likely to be a significant problem, given the relatively low median income of local entrepreneurs. Under-insurance creates fiscal risk in the form of a possible contingent liability to government.

---

<sup>55</sup> Use of CCRIF revenue required a special warrant (supplementary budget), but it was automatically appropriated. The MOF decided on beneficiary departments based on criteria to identify the most severely hit sectors (e.g., agriculture and infrastructure after Hurricane Matthew).

<sup>56</sup> The DVRP aims to reduce disaster vulnerability and increase long-term climate resilience in St. Lucia by addressing all hydro-meteorological risks. CERC is a temporary instrument until the DVRP ends in 2019.

<sup>57</sup> Parametric insurance instruments pay claims if a pre-defined event occurs rather than paying for actual losses.

<sup>58</sup> Discussion with Insurance Association and private insurance providers.

#### Box 4. The Caribbean Catastrophe Risk Insurance Facility

The Caribbean Catastrophe Risk Insurance Facility (CCRIF) is the world's first regional catastrophe risk pooling mechanism that allows countries to pool their hurricane and earthquake risk and collectively approach the international reinsurance market to purchase cheaper coverage. The CCRIF utilizes parametric insurance—which is designed to offer immediate liquidity in a disaster's aftermath, by basing pay-outs not on actual damages but by approximations using parameters such as wind-speed. The initiative is supported by the World Bank and the international donor community, and has allowed countries in the Caribbean to enjoy reduced insurance premia. The sixteen current members of the Facility are Anguilla, Antigua & Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad & Tobago, and Turks & Caicos Islands.

Coverage of CCRIF remains relatively narrow, reflecting a desire to maintain affordable premia and the need for price discovery about the cost of disasters as climate change intensifies. This has led to some disappointing pay-outs in the face of basis risk. However, CCRIF is considered a model for other risk pools and—as the insurance industry gains experience with disaster insurance for governments—is expected to expand while managing premia so they remain competitive.

55. **Under-insurance of public assets slows reconstruction after disasters.** Most public assets in St. Lucia, including critical buildings such as hospitals and schools, are not currently insured against natural disasters. St. Jude hospital (which was not insured) required seven years of reconstruction before it opened again after a fire in 2009.<sup>59</sup> Parastatals purchase insurance outside of the oversight of the central government and there is no centralized body that monitors the insurance of public assets. A sampling of 10 parastatal insurance premium payments shows that premium payments rose by 800 percent after Hurricane Thomas in 2010.

56. **St. Lucia has an innovative insurance scheme for low-income individuals.** There has been rapid progress in recent years in insuring individuals in developing countries through index insurance.<sup>60</sup> Low-income individuals in St. Lucia are eligible for insurance from wind and excess rain through the Livelihoods Protection Policy (LPP), a weather-index based insurance policy launched by the Munich Climate Insurance Initiative (MCII) in partnership with the CCRIF in 2013.<sup>61</sup> Thirty-one individuals in St. Lucia received payouts totaling US\$102,000 on their Livelihood Protection Policies due to Hurricane Matthew.<sup>62</sup> The program provides swift cash payouts following extreme weather events (high winds and heavy rain), enabling policyholders to recover quickly. The product is

<sup>59</sup>The government borrowed for reconstruction, including a US\$20 million loan in 2014 from the Export Import Bank of Taiwan, Republic of China, which is being repaid over 20 years. <http://www.stlucianewsonline.com/St.-lucia-to-borrow-20-million-for-st-jude-hospital-restoration>.

<sup>60</sup> Greatrex H., J. Hansen, S. Garvin, R. Diro, S. Blakeley, M. Le Guen, K. Rao, and D. Osgood, 2015. Scaling up Index Insurance for Smallholder Farmers: Recent Evidence and Insights. CCAFS Report No. 14. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

<sup>61</sup> Munich Climate Insurance Initiative at <http://www.climate-insurance.org/home/>. The project was implemented by the Munich Climate Insurance Initiative (MCII) in partnership with the CCRIF, MicroEnsure and Munich Re.

<sup>62</sup> <http://reliefweb.int/report/haiti/ccrif-completes-payments-totalling-us29-million-member-governments-affected-hurricane>

available across the island through local distribution channels, including co-operative banks, credit unions, and farmer associations.

### Box 5. The Cat DDO

The Development Policy Loan with a Catastrophe Deferred Drawdown Option (Cat DDO) is a contingent credit line that provides immediate liquidity in the aftermath of a natural disaster. Under the Cat DDO, borrowers can secure immediate access to financing up to US\$500 million or 0.25 percent of GDP (whichever is less). The Cat DDO has a “soft” trigger, as opposed to “parametric.” Funds become available for disbursement after the declaration of a state of emergency due to a natural disaster. It also has a revolving feature, as amounts repaid during the drawdown period are available for subsequent withdrawal. The three-year drawdown period may be renewed up to four times, for a maximum of 15 years in total. To gain access to the Cat DDO, the borrower must implement a disaster risk management program, which the Bank will monitor periodically. The Cat DDO charges a LIBOR-based interest rate on disbursed outstanding amounts. The applicable interest rate is the prevailing rate for IBRD loans at drawdown. In addition, there is a front-end fee of 0.50 percent and a renewal fee of 0.25 percent on the loan amount.

### ***Recommendations for Risk Management***

1. St. Lucia should give priority to developing a fiscal risk statement, as part of a general effort to strengthen capacity to assess risks and put plans in place to manage them.
2. Larger contingency funding is needed (even before climate change), given the size of the natural disasters facing St. Lucia.
  - a. Contingency disaster financing should be increased immediately to US\$7–10 million.
  - b. A savings fund with capitalization of 5 percent of GDP, replenished on a rolling basis, would give St. Lucia a 95 percent probability of being able to cover the fiscal costs of disasters without incurring additional debt.
3. Revenues from the Citizenship-by-Investment program would be an appropriate source of capital for a savings fund (though other fiscal savings may also be necessary).
4. Over the medium term, explore the cost-effectiveness of insurance as a supplementary buffer, for instance, to insure key government buildings.
5. Consider making insurance mandatory for buildings in flood-risk areas, and/or other measures (housing and land use policy) to limit settlements in these areas.
6. Develop the domestic insurance industry (expertise and size), while ensuring that capital and liquidity keep pace with needs to cover intensified natural disasters.
7. Regional initiatives for insurance are likely to be the most cost-effective, given St. Lucia’s diseconomies of scale. Collaboration with CCRIF and other OECS efforts to deepen the insurance industry is a promising path forward.
8. Strengthen contingency financing.

## NATIONAL PROCESSES

*Public financial management in St. Lucia has not been problematic, but now, to implement resilience-building effectively, the organization of responsibilities for climate change would benefit from streamlining, and stronger public investment management processes are called for.*

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

#### ***Have Climate-Related Projects Been Mainstreamed into National Planning?***

57. **No; though national plans prioritize climate change, there is no systematic process for translating these goals into priority projects.** While national plans and government platforms show high awareness of climate change (see paragraph 9 above), as do the responsible public agencies,<sup>63</sup> there is no systematic mechanism for translating resilience goals into public investment planning and project selection processes. Ideally, all planning documents—be they national or sectoral—should include investment plans and financing needs, from which to select priority climate-related investments. The disconnect between planning goals and specification of investment projects can be traced to a complex organization of climate change responsibilities, and to uncertainties about the status of the PSIP.

