



Saint Lucia's First Biennial Update Report



Government of Saint Lucia, 2021



The Government of Saint Lucia
Department of Sustainable Development,
Ministry of Education, Innovation, Gender Relations and Sustainable
Development

In fulfilment of its obligations under the United Nations
Framework Convention on Climate Change

September 2021

Suggested citation: Government of Saint Lucia. (2021). Saint Lucia's First Biennial Update Report:
Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and
Sustainable Development.

Cover Photo Credit: Lucius Doxerie

ACKNOWLEDGEMENTS

Saint Lucia's First Biennial Update Report (BUR) to the United Nations Framework Convention on Climate Change (UNFCCC), was made possible through the funding support of the Global Environment Facility. The United Nations Environment Programme (UNEP) office in Nairobi served as the implementing entity. The Sustainable Development and Environment Division (SDED) of the Department of Sustainable Development (DSD) within the Ministry of Education, Innovation, Gender Relations and Sustainable Development of the Government of Saint Lucia served as the focal point for the execution of activities required for the development of this BUR.

The BUR was developed through the collaborative effort with local, regional and international resource personnel. To this end, the Department of Sustainable Development, wishes to extend gratitude to the contributors of the various reports, workshop participants, and other national stakeholders from various sectors for their contribution through document reviews and supporting efforts in undertaking a participatory process which fosters national ownership.

In addition, the Department wishes to acknowledge the invaluable efforts of the staff of the Department for their input into the completion of this report. All contributions, in one form or another, are truly appreciated.

Table of Contents

ACKNOWLEDGEMENTS	II
LIST OF FIGURES.....	VIII
LIST OF TABLES	IX
LIST OF BOXES.....	XI
LIST OF ACRONYMS AND ABBREVIATIONS.....	XII
EXECUTIVE SUMMARY	1
CHAPTER 1: NATIONAL CIRCUMSTANCES	4
1.1 GEOGRAPHICAL CHARACTERISTICS	4
1.1.1 <i>Topographic Profile</i>	4
1.1.2 <i>Climate and Weather</i>	5
1.2 DEMOGRAPHY	6
1.2.1 <i>Employment</i>	6
1.2.2 <i>Poverty</i>	7
1.2.3 <i>Saint Lucia’s Human Development Index (HDI) Value and Rank</i>	8
1.3 ENVIRONMENT AND NATURAL RESOURCES	8
1.3.1 <i>Coral Reefs</i>	8
1.3.2 <i>Seagrass Beds</i>	9
1.3.3 <i>Mangrove Wetlands</i>	9
1.3.4 <i>Beaches</i>	10
1.3.5 <i>Threats to the Marine and Coastal Ecosystems</i>	11
1.4 TERRESTRIAL RESOURCES	11
1.4.1 <i>Natural Vegetation</i>	12
1.4.2 <i>Soils</i>	13
1.4.3 <i>Threats to Terrestrial Resources</i>	13
1.5 ECONOMY.....	15
1.5.1 <i>Tourism</i>	15
1.5.2 <i>Fisheries</i>	16
1.5.3 <i>Agriculture</i>	17
1.5.4 <i>Construction</i>	18
1.5.5 <i>Manufacturing</i>	18
1.6 MITIGATION SECTOR: EMISSIONS, TRENDS AND ON-GOING ACTIONS.....	19
1.6.1 <i>Energy Sector</i>	19
1.6.2 <i>Transport Sector</i>	21
1.6.3 <i>Waste</i>	22

1.7. NATIONAL PLANS AND POLICIES.....	25
1.7.1 <i>Medium-Term Development Strategy (MTDS)</i>	25
1.7.2 <i>National Climate Change Adaptation Policy</i>	26
1.7.3 <i>National Adaptation Plan</i>	26
1.7.4 <i>Nationally Determined Contribution to the Paris Agreement</i>	27
1.7.5 <i>National Environmental Policy</i>	27
1.7.6 <i>The Revised National Biodiversity Strategy and Action Plan</i>	28
1.7.8 <i>Forest and Land-use Policy</i>	29
1.8. INSTITUTIONAL FRAMEWORK	31
1.8. 1 <i>Government</i>	31
1.8.2 <i>International Climate Commitments</i>	32
1.8.3 <i>Climate Change Governance Arrangements</i>	33
1.8.4 <i>Institutional Arrangements Relevant to the Preparation of the National Communications (NCs) and Biennial Update Report (BURs) on a Continuous Basis.</i>	35
1.8.5 <i>Climate Change Legislation</i>	37
1.8.6 <i>Climate Finance Coordination</i>	38
1.9 CLIMATE CHANGE PRIORITIES	42
1.9.1 <i>Water</i>	43
1.9.2 <i>Agriculture</i>	45
1.9.3 <i>Fisheries</i>	46
1.9.4 <i>Infrastructure and Spatial Planning</i>	47
1.9.5 <i>Natural Resource Management (Coastal, Marine and Terrestrial)</i>	48
1.9.6 <i>Education</i>	48
1.9.7 <i>Health</i>	49
1.9.8 <i>Tourism</i>	49
1.9.9 <i>Mitigation</i>	50
CHAPTER 2: INSTITUTIONAL ARRANGEMENTS FOR DOMESTIC MEASUREMENT REPORTING AND VERIFICATION (MRV)	53
2.1 INSTITUTIONAL ARRANGEMENTS.....	54
2.2 THEME SPECIFIC DETAILS OF THE MRV SYSTEM	60
2.2.1 <i>GHG Inventory</i>	60
2.2.2 <i>Mitigation Projections and Climate Action Analysis</i>	63
2.2.3 <i>Support and Climate Finance</i>	66
2.3 MRV PORTAL.....	67
2.4 RECOMMENDATIONS FOR IMPROVING THE MRV SYSTEM	69
2.4.1 <i>Organisational Mandate Recommendations</i>	70
2.4.1.1 <i>Create an Organisational Structure</i>	70

2.4.1.2 Create Formal Agreements	71
2.4.1.3 Attract and Track Project-based Climate Finance.	71
2.4.1.4 Collate Information on Gaps and Needs for Action Implementation	72
2.4.2 <i>Technical Capacity Recommendations</i>	72
2.4.2.1 Recruit, Train and Sufficiently Resource National Experts	72
2.4.3 <i>Data Flow Recommendations</i>	74
2.4.3.1 Establishing New MOUs	74
2.4.3.2 Map Data Flows and Datasets Linked to Data Providing Stakeholders	75
2.4.3.3 Create Data Supply Agreements.....	76
2.4.3.4 Consolidate Existing Data into the MRV System	76
2.4.4 <i>Systems and Tools Recommendations</i>	76
2.4.4.1 Create a Central Store of Tools within the MRV System	77
2.4.4.2 Develop and Maintain an Improvement Plan.....	77
2.4.4.3 Continue Managing Work Plans, TORs, and Templates for Outputs	77
2.4.4.4 Developing Tools for the GHG Inventory, Mitigation, Adaptation, and Impact Tracking.”	77
2.4.4.5 Indicator Development and Management System	78
2.4.4.6 Metadata Categorization.....	79
2.4.4.7 Public Information and Stakeholder Engagement Tools	79
2.4.4.8 Quality Assurance and Quality Control.....	80
2.4.4.9 Enhance the MRV Portal.....	80
2.4.5 <i>Stakeholder Engagement Recommendations</i>	80
2.4.5.1 Develop the DSD’s Public Awareness and Communications Strategy	81
2.4.5.2 Under Auspices of NCCC establish a Technical Advisory Committee (TAC).....	82
2.4.5.3 Collate Information on Workshops and Events	82
2.4.5.4 Ensure Collaboration with the NEIS.....	82
CHAPTER 3: NATIONAL GREENHOUSE GAS INVENTORY	83
3.1 GHG INVENTORY.....	83
3.2 GLOBAL WARMING POTENTIALS	84
3.3 INVENTORY PREPARATION	85
3.3.1 <i>Overview of inventory preparation and management</i>	85
3.3.2 <i>Data collection, processing, and storage</i>	85
3.4 KEY METHODS AND DATA SOURCES	86
3.5 KEY CATEGORIES	88
3.6 QUALITY ASSURANCE/ QUALITY CONTROL (QA/QC)	89
3.7 UNCERTAINTY ANALYSIS.....	91
3.8 OVERVIEW OF COMPLETENESS, RECALCULATIONS & IMPROVEMENTS.....	92
3.8.1 <i>Completeness</i>	92
3.8.2 <i>Recalculations</i>	93
3.8.3 <i>Improvements</i>	94

3.9 TRENDS	95
3.9.1 OVERVIEW OF SECTORS	95
3.9.2 KEY TRENDS.....	97
3.9.2 ENERGY	99
3.9.3 INDUSTRIAL PROCESSES & PRODUCT USE (IPPU)	100
3.9.4 AGRICULTURE	102
3.9.5 LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)	103
3.9.6 WASTE.....	104
3.9.7 INDIRECT GHG EMISSIONS.....	106
CHAPTER 4: MITIGATION ACTIONS AND THEIR EFFECTS	107
4.1 SAINT LUCIA'S PATH TO REDUCING EMISSIONS.....	107
4.1.1. <i>Mitigation Actions and Policies since the Third National Communication TNC</i>	107
4.2 SAINT LUCIA'S MITIGATION STRATEGY: MEASURES TO REDUCE EMISSIONS	109
4.2.1. <i>Overview</i>	109
4.2.2. <i>Description of each Mitigation Measure to Reduce GHG Emissions, by Sector</i>	110
4.2.2.1. Energy Demand	110
4.2.2.2. Electricity Generation.....	114
4.2.2.3. Transportation.....	117
4.2.2.4. Agriculture, Land Use, Land Use Change and Forestry.....	120
4.2.2.5 Industrial Processes and Product Use (IPPU).....	122
4.2.2.6. Waste	123
4.2.3 <i>LEAP Modelling of GHG Impacts of the Mitigation Strategy</i>	124
4.2.3.1 Overview of the Methodological Approach	124
4.2.3.2 Description of Assumptions for Modelled Mitigation Actions by Sector.....	126
4.2.3.3. Results	133
4.2.4. <i>Wider Benefits and Links to Sustainable Development Goals (SDG)</i>	140
4.2.5 <i>Methods to Improve Modelling, Challenges and Barriers to Implementation</i>	143
4.3 INTERNATIONAL MARKET MECHANISMS	144
4.4 DOMESTIC MEASUREMENT, REPORTING AND VERIFICATION FOR MITIGATION ACTIONS.....	145
4.4.1 <i>Institutional Arrangements</i>	145
4.4.2. <i>Information Sharing Memorandum of Understanding (MOU)</i>	145
4.4.3. <i>Reporting Instrument for Agencies Linked with the National MRV System</i>	145
4.4.4 <i>Implementation Reports by DSD</i>	146
CHAPTER 5: FINANCE, TECHNOLOGY AND CAPACITY BUILDING NEEDS AND SUPPORT RECEIVED.....	147
5.1 OVERVIEW OF FINANCIAL AND TECHNOLOGICAL NEEDS	147
5.1.1 <i>Gaps in the Mitigation Thematic Area</i>	148
5.1.2 <i>Gaps in the Agricultural Sector</i>	150
5.1.3 <i>Gaps in the Coastal Zone Sector</i>	153