58. **As in many other countries, the organization of climate-related responsibilities is diffuse and delinked from public investment processes.** A process is needed for coordinating and prioritizing strategies and proposed expenditures. Two arrangements, in particular, will require exceptional coordination efforts to avoid undermining coherence and efficiency. First, the Ministry of Education, Innovation, Gender Relations and Sustainable Development has primary responsibility for executing climate change adaptation policies (CCAP), but no involvement in defining public investment plans (which are developed by the Department of Economic Development and the Budget Office). Second, this ministry oversees renewables policy, while the Department of Infrastructure, Ports and Energy remains responsible for other elements of the national energy strategy.

59. **There is a PSIP framework, but its screening process for consistency with national priorities is currently being bypassed.** The PSIP is in principle integrated with the budget, but it has reportedly been shelved recently, with non-pipeline investments being budgeted without going through the PSIP screening process. It should be reinstated, and then would need further strengthening to become an effective vehicle for operationalizing government priority reforms, including for climate change (this is discussed further below).

<sup>63</sup> For instance, the Department of Physical Infrastructure, Department of Economic Planning, and the Department of Physical Planning.

## 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?***

60. **St. Lucia is at early stages of introducing systematized good PIM practices.** Some good elements of public investment management are in place, but the sidelining of the PSIP was a setback, and quite a few further reforms are needed to turn the current system into a framework strong enough that it articulates national investment priorities clearly, and delivers them effectively.

61. **A summary of a recent assessment of St. Lucia's PIM practices using the IMF's evaluation tool, PIMA (see Annex III) is reported below:** <sup>64</sup>

#### **Planning**

- St. Lucia targets an overall balance (under an MTFF), and when consolidation is necessary, capital spending tends to suffer, to achieve the adjustment. Moreover, capital spending is likely to include disguised recurrent items.
- While awaiting an updated national development plan, investment planning and prioritization are decentralized, with allocation decisions driven largely by ODA financing rather than by national priorities.
- The large gaps in costed sectoral strategies make it difficult to pick the right investments. Developing costed strategies, to help clarify investment needs, should be a priority, not least because this could help to catalyze donors to support resilience-building.
- Recent progress has been made on implementing a PPP framework. The Ministry of Finance leads value of money appraisals of projects, and the accumulation of both explicit and contingent PPP liabilities is recorded. However, a strategy on PPPs and standard criteria for PPP arrangements is yet to be published.
- It is reportedly the new government's policy to foster competition and private sector involvement in infrastructure—notably renewable energy. However, this needs to be backed by clearer documentation (for instance, permitting private access to the electricity grid) and related signals that private innovation will be welcome.

#### **Allocation**

- A strong point of St. Lucia's PIM is that capital spending is almost all undertaken transparently through the budget, including foreign-financed projects. Capital expenditures are broken down by source of financing, including government revenue, ODA (grants and loans), as well as PPPs.
- St. Lucia does multiyear planning, but probably not far enough ahead: the budget (and the PSIP) has a three-year horizon. This means that investment costs are identified only for

<sup>64</sup> The PIMA tool is a detailed questionnaire covering 15 aspects of public investment management (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.



three years, though the life of some projects may be longer. Moreover, the budget has yet to factor in future recurrent costs of the projects. Also, appropriations are annual, which somewhat undermines the certainty aimed at by forward planning. Often, under-execution causes realized investment to fall short of estimates.

- The current and capital budgets are prepared and presented together, though not in line with international standards. The Chart of Accounts is not in line with international standards either, with some line ministries not using it.
- Cost-benefit analyses are conducted for major projects, usually in line with the specific project appraisal processes used by the donors involved, but are neither systematically published, nor are possible cost overruns considered in setting contingency reserves.
- In the current decentralized investment planning system, there are no standard criteria for project selection. The Ministry of Finance reviews only major projects before they are included in the budget.
- A pipeline of approved projects still exists, but, since the PSIP has been shelved, other government projects may be selected for budget financing.

## Implementation

- Project outlays are appropriated annually, and unspent appropriations cannot be rolled over to future years. However, officials say that ongoing projects are given priority in annual allocations. In-year transfers of appropriations from capital to current spending are rare, almost always prohibited.
- Cash for project outlays is normally released in a timely manner, and for the most part, agencies can plan and commit expenditure in advance based on reliable cash flow outputs, particularly for donor-financed projects.
- External financing is largely held in commercial bank accounts outside the TSA.
- Most major projects are tendered competitively, but limited information on procurement is made available to the public unless required by donors. Project costs and physical progress are centrally monitored during implementation, but practice regarding project management arrangements varies across ministries. Ex-post audits are rare unless required by donors, and there is no monitoring of public assets.

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

### ***Are Adequate Public Financial Management Systems in Place to Protect Climate-Related Funding?***

62. **St. Lucia's budget system is relatively disciplined and transparent compared with that of many other small states, but needs to establish safeguards more explicitly.** As discussed above, St. Lucia's budget is relatively unified and follows some transparent procurement practices, despite not adhering to international accounting standards. There is a TSA which is cleared nightly. Donor funds appear to be reasonably well-protected, following the regular commitments process, and—though separate from the TSA—included in nightly cash balance management. All borrowing must be authorized by the Minister of Finance. A PEFA was undertaken in 2009, and St. Lucia has just completed an update. Preliminary results suggest substantial progress in some PFM areas since 2009 but further need to develop competitive practices in procurement, and some concerns about complete capture of donor funds, particularly outside central government.



63. **The budget system needs further development to facilitate implementation of a resilience-building strategy.** There is as yet no system either in the PSIP or the budget for identifying climate-change related projects, other than by project title.<sup>65</sup> Nor are there criteria for evaluating the climate-change mitigation and adaptation impact of proposed investments. Line ministries are not asked to consider the adaptation impacts of their proposed budgets explicitly, nor the costs of their proposed adaptation proposals (both of which would help to prioritize spending items and projects).<sup>66</sup>

64. **Some program budgeting features have been introduced, which provide a useful format for prioritizing climate change objectives in the budget.** St. Lucia began reforms to introduce program budgeting as far back as the 1990s. There is a requirement for agencies to specify objectives, and report the following year on success with meeting them, and—while there is no mandatory feedthrough from national plans to the budget—some line ministries have already included disaster-management and adaptation goals.<sup>67</sup> So far, reporting on progress to meet objectives is still incomplete and sporadic. It will be important to enforce reporting requirements, to keep momentum behind the constructive move toward program budgeting (with its enhanced capacity to articulate government priorities and track spending on them).

65. **Lastly, the Government is also amending its Public Procurement legislation.** This will strengthen the efficiency of emergency public procurement for effective disaster response, in addition to generating expenditure efficiencies and fiscal savings over the medium term. The revised Public Procurement and Asset Disposal Act,<sup>68</sup> currently under review, makes provisions for streamlined procurement procedures that will allow for flexible procurement systems with the capacity to adapt to post-disaster circumstances to ensure that urgently needed goods, rehabilitation works and services reach affected areas and populations in a timely and effective manner.