5.1.3 Gaps in the Critical Infrastructure Sector	158
5.1.4 Gaps in the Disaster Management Sector	161
5.1.5 Gaps in the Financial Services Sector	164
5.1.6 Gaps in the Forest Biodiversity Sector.....	167
5.1.7 Gaps in the Health Sector.....	169
5.1.8 Gaps in the Human Settlement Sector	171
5.1.9 Gaps in the Marine Biodiversity Sector	172
5.1.10 Gaps in the Tourism Sector	174
5.1.11 Gaps in the Water Sector	176
5.2 BARRIERS TO INCREASING DATA MANAGEMENT CAPACITY AND SENSITIZATION	178
5.2.1 Technical Challenges	179
5.2.2 Institutional Challenges.....	179
5.2.3 Legal and Policy Barriers	180
5.3 MECHANISM TO STRENGTHEN CAPACITY IN DATA COLLECTION AND DATA SENSITIZATION	181
5.3.1 Quality and Usefulness of data	181
5.3.2 Building Capacity Among Data Providers and Users.....	186
5.4 PROVISION OF TOOLS AND EQUIPMENT AND CAPACITY DEVELOPMENT	186
5.4.1 Availability of Tools and Equipment.....	186
5.4.2 Developing Strategic Relationships.....	186
5.4.3 Strengthening the Policy and Legislative Environment for Data Collection and Management	187
5.4.4 Strengthening the National Statistical System.....	187
5.5 FINANCIAL AND TECHNICAL SUPPORT RECEIVED FROM NATIONAL AND OTHER SOURCES	187
5.5.1 Financial and Technical Support Received	189
5.5.2 Capacity Development and Technology Transfer.....	202
5.6 FINANCIAL RESOURCES NEEDED AND RECEIVED BY KEY AGENCIES.....	205
5.6.1 Limitations Posed by Lack of Adequate Finance	205
5.6.2 Support Received for the Preparation of the BUR.....	208
5.7 REQUIREMENTS TO OVERCOME CONSTRAINTS AND GAPS.....	208
5.7.1 Country Capacity Development and Technology needs Priorities	209
5.7.2 Capacity Building Needs for Saint Lucia’s NAP Implementation	218
CHAPTER 6: OTHER RELEVANT INFORMATION.....	222
6.1 AWARENESS AND EDUCATION	222
6.1.1 Awareness and Response to Climate Change in Saint Lucia	222
6.1.1.1 Public Participation in climate change activities	222
6.1.1.2 Public Outreach, education, and training initiatives	223
6.1.2 Scientific Research and Observation	224
6.1.2.1 Measures to Improve National Programmes	225
6.1.2.2 Challenges, Gaps, Needs and Priorities	225

6.1.2.3 Opportunities for Improving Climate Change Research and Systematic Observation	226
6.1.3 Livelihood Protection and Vulnerable Populations	227
6.1.3.1 Gender Considerations	229
6.1.3.2 Capacity Limitations	230
6.1.4 Adequacy of Technical Personnel Involved in Climate Change Planning and Adaptation	230
6.1.5 Capacity Building Activities, Options and Priorities	231
REFERENCES.....	233
ANNEXES	239
ANNEX I – TERMS OF REFERENCE FOR THE NCCC	239
ANNEX II- DETAILS FOR EACH MITIGATION ACTION PROPOSED	247
ANNEX III- GHG INVENTORY SUMMARY SHEETS (TABLE 1)	272

List of Figures

FIGURE 1: - MAP OF THE CARIBBEAN	4
FIGURE 2: POPULATION STRUCTURE BY AGE AND SEX IN SAINT LUCIA FROM 1990 - 2015.....	6
FIGURE 3: TOURIST ARRIVALS BY SECTOR 2018	16
FIGURE 4: AGRICULTURE REAL GDP GROWTH	18
FIGURE 5: FUEL CONSUMPTION IN SAINT LUCIA FROM 2010 TO 2018.....	20
FIGURE 6: VEHICLE IMPORTATION TO SAINT LUCIA.....	22
FIGURE 7: STRUCTURE OF GOVERNMENT IN ST. LUCIA.....	32
FIGURE 8: ORGANISATIONAL ARRANGEMENT FOR THE PREPARATION, MONITORING AND REPORTING OF NC'S AND BURs	36
FIGURE 9: SUMMARY OF CLIMATE TRANSPARENCY THEMES INCLUDED IN THE MRV SYSTEM.	54
FIGURE 10: PROPOSED INSTITUTIONAL ARRANGEMENTS FOR SAINT LUCIA'S MRV SYSTEM	59
FIGURE 11: INSTITUTIONAL ARRANGEMENTS FOR THE GHG INVENTORY	61
FIGURE 12: DATA STRUCTURING COMPONENTS OF THE MRV PORTAL	69
FIGURE 13: THE GHG INVENTORY CYCLE	85
FIGURE 14: TOTAL GHG EMISSIONS AND REMOVALS BY SECTOR AND TOTAL EMISSIONS WITH AND WITHOUT THE LULUCF SECTOR	98
FIGURE 15: TOTAL GHG EMISSIONS FROM THE ENERGY SECTOR	100
FIGURE 16: TOTAL GHG EMISSIONS FROM THE INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU) SECTOR	101
FIGURE 17: NON F-GAS EMISSIONS FROM THE INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU) SECTOR	101
FIGURE 18: TOTAL GHG EMISSIONS FROM THE AGRICULTURE SECTOR, NOTE MS = MANAGED SOILS	103
FIGURE 19: TOTAL GHG EMISSIONS AND REMOVALS FROM THE LAND USE, LAND USE CHANGE AND FORESTRY SECTOR	104
FIGURE 20: TOTAL GHG EMISSIONS FROM THE WASTE SECTOR	105
FIGURE 21: NMVOC EMISSIONS FROM THE INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU) SECTOR	106
FIGURE 22: POPULATION TREND TO 2050	133
FIGURE 23: GDP TREND TO 2050	134
FIGURE 24: HOUSEHOLD TREND TO 2050	134

FIGURE 25: GDP PER CAPITA TREND TO 2050.....	134
FIGURE 26: PROJECTED GHG EMISSIONS BY SECTOR IN THE BASELINE	135
FIGURE 27 : PROJECTED GHG EMISSIONS BY GAS IN THE BASELINE	135
FIGURE 28: PROJECTED EMISSIONS FOR THE ENERGY SECTOR ONLY, UNDER THREE SCENARIOS	136
FIGURE 29: PROJECTED REDUCTIONS BY END-USE STRATEGY (ENERGY ONLY), INCLUDING EMISSIONS FROM POWER GENERATION ALLOCATED TO END-USES; COMPARING THE BASELINE AND THE MITIGATION WITH MORE RENEWABLES SCENARIOS	137