---

<sup>65</sup> The FY17/18 budget has 10 budget lines dedicated to disaster-risk management.

<sup>66</sup> Individual agencies, such as the Department of Infrastructure and the Department of Economic Development, indicate that they consider resilience in their investment planning and execution processes and in the development of design standards for building, reconstruction, and rehabilitation projects.

<sup>67</sup> But others have not yet done so. For instance, the Department of Infrastructure has no goals for streetlighting reform.

***Recommendations for National Processes***

1. Ensure that responsibilities for meeting climate-change objectives are logically grouped in relevant ministries, and include responsibilities for developing appropriate sectoral strategies with costed investment projects.
2. Revive the PSIP, while addressing any problems that caused it to be considered inadequate for pursuing the government's investment priorities.
3. Establish a standard framework and process for integrating climate-change mitigation and adaptation measures into the public investment management cycle, with clear, uniform criteria for evaluating, appraising, and allocating resources to climate-change and disaster-resilience initiatives.
4. Ensure that climate change objectives and activities are systematically identified throughout the budget, and investment projects explicitly linked to these.
  - a. In the short run, include climate change objectives into budget circulars to help line ministries identify and prioritize climate related budget items and capital investments.
  - b. In the long run, consider introducing climate change expenditure classification methodology, assigning climate 'tags', and incorporating these in the economic and functional classifications of the budget.<sup>1</sup>
5. Build capacity for effective public investment appraisal and monitoring, in the Ministry of Finance and other relevant ministries.
6. Continue the development of program budgeting, in particular by enforcing reporting requirements and introducing climate change objectives.

<sup>1</sup> An expenditure should be identified as supporting climate change action whenever it finances activities whose outcomes and results can be measured in climate terms—such as reduced climate vulnerability, or reduced emissions. The classification methodology should therefore be robust and evidence-based, and uniformly applied to all financial flows.

## TAKING STOCK: PRIORITY NEEDS TO BE MET

*St. Lucia has shown leadership in confronting climate change, despite its difficult fiscal constraints. Success will require full articulation of a costed strategy, the mobilization of private investment for bankable projects and external grants for public goods, and capacity-building to manage the plans effectively.*

### **What Resources Does St. Lucia Need to Mobilize, to Achieve Its Climate-Change Strategy?**

66. **An indicative tally of the priorities identified in this Assessment points to the following resource needs** (though this list is not intended to be exhaustive and will evolve with time and experience):

#### **General preparedness (see Chapter III for more detail)**

- Updates of planning documents and legal drafting for legislative revisions (capacity-building)
- Completion of the disaster-preparedness strategy (financial support and capacity-building)
- Integration of climate-related activities into costed sectoral plans (capacity-building)

#### **Mitigation (see Chapter IV for more detail)**

- Private investment of US\$218 million by 2030 (\$183 million by 2025) in:
  - Energy-efficient buildings and appliances
  - Geo-thermal, wind and solar energy generation
  - Improvements to grid distribution and transmission efficiency
  - Water distribution and network efficiency
  - Efficient vehicles
  - Expanded public transit
- Supporting government program costs of US\$ 23 million by 2030 (\$19 million by 2025) (primarily government financing or external support)
- Carbon taxation (follow-up capacity-building, especially to rationalize base-broadening of fuel taxes to pricing of power, and possibly vehicle taxation and congestion pricing); also capacity-building to support general revenue mobilization.
- Support for investment promotion (capacity-building; external support)

#### **Adaptation (see Chapter V for more detail)**

- Public investment on road construction and rehabilitation (US\$91 million)
- Water supply systems (not costed; some private investment should be possible)
- Land use planning and management, including coasts (not costed; some private investment should be possible)
- Agriculture and food security (not costed; private investment would be most appropriate).

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

- Further development of public investment management skills (capacity-building)<sup>69</sup>
- Further strengthening of public financial management skills (capacity-building)

<sup>69</sup> In collaboration with the World Bank, the Ministry of Development is developing a framework to address capacity constraints in the selection and implementation of public investment projects.

## Annex I. Renewable Energy in St. Lucia

1. **St. Lucia is almost fully dependent on imported fossil fuels to produce energy.** In 2014, 25 percent of all merchandise imports were fuel. More than 16 percent of GDP is spent on fuel imports,<sup>1</sup> of which more than half for the transport sector.<sup>2</sup>
2. **St. Lucia has large technical potential for geothermal, wind and solar energy.** Geothermal energy is particularly feasible, and relatively low-cost, due to the island's volcanic nature. On the other hand, biomass and hydroelectric generation are infeasible, due to scarcity of large tracts of agricultural land and a small base flow rate in the rivers and waterfalls.
3. **St. Lucia's National Energy Policy (2014 revision) sets a target for penetration of renewable energy of 35 percent by 2020.** Meeting this target could imply a 22 percent reduction in oil imports, an 11 percent reduction in the national electricity bill, and a 1 percent increase in the level of long-term GDP.<sup>3</sup>
4. **The National Energy Transition Strategy (NETS), developed in 2016 by the Government, LUCELEC, and the Clinton Climate Initiative (CCI),<sup>4</sup> provides a roadmap for transition from almost 100 percent diesel generation in electricity to include indigenous renewable sources of energy such as solar, wind and geothermal, without compromising grid stability.**
5. **The power company, LUCELEC, has a monopoly in fossil fuel energy generation until 2045, but a 2016 revision of the Electricity Supply Act allows competition in renewable energy generation.**

### Geothermal Energy Development

- St. Lucia has potential to produce more than 75 MW of geothermal energy, compared with total peak demand of 60 MW in 2016. Any excess relative to demand could be exported.<sup>5</sup>
- In 2011, the Government introduced the Geothermal Resources Development Bill to govern the development of geothermal energy.
- From 2014 to 2016, the Government, with support from the World Bank and the Government of New Zealand, carried out surface exploration, which suggested the existence of a geothermal reservoir. Further exploration drilling is needed before the project can be confirmed. There are plans to use grant and concessional financing worth US\$21 million from the World Bank to mitigate some of the early stage risks associated with the project.<sup>6</sup>

<sup>1</sup> Energy Snapshot: St. Lucia, Energy Transition Initiative. National Renewable Energy Laboratory, February 2015.

<sup>2</sup> ECLAC, *An assessment of mechanisms to improve energy efficiency in the transport sector in Grenada, St. Lucia and St. Vincent and the Grenadines*, October 2014.

<sup>3</sup> McIntyre et al, *Caribbean Energy: Macro-Related Challenges*, IMF WP/16/53, March 2016.

<sup>4</sup> An Initiative of the Clinton Foundation and Rocky Mountain Institute-Carbon War Room (RMI-CWR).

<sup>5</sup> *Got Steam? Geothermal as an Opportunity for Growth in the Caribbean*. World Bank, 2013. Report No. 78608.

<sup>6</sup> Renewable Energy Sector Development for Saint Lucia project document, PAD2362. World Bank 2017.