List of Tables

TABLE 1: RELEVANCE TO SAINT LUCIA'S POLICIES AND DRAFT LEGISLATION TO THE MRV SYSTEM.....	55
TABLE 2: ROLES OF STAKEHOLDERS FOR GHG INVENTORY.....	61
TABLE 3: ESTIMATE OF BASIC RESOURCE NEEDS FOR MRV SYSTEMS FOR SMALL TO MEDIUM-SIZED COUNTRIES.....	73
TABLE 4: GLOBAL WARMING POTENTIAL (GWP) VALUES APPLIED IN THE INVENTORY, SOURCE: SAR	84
TABLE 5: SUMMARY OF THE IDENTIFIED KEY CATEGORIES ACCORDING TO LEVEL AND TREND ASSESSMENTS WITH LULUCF USING APPROACH 1 AND APPROACH 2.....	88
TABLE 6: RECALCULATIONS BETWEEN THE CURRENT AND PREVIOUS INVENTORY FOR 2000, 2005 AND 2010	93
TABLE 7: TOTAL GHG EMISSIONS AND REMOVALS BY SECTOR	98
TABLE 8: STATUS OF MITIGATION ACTIONS	107
TABLE 9: DISTRIBUTION OF MITIGATION SCENARIOS BY SECTOR	110
TABLE 10: MITIGATION ACTIONS FOR THE ENERGY DEMAND SECTOR.....	112
TABLE 11: MITIGATION ACTIONS FOR ELECTRICITY GENERATION	116
TABLE 12: MITIGATION ACTIONS FOR TRANSPORTATION	118
TABLE 13: MITIGATION ACTIONS FOR THE AGRICULTURE, LAND-USE, LAND-USE CHANGE AND FORESTRY SECTOR	121
TABLE 14: MITIGATION ACTION FOR THE INDUSTRIAL PROCESSES AND PRODUCT USE SECTOR	122
TABLE 15: MITIGATION ACTIONS FOR THE WASTE SECTOR	123
TABLE 16: SHOWING ENERGY EFFICIENCY MITIGATION ACTIONS GROUPING.....	126
TABLE 17: DETAILED ASSUMPTION FOR ENERGY EFFICIENT EQUIPMENT IN THE RESIDENTIAL SECTOR.....	126
TABLE 18: DETAILED ASSUMPTION FOR ENERGY EFFICIENT EQUIPMENT IN THE COMMERCIAL SECTOR	127
TABLE 19: ASSUMPTION FOR INCREASE UPTAKE OF SOLAR WATER HEATERS.....	127
TABLE 20: DETAILED ASSUMPTION FOR STREETLIGHTING RETROFITS	128
TABLE 21: POWER GENERATION CAPACITY ENERGY GENERATIONS ASSUMPTIONS FOR THE MODELLED SCENARIOS.....	129
TABLE 22: MITIGATION ACTIONS FOR ELECTRIFICATION OF PRIVATE AND GOVERNMENT VEHICLES.....	130
TABLE 23: ASSUMPTIONS MADE IN THE ELECTRIFICATION OF PRIVATE AND GOVERNMENT VEHICLES	131
TABLE 24: ASSUMPTIONS IN THE ELECTRIFICATION OF PUBLIC TRANSPORT	131
TABLE 25: SUMMARY OF DIRECT EMISSIONS REDUCTIONS ACHIEVED IN EACH YEAR BY SECTOR COMPARING BASELINE TO MITIGATION SCENARIOS. (THOUSAND MT CO ₂ E AVOIDED PER YEAR).....	137
TABLE 26: SUMMARY OF EMISSIONS REDUCTIONS ACHIEVED IN EACH YEAR BY SECTOR/END USE COMPARING BASELINE TO MITIGATION SCENARIOS. (THOUSAND MT CO ₂ E AVOIDED PER YEAR).....	139

TABLE 27 - SUMMARY OF GAPS AND NEEDS IN THE MITIGATION THEMATIC AREA	148
TABLE 28 - SUMMARY OF GAPS AND NEEDS IN THE AGRICULTURAL SECTOR	150
TABLE 29 - SUMMARY OF GAPS AND NEEDS IN THE COASTAL ZONE SECTOR	153
TABLE 30 - SUMMARY OF GAPS AND NEEDS IN THE CRITICAL INFRASTRUCTURE SECTOR	158
TABLE 31 - SUMMARY OF GAPS AND NEEDS IN THE DISASTER MANAGEMENT SECTOR.....	161
TABLE 32 - SUMMARY OF GAPS AND NEEDS IN THE FINANCIAL SERVICES SECTOR	164
TABLE 33 - SUMMARY OF GAPS AND NEEDS IN THE FOREST BIODIVERSITY SECTOR.....	167
TABLE 34 - SUMMARY OF GAPS AND NEEDS IN THE HEALTH SECTOR	169
TABLE 35 - SUMMARY OF GAPS AND NEEDS IN THE HUMAN SETTLEMENT SECTOR.....	171
TABLE 36 - SUMMARY OF GAPS AND NEEDS IN THE MARINE BIODIVERSITY SECTOR	172
TABLE 37 - SUMMARY OF GAPS AND NEEDS IN THE TOURISM SECTOR	174
TABLE 38 - SUMMARY OF GAPS AND NEEDS IN THE WATER SECTOR.....	176
TABLE 39 - KEY INVENTORY ACTIVITY DATA GAPS AND RECOMMENDATIONS	181
TABLE 40 - TECHNOLOGY AND CAPACITY DEVELOPMENT ASSISTANCE RECEIVED	202
TABLE 41 - BUDGET ALLOCATIONS FOR EACH SECTOR IN THE LAST 3 FISCAL YEARS	207
TABLE 42 - SUPPORT RECEIVED FOR THE PREPARATION OF THE BUR.....	208
TABLE 43 - IDENTIFIED NATIONAL ADAPTATION AND MITIGATION PRIORITIES	209
TABLE 44: MITIGATION ACTION 1 - IMPLEMENTATION OF REGIONAL ENERGY EFFICIENT BUILDING CODES	247
TABLE 45: MITIGATION ACTION 2 - ENERGY AUDITS FOR ALL GOVERNMENT OCCUPIED BUILDINGS INCLUDING SCHOOLS BY 2025	248
TABLE 46: MITIGATION ACTION 3 - LIGHTING RETROFITS FOR ALL GOVERNMENT OCCUPIED BUILDINGS	248
TABLE 47: MITIGATION ACTION 4 - PUBLIC AWARENESS CAMPAIGNS ON INCENTIVES FOR RENEWABLE ENERGY EQUIPMENT INCLUDING SOLAR WATER HEATERS.....	249
TABLE 48: MITIGATION ACTION 5 - DEVELOPMENT OF COMPREHENSIVE INCENTIVES FOR ENERGY EFFICIENT EQUIPMENT	250
TABLE 49: MITIGATION ACTION 6 - ADOPTION OF MANDATORY ENERGY EFFICIENCY STANDARDS FOR APPLIANCES BY 2025	251
TABLE 50: MITIGATION ACTION 7 - STREETLIGHTING RETROFIT 22,000 HPS TO LEDs BY 2025.....	252
TABLE 51: MITIGATION ACTION 8 - REDUCTION OF 20% ENERGY CONSUMPTION IN SCHOOLS BY 2030.....	252
TABLE 52: MITIGATION ACTION 9 - REDUCTION IN SYSTEM WATER LOSSES TO LESS THAN 20% BY 2030	253
TABLE 53: MITIGATION ACTION 10 - REDUCTION OF TRANSMISSION AND DISTRIBUTION LOSSES TO 5% 2030	254
TABLE 54: MITIGATION ACTION 11 - INSTALLED RENEWABLE ENERGY OF 54MW SOLAR, 18MW WIND BY 2030 AND 15MW GEOHERMAL BY 2035	255
TABLE 55: MITIGATION ACTION 12 - 20MWH OF STORAGE INSTALLED BY 2030	255
TABLE 56: MITIGATION ACTION 13 - AT LEAST 13MW OF DISTRIBUTED GENERATION INCLUDED IN THE 54MW OF SOLAR	256
TABLE 57: MITIGATION ACTION 14 - 400KW OF INSTALLED PV SYSTEMS ON SCHOOLS REPRESENTING ABOUT 10KW IN 40 SCHOOLS	256
TABLE 58: MITIGATION ACTION 15 - NEW ELECTRICITY BILL IS ENACTED BY 2022.....	257
TABLE 59: MITIGATION ACTION 16 - ENERGY EFFICIENCY BILL IS ENACTED BY 2022	258
TABLE 60: MITIGATION ACTION 17 - 33% SALE OF VEHICLES (INCLUDING GOVERNMENT) ARE ELECTRIC BY 2030	258