- If a high-quality geothermal resource is confirmed, the Government plans to collaborate with the private sector to develop the project.
- The envisaged 30 MW geothermal facility, to be operational by 2023, would help St. Lucia transform its energy sector well beyond the renewable generation target of 35 percent, closer to 65–70 percent.<sup>7</sup>

## Regulatory and Policy Framework

6. **Several challenges will need to be confronted for successful development of renewable energy projects, including difficulties with land acquisition, obtaining permits, policy adjustments from changes in political administrations, and further development of the regulatory regime.**<sup>8</sup>

### *Regulatory Framework*

- Currently, the government controls 46 percent of LUCELEC's shares, including a direct stake of 12 percent and a 33 percent stake through the National Insurance Corporation and the Castries City Council. LUCELEC's concession is governed by the Electricity Supply Act of 2001, which also defines the tariff-setting mechanism and minimum service standards. In practice, however, LUCELEC is mainly self-regulatory, with little oversight of adherence to standards.<sup>9</sup>
- The National Utility Regulatory Commission (NURC) was set up in January 2016, replacing the Government as regulator for electricity and water. While primary legislation giving the NURC authority over LUCELEC was introduced, other supporting regulations were deferred.
- The Eastern Caribbean Energy Regulatory Agency (ECERA) was launched in April 2017, with World Bank support. It is a supra-national regulatory authority for the OECS, under pilot launch in Grenada and Saint Lucia. Its goal is to implement regional arrangements for electricity supply, providing advisory support to national regulatory authorities and facilitating the adoption of cost-reflective and performance based tariffs in OECS countries.<sup>10</sup>

### *Sector Policies*

- From 2015, the Government allowed Independent Power Producers (IPPs) and implemented net metering in the energy sector. The IPPs are end users, both residential and industrial, who are allowed to produce electricity and sell it back to the grid.
- Fiscal incentives have encouraged production of renewable energy.
  - In 1999, all import duties and consumption taxes on renewable energy equipment were eliminated. In 2001, purchase of solar water heaters was made tax-deductible. The government provides no direct subsidies to the electricity sector. However, residential consumers consuming less than 180kW are cross-subsidized by those with a consumption higher than 180kW.<sup>11</sup> As in other Eastern Caribbean countries, LUCELEC benefits from an indirect subsidy as it is exempt from paying import duties.

<sup>7</sup> Renewable Energy Sector Development for Saint Lucia project document, PAD2362. World Bank 2017.

<sup>8</sup> LUCELEC 2016 Annual Report. <http://www.lucelec.com/sites/default/files/annual-reports/LUCELEC-2016-Annual-Report.pdf>.

<sup>9</sup> World Bank 2017, op. cit.

<sup>10</sup> OECS Countries ECERA: Implementation Status Results Report: Sequence 11, World Bank, May 2017.

<sup>11</sup> Challenges and Opportunities for the Energy Sector, Inter-American Development Bank, October 2015.

## Annex II. Assessing the Impact of Alternative Mitigation Policies—IMF Spreadsheet Model

1. **The IMF has developed a spreadsheet model of fossil fuel use.** Its application to St. Lucia is similar to recent applications to carbon mitigation policies in China and India; see these studies<sup>1</sup> for more detail on the model and data sources used to justify typical parameter assumptions (e.g., price responsiveness of fuels and income responsiveness of energy products), though some adjustments are made (based on judgment) in applying the model to St. Lucia.

### Model

2. **The model distinguishes three sectors—power generation, transportation, and an ‘other’ energy sector representing direct fuel use in the industrial, commercial and residential sectors.**<sup>2</sup> 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 is not a major drawback given the longer term focus on meeting targets in 2025 and 2030.

3. **In the power sector, electricity demand (distinguished by commercial, industrial and residential consumers) rises over time with GDP, which is based on IMF forecasts.**<sup>3</sup> The income elasticity for electricity (i.e., the percent increase in electricity demand in response to a one percent increase in GDP) is assumed to be unity so, absent other factors, electricity demand would rise in proportion to GDP (which expands by 23 percent between 2015 and 2030). However, electricity use is assumed to decline autonomously by 0.5 percent a year due to gradual retirement of older, less efficient capital. Electricity prices rise over time, though only by about 5 percent between 2015 and 2030 due to gradually rising crude oil prices,<sup>4</sup> which has a very small impact on depressing demand. In particular, each 1 percent increase in crude oil prices raises retail prices for diesel fuel used by the power sector by about 0.4 percent; in turn this increases electricity prices (at least initially) by 0.2 percent.

4. **Higher electricity prices affect demand through changes in average energy efficiency (e.g., upgrading to more efficient appliances, capital, and lighting, faster turnover of capital) and from reductions in the demand for electricity-using capital (e.g., from economizing on**

---

<sup>1</sup> See Ian W.H. Parry, Baoping Shang, Philippe Wingender, Nate Vernon, and Tarun Narasimhan, 2016. “Climate Mitigation in China: Which Policies Are Most Effective?” Working paper 16-148, International Monetary Fund, Washington, DC and Ian W.H. Parry, Victor Mylonas, and Nate Vernon, 2017. “Reforming Energy Policy in India: Assessing the Options.” Working paper 17-103, International Monetary Fund, Washington, DC.

<sup>2</sup> Use of kerosene and LPG is not modelled (given their minor contribution to emissions) nor non-fossil GHGs (given practical difficulties in controlling them).

<sup>3</sup> Possible increases in GDP growth due to investments that improve resilience to natural disasters are not taken into account.

<sup>4</sup> Oil price forecasts average over IMF forecasts (which are essentially flat as they are based on futures markets) and those by the International Energy Agency (where prices rise over time as predicted by a global oil demand and supply model).

**the use of electricity-consuming capital, adoption of solar panels).** Each 1 percent increase in electricity prices is assumed to reduce overall demand by 0.4 percent, with 60 percent of the response from efficiency improvements and 40 percent from reduced product use.

5. **In the BAU scenario, it is assumed to be cost effective to gradually increase the share of renewables in power generation (given that LUCELEC is already progressing on some small-scale renewable projects and considering other medium-term options) so that it reaches 5 percent by 2020.** This fuel switching continues, albeit very slowly, given that the efficiency of renewables (an immature technology) is assumed to improve faster than for diesel (a mature technology). Higher diesel fuel prices improve the relative cost-effectiveness of renewables and therefore induce switching from diesel to renewables—overall, a 1 percent increase in diesel fuel prices reduces diesel fuel use in the power sector by approximately 0.55 percent with three quarters of the response from fuel switching and a quarter from reduced electricity demand. Changes in electricity demand lead to changes in generation from diesel and renewables equal to the change in demand times the respective generation shares for these fuels—an expansion of the renewables generation share therefore leads to a corresponding reduction in the diesel fuel generation shares.

6. **In the road transport sector, each 1 percent increase in GDP is assumed to increase the demand for fuel use by 0.75 percent (as vehicle ownership rises and vehicles are used more intensively).** On the other hand, fuel use falls over time (at a rate of 0.75 percent a year) due to autonomous improvements in vehicle fuel economy. Again, fuel prices affect fuel use both through changes in average fleet fuel economy (e.g., due to shifting towards more fuel-efficient vehicles) and in vehicle use. Each 1 percent increase in road fuel prices is assumed to reduce fuel use by 0.4 percent, with 60 percent of the response due to improvements in fuel efficiency and 40 percent due to reductions in driving.<sup>5</sup>

7. **The other energy sector is analogous to the road transport sector with the same rates of autonomous technological change and fuel price responsiveness, though fuel demand rises in proportion to GDP.**

## Data

8. **Fuel prices per (imperial) gallon, provided by the MOF, include base CIF prices, margins for wholesalers and retailers, excises or levies, and service charges (currently 6 percent of the CIF price)—excises for road fuels are currently \$2.5 per gallon (though scheduled to increase to \$4 per gallon) while levies for diesel use for the power and other energy sector are \$1 per gallon.** The crude oil component of the CIF cost is the regional oil price.