TABLE 61: MITIGATION ACTION 18 - REPLACEMENT OF 30% OF GOVERNMENT FLEET BY 2030 TO ELECTRIC VEHICLES, WHICH IS EQUAL TO THE REPLACEMENT OF APPROXIMATELY 144 ICE VEHICLES TO ELECTRIC VEHICLES BASED ON 2018 GOVERNMENT FLEET TRANSITION STUDY AND 50% BY 2050	259
TABLE 62: MITIGATION ACTION 19 - 30% EXPANSION OF PUBLIC TRANSIT, THIS WOULD INCREASE ACCESS TO PUBLIC TRANSPORT AND REDUCE THE USE OF PRIVATE VEHICLES	260
TABLE 63: MITIGATION ACTION 20 - DEVELOPMENT AND ADOPTION OF THE TRANSPORT POLICY BY 2025	261
TABLE 64: MITIGATION ACTION 21 - 10% SALES OF VEHICLES IN PUBLIC TRANSPORT AND TAXI VEHICLE FLEET ARE OF ELECTRIC VEHICLES BY 2030.	261
TABLE 65: MITIGATION ACTION 22 - IMPROVED INCENTIVES FOR ELECTRIC VEHICLES.....	262
TABLE 66: MITIGATION ACTION 23 - PUBLIC AWARENESS ON INCENTIVES FOR ELECTRIC VEHICLES/HYBRID VEHICLES	263
TABLE 67: MITIGATION ACTION 24 - FUEL EFFICIENCY STANDARDS FOR VEHICLES AND IMPLEMENTATION OF MANDATORY AGE LIMIT ON IMPORTED VEHICLES BY 2025.....	263
TABLE 68: MITIGATION ACTION 25 - 2500 HA OF ADDITIONAL AGRICULTURAL LANDS ARE CONVERTED TO AGROFORESTRY PRACTICES BY 2030.	264
TABLE 69: MITIGATION ACTION 26 - 2,500HA REFORESTED AREAS IN DEGRADED AREAS BY 2030.....	265
TABLE 70: MITIGATION ACTION 27 - 500HA OF SEAGRASS BEDS, REEFS, MANGROVES PROTECTED AND REHABILITATED	266
TABLE 71: MITIGATION ACTION 28 - WATERSHED AND FLOOD MANAGEMENT IMPROVEMENT.....	266
TABLE 72: MITIGATION ACTION 29 - 10% PHASE DOWN BY 2029, 30% PHASE DOWN BY 2035, 50% PHASE DOWN BY 2040 AND 80% PHASE DOWN BY 2045.....	267
TABLE 73: MITIGATION ACTION 30 - PUBLIC AWARENESS CAMPAIGN FOR HOME COMPOSTING SYSTEMS	268
TABLE 74: MITIGATION ACTION 31 - PILOT INTRODUCTION FOR WASTE SEPARATION BY 2023.....	269
TABLE 75: MITIGATION ACTION 32 - DEVELOPMENT STRATEGY RE-PURPOSE BATTERY FOR ELECTRIC VEHICLES TO OTHER USE UPON END OF LIFE BY 2022.....	269
TABLE 76: MITIGATION ACTION 33 - FEASIBILITY STUDY TO UNDERTAKE INDUSTRIAL-SCALE COMPOSTING OF ORGANICS FROM RESIDENTS FOR PRODUCTION OF BIOGAS TO USE IN WASTE COLLECTION VEHICLES	270
TABLE 77: MITIGATION ACTION 34 - ASSESSMENT OF ENERGY UTILIZED FOR WASTE MANAGEMENT.....	271
TABLE 78: 2018 INVENTORY SUMMARY TABLE.....	272

List of Boxes

BOX 1 - SAINT LUCIA CLIMATE FINANCE STRATEGY AND NATIONAL ADAPTATION PLAN 2018 - 2028	40
---	----

List of Acronyms and Abbreviations

ABS	Access and Benefit Sharing
ADFD	Abu Dhabi Fund for Development
ADP	Durban Platform for Enhanced Action
AF	Adaptation Fund
AFOLU	Agriculture, Forestry and Other Land Use (2006 IPCC Guidelines)
BMZ	German Federal Ministry for Economic Cooperation and Development
BOD	Biological Oxygen Demand
BTR	Biennial Transparency Report
BUR	Biennial Update Report
CAFF	Climate Adaptation Financing Facility
CANARI	Caribbean Natural Resources Institute
CARICOM	Caribbean Community
CATS	Caribbean Aqua-Terrestrial Solutions Programme
CBD	Convention on Biological Diversity
CBF	Caribbean Biodiversity Fund
CCAP	Climate Change Adaptation Policy
CCCCC	Caribbean Community Climate Change Centre
CCI	Caribbean Challenge Initiative
CCRIF	Caribbean Climate Risk Insurance Facility – Segregated Portfolio Company
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster Emergency Management Agency
CEHI	Caribbean Environmental Health Institute
CfRN	Coalition for Rainforest Nations
CIMH	Caribbean Institute for Meteorology and Hydrology
CO ₂ eq	Carbon dioxide Equivalents
COD	Chemical Oxygen Demand
COP	Conference of the Parties
COVID-19	Coronavirus Disease 2019
CPEIR	Climate public expenditure and institutional review
CROP	Caribbean Regional Oceanscape Project
CROSQ	CARICOM Regional Organization for Standards and Quality
CSDEO	Chief Sustainable Development & Environmental Officer
CSO	Central Statistical Office of Saint Lucia
CWR	Carbon War Room
DOA	Department of Agriculture
DOF	Department of Fisheries

DOM	Dead Organic Matter
DSA	Data Supply Agreements
DSD	Department of Sustainable Development
DVRP	Disaster Vulnerability Reduction Project
ECROP	Eastern Caribbean Regional Ocean Policy
EEZ	Exclusive Economic Zone
EIB	European Investment Bank
ENSO	El Nino Southern Oscillation
ESR	Economic and Social Review
EV	Electric Vehicle
F-gases	Fluorinated gases
FAO	Food and Agricultural Organisation
FCDO	Foreign Commonwealth and Development Office (formerly Department of International Development)
FTE	Full time equivalent
GACMO	Greenhouse Gas Abatement Cost Model
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEF-CCCD	Global Environment Facility Cross-cutting Capacity Developments
Gg	Gigagrams (1 Gg = 1 kt)
GGGI	Global Green Growth Institute
GHG	Greenhouse Gas
GHGMI	Greenhouse Gas Management Institute
GIS	Geographic Information Systems
GIZ	German Agency for International Cooperation
GNI	Gross National Income
GOSL	Government of Saint Lucia
GWP	Global Warming Potential
HDI	Human Development Index
HFC	Hydrofluorocarbons
HWP	Harvested Wood Products
IADB	Inter-American Development Bank
ICCAT	International Convention for the Conservation of Atlantic Tunas
ICE	Internal Combustion Engine
IICA	Inter-American Institute for the Cooperation on Agriculture
IISD	International Institute for Sustainable Development
IKI	German International Climate Initiative

IMF	International Monetary Fund
INC	Initial National Communication to the UNFCCC
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Process and Product Use
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
IWCAM	Integrated Water and Coastal Area Management
IWEco	Integrating Land and Ecosystems Management Project in Caribbean Small Island States
KAP	Knowledge, Attitudes and Practices
KRA	Key Results Areas
LDN	Land Degradation Neutrality
LEAP	Low Emissions Analysis Platform
LEED	Leadership in Energy and Environment Design
LIDAR	Light Detection and Ranging
LPD	Land Productivity Dynamics
LUCELEC	Saint Lucia Electricity Services Limited
LULUCF	Land use, land use change and forestry
MARTA	Mitigation Action Reporting Tool for Agencies
MCF	Methane Correction Factor
MEA	Multilateral Environmental Agreement
MOF	Ministry of Finance
MOH	Ministry of Housing
MoU	Memorandum of Understanding
MRV	Measurement, Reporting and Verification
MSDEST	Ministry of Sustainable Development, Energy, Science and Technology
MW	Megawatt
MTDS	Medium-Term Development Strategy
NAMA	Nationally Appropriate Mitigation Action
NAP	National Adaptation Plan
NBSAP	National Biodiversity Strategy and Action Plan
NC	National Communication
NCCC	National Climate Change Committee
NDA	National Designated Authority
NDC	Nationally Determined Contribution
NDCPCAEP	National Determined Contribution Partnership Climate Action Enhancement Package
NDC-TEC	Supporting the implementation of NDCs in the Caribbean - transforming the transport and energy sectors towards a low-carbon and climate-resilient future
NEIS	National Environmental Information System

NEP	National Environmental Policy
NETS	National Energy Transition Strategy
NGO	Non-Governmental Organisation
NIR	National Inventory Report
NOAA	National Oceanic and Atmospheric Association
NOP-SAP	National Ocean Policy – Strategic Action Plan
NSDI	National Spatial Development Infrastructure
NSEP	National Sustainability Energy Plan
OAS	Organization of American States
ODS	Ozone Depleting Substance
OECS	Organisation of Eastern Caribbean States
OLADE	Latin American Energy Organisation
PMU	Project Management Unit
PPCR	Pilot Programme for Climate Resilience
PPPs	Public/ Private Partnerships
PS	Permanent Secretary
QA/QC	Quality Assurance and Quality Controls
RAC	Refrigeration and Air Conditioning
REASAP	Resilient Ecosystems Adaptation Strategy and Action Plan
REEBC	Regional Energy Efficiency Building Code
ReMLit	Reduction of Marine Litter
RMI	Rocky Mountain Institute
RMMS	Road Maintenance Management Systems
SAR	Second Assessment Report
SASAP	Sectoral Adaptation Strategy and Action Plan
SDED	Sustainable Development and Environment Division
SDG	Sustainable Development Goals
SIDS	Small Island Developing States
SIRMM	Sustainable Island Resource Management Mechanism
SLASPA	Saint Lucia Air and Sea Ports Authority
SLNT	Saint Lucia National Trust
SLSWMA	Saint Lucia Solid Waste Management Authority
SMMA	Soufriere Marine Management Association
SNC	Second National Communication to the UNFCCC
SOC	Soil Organic Carbon
SUV	Sport Utility Vehicle
SWD	Solid Waste Disposal Sites
TAC	Technical Advisory Committee