9. **Data for the power sector (2016 electricity sales by residential, commercial and industrial sectors, use of diesel fuel for generation, and the share of diesel fuel in operating**

<sup>5</sup> The driving response is limited due to limited possibilities for using other travel modes like public transport, cycling, and walking.

costs) is taken from LUCELEC.<sup>6</sup> Tariffs vary very little across consumers<sup>7</sup> and are set to approximately recover operating and capital costs.

10. **Road fuel use (aggregating over gasoline and diesel) is obtained by dividing MOF road fuel excise revenues for 2016 (\$42.6 million) by the excise rates (\$2.5 per gallon).** Diesel use in the other energy sector is from IDB.<sup>8</sup>

11. **CO<sup>2</sup> emission rates are taken to be 0.0123 (metric) tons per gallon for diesel and 0.0114 tons per gallon (averaging over diesel and gasoline) for road 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 excise tax or levy and aggregated over fuels.<sup>9</sup>

## Policy Scenarios

12. **The BAU scenario simply projects future fuel use and electricity demand each year to 2030 starting with their 2016 levels according to the relationships just described, with tax rates and prices, aside from the crude oil price, fixed at their current levels.**

13. **The road fuel tax scenario simply incorporates the slated \$1.50 per gallon excise tax increase for road fuels into future fuel prices, and calculates the change in fuel use, emissions, and revenue relative to the BAU.**

14. **The carbon tax scenario includes the road fuel tax and also applies the same tax increase (\$1.50 per gallon) to diesel fuel use in the power and other energy sector although the increase is implemented progressively, rising by a fixed annual amount each year to reach \$1.50 by 2030.**

15. **The vehicle fuel economy policy represents measures (e.g., excise taxes that promote purchase of fuel-efficient vehicles) that, in a cost-effective way, lower the average fuel consumption rate of the in-use vehicle fleet.** This policy is modelled by a 'shadow price' (or virtual price) which increases the price in the equation determining average fuel efficiency but not in the equation determining vehicle miles travelled. The shadow price is phased in progressively to reach \$1.50 per gallon by 2030. Since it is not an actual tax it does not contribute new revenues.

16. **The VAT reform applies the standard VAT rate of 12.5 percent to road fuels and electricity consumption at the residential level.** This reduces road fuel use in the same way that higher excises do, though the size of the tax increase is smaller. It has only a very blunt effect on emissions from the power sector however, as, since it applies only to final consumption, it does not

<sup>6</sup> LUCELEC, *Resilience*, 2016 Annual Report.

<sup>7</sup> For example, Inter-American Development Bank, 2015, *Challenges and Opportunities for the Energy Sector in the Eastern Caribbean*, Technical Note No. IDB-TN-852, pp 31.

<sup>8</sup> Inter-American Development Bank, 2015, *Challenges and Opportunities for the Energy Sector in the Eastern Caribbean*, Technical Note No. IDB-TN-852, pp 31. Fuel use is updated from 2013 to 2016 using the spreadsheet demand function.

<sup>9</sup> Revenues from service charges are not included as they are relatively small and the future rates are uncertain.



affect commercial and industrial demand, and does not promote switching from diesel to renewables.

17. **The policy to increase efficiency of electricity-using products is analogous to the vehicle fuel economy policy (i.e., it represents measures that cost effectively reduce electricity consumption rates). Again, it is modelled by a shadow price in the equation that determines energy efficiency, with the same level of incentive as provided in the carbon tax scenario.**
18. **The renewables policy simply forces an extra amount of renewable generation over and above that in the BAU scenario such that the share reaches 50 percent by 2030 (the share of diesel fuel generation falls accordingly).**
19. **The high carbon tax is the same as the carbon tax policy but with all tax increases doubled (i.e., an increase in fuel tax of \$3 per gallon introduced immediately for road fuels and gradually for non-transport fuels).**

## Annex III. NDC-Based Scenarios to Achieve GHG Emission Reduction Targets—World Bank Model<sup>1</sup>

### Background

1. **In response to a request from the authorities, the World Bank provided complementary technical assistance during the first half of 2017 to support the government in adopting a customized macro-fiscal model that simulates the effects of different climate-change policies.** The model provides an internally consistent framework for estimating the macroeconomic and fiscal impacts of NDC implementation and comparing the effects of policy alternatives.
2. **The core macro-fiscal model of the St. Lucian economy provides an easy to use Excel interface for conducting economic forecasting and policy analysis using a general equilibrium model.** The extended version of the model—with the climate change block—incorporates details on energy and carbon emissions, to enable the Government to estimate the impact of different NDC-related climate change policies, such as taxes and infrastructure investment, on the economy and carbon emissions. With the macro-results from the NDC policy scenarios, the World Bank also ran micro-simulations outside of the model with the Integrated Household Survey (IHS) conducted in 2016, to estimate the distributional impacts of different climate policies the Government may implement.

### Description of the Macro-Fiscal Core Model

3. **The St. Lucia-World Bank Macro-Fiscal model is a structural econometric model with its core foundations based on neoclassical principles.** The model is a representation of both demand and supply factors. The model is amended to study various climate change mitigation policies. The macro-fiscal outlook feeds into the climate component of the model.
  - Most of the equations are derived from standard first order conditions using a firm/household objective function subject to various constraints – i.e. households maximize utility subject to various constraints. Each equation is then linearized to produce a system of linear reduced form equations.
  - The exercise includes estimates of the parameters that are specific to St. Lucia. These parameters determine the behavior of the economy. Simplifying assumptions are made where data does not exist. Currently, there are no data for real expenditure GDP components. This is a crucial block of any economic model. To produce a set of expenditure estimates on the real side (i.e., at constant prices), a number of deflators were created. As an example, the export deflator is derived from a basket of commodity exports and trade weights.
  - The expenditure components of GDP are split out into its usual components (i.e., household consumption, government consumption, exports, and imports), which are then linked to the

---

<sup>1</sup> Compiled by the World Bank's MFM GP.

production side (value added of sectors). The absence of sectoral labor and capital data limits the model's capacity to an extent.

- Equilibrium in the model is achieved through prices. This ensures that the model converges to a balanced growth path in the long-run.
- The government block of the model breaks out expenditures and revenues into broad categories. Revenues consist of income taxes, customs revenue, value added taxes and grants. Expenditures consist of the government's wage bill, expenditure on goods and services, acquisition of non-financial assets, government interest payments (domestic and foreign), transfers and other expenditures that capture the remaining expenditure components.
- The climate component of the model is a hybrid macro/CGE type model. An input-output table is used to capture the intermediate input use of commodities in each sector. The flow in the model is mainly determined through prices and final demand. As an example, an increase in final demand (household and government consumption, gross fixed capital formation and change in inventories) affect the production side or use of commodities. Demand and supply interact, and consequently prices in the economy change. The model is dynamic, and consequently demand shocks are seen only as temporary. The production block of the model is set up so that each sector uses intermediate inputs from other sectors in the production process. In addition, some sectors use a different energy mix to produce a unit of a good – and this is also the starting point of the climate change section.

## The Climate Change Block

4. **The climate change components of the model are:**
  - Carbon taxes that target the carbon content of non-renewable energies. A standard conversion factor expresses kilograms of carbon emission from a liter of diesel as an example.
  - Energy efficiency
    - Housing (e.g., solar)
    - Transport (diesel and gasoline)
  - Alternatives
    - Share of gasoline in transport services
    - Share of renewable energy in electricity production (e.g., geothermal)
5. **The model also accounts for different pricing mechanisms on fuel. Diesel at the pump in St. Lucia is charged at a different rate than the diesel use by the national power provider (LUCELEC).** The latter receives a discount on the price.
6. **The size of the carbon tax should typically equal the externality created by carbon.** I.e., the market price of carbon is lower than the social optimal price, and then the carbon tax attempts to close that gap. Carbon is associated with creating, at a minimum, the following costs:
  - Environmental: Deforestation, arable land that becomes arid, rising sea levels
  - Economic: Food security, the economic costs of capital destruction due to natural disasters
  - Geopolitical: Paris agreement or countries that renege on meeting carbon reduction targets

7. **From an economic perspective, the carbon tax creates a wedge between optimal prices, which should be defined broadly to include social costs.** There are a large number of studies that attempt to compute the unit cost of carbon.<sup>2</sup>

8.

9. **The other mitigating strategies allow for changes to energy inputs away from carbon to more renewable sources.** The modeler, however, needs to make a transparent computation on the financing source for renewables. If financing for some geothermal development is sourced from abroad, then the analyst would have to take in the real value of that investment, but also work out what the energy capacity for renewables are. These quantities can then be translated into the model to study the effectiveness of this policy.

10. **In general, the model is set up to quantify emission-reduction policies from three perspectives:**

1. Carbon reduction
2. Efficiency (carbon taxes are an additional revenue source for the budget)
3. Welfare (incidence analysis)

The policymaker determines the weight on each objective. There exists thus a mix of different climate mitigation policies that achieve the goals set above.

11. **Finally, most of the equations are estimated using techniques consistent with state-of-the-art macro-modelling.** As with the core macro-fiscal model, some parameters are calibrated where insufficient data exist.

## Scenarios

12. **A set of scenarios illustrates the adequacy and effectiveness of the mitigation measures in St. Lucia's NDC to achieve its climate change policy targets, and some policy options the Government might consider to strengthen the likelihood of achievement.** These scenarios are based on St. Lucia's Green House Gas (GHG) emission-reduction targets<sup>3</sup> identified in its NDC relative to BAU (from 643 GgCO<sub>2</sub>eq emissions in 2010), i.e., a 16 percent reduction and 23 percent reduction in by 2025 and 2030, respectively. Additionally, the scenarios incorporate the identified NDC-related objectives of a shift in the energy mix of renewables from accounting for less than 1 percent as of 2016, to 35 percent and 50 percent by 2025 and 2030, respectively. Some of the measures in the NDC were not modelled, due to lack of detail on their implementation: energy efficient appliances; improvements to the energy efficiency of water distribution; improvements to the grid distribution; increased efficiency of transmission electricity; and, increased efficiency in transport.

13. **It must be noted that significant uncertainties attach to some of the assumptions in these models.** For instance, applying different elasticities of demand results in substantially different estimates of reductions in carbon emission. The high uncertainty is unavoidable, given limited data, the ambitiousness of the targets, and the comprehensive set of variables. That said, uncertainties will

<sup>2</sup> <http://carbon-price.com/william-nordhaus/>

<sup>3</sup> Emission reduction targets in St. Lucia's NDC are for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O.

diminish over time as implementation progresses and reporting and monitoring improves, providing scope for improved policy calibration and achievement of targets going forward.

*Renewables Policy:*

- A first scenario, *NDC Renewables*, imposes a gradual increase in the share of renewables used in St. Lucia, with a maximum level of 50 percent reached in 2030, in line with the objectives outlined in the NDC. The share rises by a bit less than 4 percentage points per year from 2018 onwards; and
- A second scenario, *Full Renewables*, provides an estimate of the impacts of key projects listed in the NDC to achieve the GHG reduction-targets: (i) a solar farm of 3MW (US\$ 2.2 million), (ii) a wind farm of 12 MW (US\$ 37 million), and (iii) a geothermal power plant of 30MW (US\$ 147 million, of which US\$ 22 million of public financing). Beginning in 2019, one-third of the energy is sourced from renewables, climbing to 100 percent in 2023.

*Carbon Taxation:*

- The *Road Fuel Tax* scenario analyzes the impact of raising the fuel excise by EC\$1.5 per gallon. The hike is to a carbon tax on transport fuels of US\$ 45 per ton of carbon emission. In the model, the shock was imposed by calculating an equivalent carbon tax only in the transportation sector;
- The *Moderate Carbon Tax* scenario applies the same excise fuel increase but to all diesel products in the economy. The application of the tax to non-transport sectors of the economy was introduced in a gradual manner such that the tax in 2030 was equivalent to the excise tax applied to the transport sector in 2017 and 2018; and
- the *High Carbon Tax* scenario applies an excise fuel twice as large for the transport sector throughout the analyzed period, with the tax on the non-transport sectors rising gradually to the same level of EC\$3 per gallon by 2030. The scenarios relating to carbon tax policies were also modified to simulate the use the additional tax revenues from carbon to finance public investment producing reductions of carbon emissions of similar magnitude as described above.

## **Findings: Estimates of GHG Emission Reductions, Growth and Public Finance Impacts**

14. **The carbon emission reduction from the NDC Renewables scenario would amount to 24 percent in 2030 compared to the baseline, just enough to meet the NDC target.** In the Full Renewables scenario, carbon emissions are around 48 percent lower in 2030 than in the baseline scenario. The size of the reduction in carbon emissions in the model derives from the large share of diesel used in electricity generation. It was assumed there would be no change in consumer prices from the switch to renewables.

15. **With regard to the Carbon Taxation simulations, in the Road Tax Fuel scenario household price inflation increases by around 0.87 percentage points in the year of the excise increase, mostly driven by the increase in transportation prices.** Carbon emissions are estimated to be around 2 percent lower in 2030 than in the baseline without the excise increase. The excise is estimated to generate additional revenue of around 0.4 percent of GDP by 2030. The much broader application of the tax (importantly including in the electricity sector) in the *Moderate Carbon Tax*

scenario means the price increase has a much greater impact on carbon emissions than in the *Road Fuel* scenario. In 2030, carbon emissions are estimated to be around 5.6 percent lower than in the baseline. The broader application of the price increase generates revenue of almost 1 percent of GDP by 2030. In the *High Carbon Tax* scenario, household price inflation increases by around 2 percentage points in the year of the excise increase. In 2030, carbon emissions are estimated to be around 10 percent lower than in the baseline. The broader application of the price increase generates revenue of almost 1.8 percent of GDP by 2030. In terms of real GDP, negative effects of the implementation of the carbon could be counter-balanced by the increases in private investment related to the renewable energy projects and in public investment supported by the carbon tax revenues.