tCO ₂ eq	Metric tons of carbon dioxide equivalent emissions
TNC	Third National Communication
TORs	Terms of Reference
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNSD	United Nations Statistics Division
USA	United States of America
USD	United States Dollar
UWI	University of the West Indies
VCA	Vulnerability and Capacity Assessment
WASCO	Saint Lucia Water and Sewerage Company
WECAFC	Western Central Atlantic Fisheries Commission
WLBL-DBC	Windward & Leeward Brewery Ltd – Du Boulay's Bottling Company
WPP	Water Partnership Programme
WRAP	Waste and Resources Action Programme
WRMA	Water Resources Management Agency
WTTC	World Travel and Tourism Council
WRI	World Resources Institute
WSS	Water Supply Systems

EXECUTIVE SUMMARY

Saint Lucia is a Small Island Developing State (SID) and contributes very little to global warming and climate change; yet it is extremely vulnerable to the damaging effects posed by climate change. Similar to many SIDS, Saint Lucia is striving towards sustainable development and the Government is committed to addressing climate change as is evidenced by Saint Lucia's International Climate Commitments. Saint Lucia has submitted three National Communications to the United Nations Framework Convention on Climate Change (UNFCCC), with the latest Third National Communication (TNC) being submitted in 2017.

The island also submitted its updated Nationally Determined Contribution (NDC) for mitigation in 2020 and is considering a 7% greenhouse gas (GHG) emissions reduction in the energy sector (electricity generation and transportation) relative to 2010, by 2030. This mitigation target represents a focus of the island's commitment to tackle climate change and contribute to reduction in global emissions.

This first Biennial Update Report has been prepared to meet Saint Lucia's obligations as a party to the UNFCCC. It contains the following chapters:

- Chapter 1: National Circumstances
- Chapter 2: Institutional Arrangements for Domestic Measurement, Reporting and Verification (MRV)
- Chapter 3: National Greenhouse Gas Inventory
- Chapter 4: Mitigation Actions and Their Effects
- Chapter 5: Finance, Technology and Capacity Building Needs and Support Received
- Chapter 6: Other Relevant Information.

Saint Lucia's economy depends primarily on revenue from tourism, agriculture, and manufacturing. Also, construction, which is a significant component of government expenditure, is an essential contributor to the island's Gross Domestic Product (GDP). According to the Government of Saint Lucia (GOSL) Economic and Social Review (ESR 2019), activity in the domestic economy continued to be most significantly influenced by the tourism sector's performance, the critical source of foreign exchange and employment. The covid19 pandemic has caused a significant drop in the island's revenue and massive contraction to the GDP of the island. In addition, Saint Lucia faces a high risk of tropical cyclones and landslides and ranks 5th among small states for climate-induced events.

Saint Lucia has recognised that a solid and sustainable system of governance is critical to ensure that the island can meet its Sustainable Development Goals (SDGs) as well as its obligations under the

UNFCCC. Considerable progress has been made in the integration of climate change into national policies. To support the institutional arrangements, the GOSL has created a robust policy and legal framework to support reforms, which will result in net greenhouse gas emissions reduction. Where required, a review of relevant policies and legislation will be undertaken to ensure that more robust implementation possibilities are explored.

To aid with this, Saint Lucia is currently developing its measurement, reporting and verification (MRV) system. This system is being developed through continuous improvement and will create the necessary institutional arrangements for Saint Lucia to continue fulfilling its reporting commitments to the UNFCCC. The MRV system together with Saint Lucia's National Environment Information System (NEIS) will support the GHG Inventories, Climate Actions Analysis, Mitigation Projections, and Climate Finance.

Saint Lucia's GHG Inventory was prepared for the time series 2000 to 2018. Saint Lucia's total GHG emissions for the year 2018 was 509 GgCO₂e with Land Use, Land Use Change and Forestry (LULUCF). This is miniscule in global terms, with the country having contributed to approximately 0.0009% of the global emissions in 2018. The methodology used for the GHG Inventory was guided by the Intergovernmental Panel on Climate Change (IPCC) 2006 Guidelines. The largest contributor to emissions is the energy sector, accounting for approximately 76% of the total emissions; this is mainly due to the heavy dependence on fossil fuel for power generation and transportation. The LULUCF sector for the year 2018 operated as a sink with a removal of 227 GgCO₂e.

Saint Lucia has submitted a total of thirty-four (34) mitigation actions covering all five sectors of Energy, Industrial Processes and Product Use (IPPU), Agriculture, LULUCF and Waste. These actions were mainly updated from the TNC and were shown to align with at least twelve (12) of the SDGs. The majority of the actions are within the energy sector, with a total of twenty-four (24) actions in energy demand, electricity generation and transport. The Low Emissions Analysis Platform (LEAP) was used to model seventeen (17) of these actions. The mitigation assessment with LEAP indicates potential emission reductions of 122.8 GgCO₂e in 2025, 224.8 GgCO₂e in 2030, and 350.1 GgCO₂e in 2050 when comparing the baseline to the mitigation scenario.

Saint Lucia has and continues to work with several international donors and funding agencies on projects that directly address climate change adaptation and mitigation. Nevertheless, several constraints and gaps still exist, and efforts are being made to address them which will be aided by the MRV system and the climate finance tracking system. The island has developed a National Adaptation Plan (NAP) for the period 2018-2028 and several Sectoral Adaptation Strategy and Action Plans (SASAP). The implementation of these plans will depend of funding, policy and other opportunities.

The island is committed to seizing opportunities for implementation as they arise, cross-sectoral or sectoral. The island has developed a portfolio of project concept notes to increase its readiness to access funds. Project concept notes development are ongoing and is reflective of the prioritised measures. Some of these concepts have been combined to develop funding concept notes or proposals.