16. **Shifting to greater reliance on the planned renewable energy capacity than envisioned in the NDCs, as in the *Full Renewables* scenario, would provide for a larger carbon emission reduction, than just the NDC targets.** Taking full advantage of the country's renewable energy capacity as it comes on stream could work as a buffer to existing downward risks to achieving the target of reducing carbon emission, such as: project delays, uncertain costs of renewable energy technology, changing in relative prices favoring carbon emitting fuels (diesel, gasoline and natural gas), higher car imports or difficulties in attracting investors in renewables. A similar reasoning could support a more ambitious carbon taxation policy.

### Findings: Estimates of the Distributional Impacts of Scenarios

17. **The World Bank estimated the distributional impacts of each of the climate tax scenarios by developing a macro-micro simulation model linked to the 2016 household survey.** This simulation module functions by passing on macro level changes into specific budget allocations for households. The linkage between macro and micro is established by combining a) the sectoral simulation results for each policy scenario with b) detailed budget shares at the household level obtained from the St. Lucia Survey of Living Conditions and Household Budgets (2016).

18. **This simulation module has the following 3 steps:**

*Step 1.* Macroeconomic price deflators at sectoral level are converted into consumer prices for 105 economic activities.

- Macroeconomic price deflators are initially obtained for 7 sectors: Agriculture, Industry, Construction, Electricity, Transport, Hotels, and Other services.
- The St. Lucia Supply and Use Table (SUT) allows us to distribute price changes at the broad sectoral level into 105 activities and obtain the effect on purchaser prices, margins, and final consumer prices.

*Step 2.* Changes in consumer prices for 105 economic activities are assigned to the corresponding household budget items.

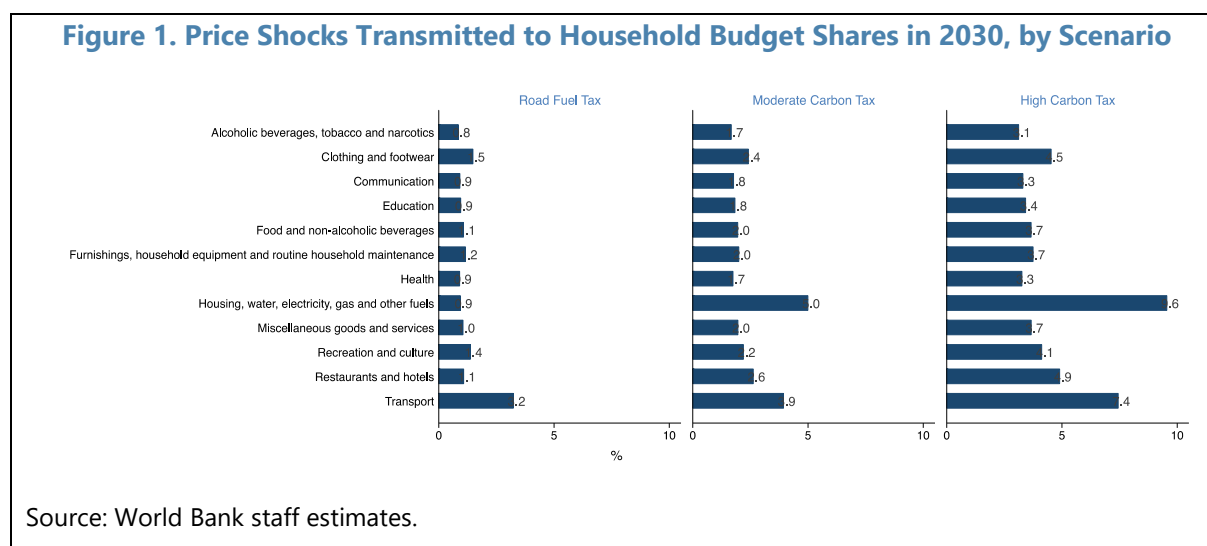
- Activities in the SUT table and consumption items in the household survey use different classification methods. Activities listed in the SUT table are based on the *International Standard of Industrial Activity Revision 3* (ISIC Rev. 3) while consumption items in the household budget survey use the *Classification of Individual Consumption According to Purpose* (COICOP).

- A concordance table between ISIC Rev. 3 and COICOP was constructed using the Central Product Classification, Ver. 1.0 (CPC Ver 1.0) as bridge. Concordance tables between ISIC Rev. 3 and CPC Ver1.0 and CPC Ver1.0 and COICOP are provided by the United Nations Statistical Division.<sup>4</sup>

*Step 3.* Using household budget shares, calculate losses in household per capita income due to changes in consumption prices.

- Prices affect each household based on budget shares.
- Household behavior is not affected as a response to changes in prices. In other words, there is no substitution effect between commodities.
- Long-term distributional effects for each simulation are presented as percent changes in household per capita income by quintile 5a, which presents results for 3 :7) Road Fuel Tax; 2) Moderate Carbon Tax; 3) High Carbon tax.<sup>5</sup>

The final shocks transmitted to the household surveys are depicted in Figure 1 below.



<sup>4</sup> Concordance tables can be found at the [United Nations Statistics Website](https://data.un.org/Data.aspx?d=SDG%20Indicators&f=sdg%3A8.10), accessed on June 27, 2017.

<sup>5</sup> Sensitivity analysis two assumptions: a) only tax; and b) tax + revenues for public investment. Sensitivity analysis including revenues for public investment can augment losses only marginally, less than 1 percentage point in all cases.

## Annex IV. PIMA Institutional Questionnaire—Interview Responses from St. Lucia

			Comments from GOSL
<b>A. Planning Sustainable Levels</b>			
<b>1</b>	<b>Fiscal Principles or Rules: Are there permanent fiscal principles or rules that support sustainable levels of capital spending?</b>		-
<b>1.a</b>	Is fiscal policy guided by one or more permanent fiscal principles, or rules?	No. Over the past years, debt and deficit targets have been set (MTFF in place).	-
<b>1.b</b>	Do fiscal principles or rules protect capital spending over the short term or medium term?	No. Capital spending is included under a target or limit for the overall fiscal balance or aggregate expenditure. Capital spending allocations are second in priority to recurrent due to fiscal constraints. Capital spending is not limited to physical assets.	-
<b>1.c</b>	Is there a target or limit for government liabilities, debt, or net worth?	Target for public debt ratio to GDP	-
<b>2</b>	<b>National and Sectoral Planning: Are investment allocation decisions based on sectoral and inter-sectoral strategies?</b>		-
<b>2.a.</b>	Does the government publish national and sectoral strategies for public investment?	There are no national development and sectoral development strategies and no national or sectoral public investment strategies. When there was a PSIP in prior years, these were not adhered to. Investment planning and prioritization are decentralized. Investment allocation decisions are largely driven by ODA financing.	-
<b>2.b.</b>	Are the government's national and sectoral strategies or plans for public investment costed?	No	-
<b>2.c.</b>	Do sector strategies include measurable targets for the outputs and outcomes of investment projects?	They are being enhanced as program budgeting practices are slowly undertaken	-
<b>3</b>	<b>Central-Local Coordination: Is there effective coordination of central and sub-national governments' investment plans?</b>		-
<b>3.a.</b>	Are there limits on subnational government (SNG) borrowing?	n.a.	-
<b>3.b.</b>	Is capital spending by SNGs coordinated with the central government?	n.a.	-
<b>3.c.</b>	Does the central government have a transparent, rule-based system for capital transfers to SNGs, and for	n.a.	-



			Comments from GOSL
	providing timely information on such transfers?		
<b>4</b>	<b>PPP: Is there a transparent framework for the scrutiny, selection and oversight of PPP projects?</b>		-
<b>4.a.</b>	Has the government published a strategy for PPPs and issued standard criteria for entering into PPP arrangements?	No. There is a Government Policy Paper which was approved by the Cabinet in March 2015.	-
<b>4.b.</b>	Are PPPs subject to value for money review by a dedicated PPP unit prior to approval?	Yes. Implementation has just been initiated and led by the Ministry of Finance.	-
<b>4.c.</b>	Is the accumulation of explicit and/or contingent PPP liabilities systematically recorded and controlled?	Yes. (This applies to a very few prior PPP-type of transactions in the past called DFC/1)	-
<b>5</b>	<b>Regulation on Infra Companies: Is there a favorable climate for the private sector and SOEs to participate in infrastructure provision?</b>		-
<b>5.a.</b>	Does the regulatory framework support competition in contestable markets for economic infrastructure (e.g., power, water, telecoms, and transport)?	Provision of economic infrastructure is restricted to domestic monopolies	-
<b>5.b.</b>	Are there independent regulators who set the prices of economic infrastructure services based on objective economic criteria?	(There is not enough information to assess)	-
<b>5.c.</b>	Does the government oversee the investment plans of infrastructure SOEs and monitor their financial performance?	(There is not enough information to assess)	-
<b>B. Allocation to the Right Sectors and Projects</b>			
<b>6</b>	<b>Multi-Year Budgeting: Does the Government prepare medium-term projections of capital spending on a full cost basis?</b>		-
<b>6.a.</b>	Is capital spending by ministry forecasted over a multiyear horizon?	No. (Though it is being considered, currently, the Government does not have a medium-term expenditure projections for capital spending.)	-
<b>6.b.</b>	Are there multiyear ceilings on capital expenditure by ministry or program?	No	-
<b>6.c.</b>	Are projections of the full cost of major capital projects over their life cycles published?	No	-
<b>7</b>	<b>Budget Comprehensiveness: To what extent is capital spending undertaken through the budget?</b>		-

			Comments from GOSL
7.a.	Is capital spending mostly undertaken through the budget?	Yes. Capital spending is undertaken through the budget financed by own source revenues, ODA, and PPPs.	-
7.b.	Are externally funded capital projects included in the budget documentation?	Yes	-
7.c.	Is information on PPP transactions included in the budget documentation?	Yes (based on a few DFC/1 practices so far in country)	-
8	<b>Budget Unity: Is there a unified budget process for capital and current spending?</b>		-
8.a.	Are capital and recurrent budgets prepared and presented together?	Yes but not in line with international standards.	-
8.b.	Does the budget include appropriations of the recurrent costs associated with capital investment projects?	Yes, but due to fiscal constraints the O & M budget is systematically underfunded	-
8.c.	Does the budget classification and chart of accounts distinguish clearly between recurrent and capital expenditure, in line with international standards?	No, the COA is not in accordance with international standards (some LMs do not use it)	-
9	<b>Project Appraisal: Are project proposals subject to systematic project appraisal?</b>		-
9.a.	Are capital projects subject to standardized cost-benefit analyses whose results are published?	Cost-benefit analyses are usually conducted for major projects but not systematically published	-
9.b.	Is there a standard methodology and central support for the appraisal of projects?	There is no published methodology or central support for project appraisal. Project appraisal is not systematic and usually adopts the specific appraisal processes of the donors involved.	-
9.c.	Are risks taken into account in project appraisals?	A risk assessment covering a range of potential risks is included in the project appraisal, but budgets do not include contingency reserves to cater for possible cost overruns	-
10	<b>Project Selection: Are there institutions and procedures in place to guide project selection?</b>		-
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 Ministry of Finance (MoF) staff prior to inclusion in the budget (but not necessarily for all local revenue financing by loans and bonds).	-
10.b.	Does the government publish and adhere to standard criteria for project selection?	No. There are institutions and procedures but these are not systematic and could benefit from having clear and consistent criteria. The investment planning	-

			Comments from GOSL
		function is supposedly decentralized at the ministry/department level.	
10.c.	Does the government maintain a pipeline of approved investment projects for inclusion in the annual budget?	The government maintains a pipeline of approved investment projects but other projects may be selected for financing through the annual budget	-
<b>C. Ensuring Productive and Durable Public Assets</b>			
11	<b>Protection of Investment: Are investment projects protected during budget implementation?</b>		-
11.a.	Are total project outlays appropriated by parliament at the time of the project's commencement?	No. Outlays are appropriated on an annual basis	-
11.a.	Are in-year transfers of appropriations (virement) from capital to current spending prevented?	Yes but the MOF may allow them under very extreme conditions, which are very rare according to officials.	-
11.c	Can unspent appropriations for capital spending be carried over to future years?	No	
12	<b>Availability of Funding: Is financing for capital spending made available in a timely manner?</b>		-
12.b	Are ministries/agencies able to plan and commit expenditure on capital projects in advance on the basis of reliable cash flow forecasts?	For the most part yes particularly for donor financed projects. Donor financed projects are allowed flexibility since source of financing is guaranteed by a loan/grant agreement.	
12.b	Is cash for project outlays released in a timely manner?	Cash for project outlays are normally released in a timely manner according to the appropriation	
12.c	Is external (donor) financing of capital projects integrated into cash management and the TSA?	External financing is largely held in commercial bank accounts outside the central bank's government accounts/TSA	
13	<b>Transparency of budget execution: Are major investment projects executed transparently and subject to audit?</b>		-
13.a	Is the procurement process for major capital projects open and transparent?	Many major projects are tendered in a competitive process, but the public has only limited access to procurement information unless required by donors.	-
13.b	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 (as well by donors for ODA projects) during project implementation	-
13.c	Are ex post audits of capital projects routinely undertaken?	No unless required by donors.	-
14	<b>Management of Project Implementation: Are capital projects well managed and controlled during the execution stage?</b>		-

			Comments from GOSL
14.a.	Do ministries have effective project management arrangements in place?	Capital project are not systematically managed and controlled during execution stage. And practice varies with ministry	-
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.	Does the government systematically conduct an ex post review and evaluation of a project that has completed its construction phase?	No	-
15	<b>Monitoring of Public Assets: Is the value of the assets properly accounted for and reported in financial statements?</b>		-
15.a	Are surveys of the stocks, values, and conditions of public assets regularly conducted?	No	-
15.b	Are nonfinancial asset values recorded in the government balance sheets?	No	-
15.c	Is depreciation of fixed assets captured in government operating statements?	No	-

1/ Design/Finance/Construct

## 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\$ million	%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.

6/1/2018