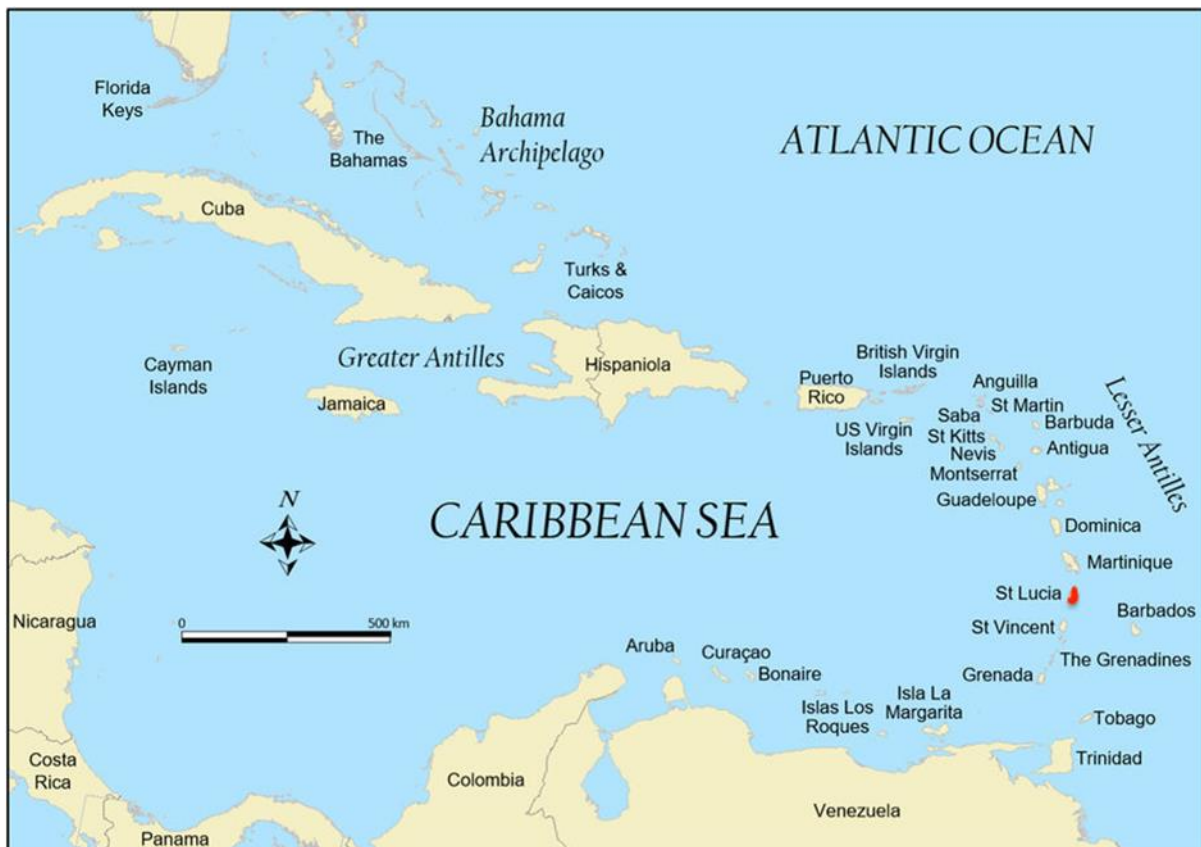
The Government of Saint Lucia will continue to make strides in the fight against climate change through strategic mitigation and adaptation measures.

CHAPTER 1: NATIONAL CIRCUMSTANCES

1.1 GEOGRAPHICAL CHARACTERISTICS

Saint Lucia is situated within a string of islands bordering the Caribbean Sea (See Figure 1.), located east of Central America, known as the West Indies (also called the Caribbean). The island of Saint Lucia located Northwest of Barbados and South of Martinique, has a land area of approximately 616 km². It is 42 km long and, at its widest point, it is 22 km wide. The island has a continuous maritime zone of 24 nautical miles (nm), with an exclusive economic zone (EEZ) of 200 nm. The territorial sea is 12 nm. The precise coordinates of Saint Lucia are Latitude 13.59° N, Longitude 61°W. Its coastline has a length of approximately 158 km, with a coastal shelf area of 522 km² that is relatively narrow and drops off sharply along the West Coast.

Figure 1: - Map of the Caribbean



Source: (Researchgate.net)

1.1.1 Topographic Profile

Saint Lucia is almost entirely of volcanic origin, with the oldest rocks dating back to the Early Tertiary period. Like the other islands of the Lesser Antilles, Saint Lucia began as a series of submarine volcanoes. It is, therefore, part of a volcanically active ridge formed along the subduction zone in the

Eastern Caribbean. As a result, the island is affected by volcanic and seismic activity. The island's volcanic centres are divided into three (3) broad groups based on age and geographic distribution, as follows:

- Group 1: Eroded basalt and andesite centres (the Northern Series)
- Group 2: Dissected andesite centres (the Central Series)
- Group 3: The Soufrière Volcanic Centre (the Southern Series)

Saint Lucia is divided into two main physical regions, the northern half having been eroded to ridges and wide flat valleys, and the southern and central regions consisting of steep-walled valleys and mountain peaks [Towle et al, 1991]. The island's physical landscape is dominated by high peaks and rain forests in the interior, and it is known for the twin peaks of Gros Piton and Petit Piton on the southwestern coast. Mount Gimie, the highest peak, is in the central mountain range and rises to 958 meters (3,143 ft) above sea level. The island's steep terrain also accentuates the many rivers that flow from the central part of Saint Lucia to the Caribbean Sea. As a result, the river channels in the upper catchments are deeply incised into the volcanic terrain.

1.1.2 Climate and Weather

Saint Lucia has a tropical, humid climate moderated by northeast trade winds that allow for pleasant year-round conditions. Mean annual temperatures range from 26 °C (78.8 °F) to 32 °C (89.6 °F) at sea level and drop to an average of 13 °C (55.4 °F) in the mountain peaks. The location, size and geomorphology of the island allow for weather that is affected by large scale weather systems such as the Northeast Trades, the El Niño Southern Oscillation (ENSO), the Atlantic High-Pressure System and the passage of tropical waves, depressions, storms, and hurricanes.

Annually, from June to November the country experiences periods of heavy rain, often marked by the passage of tropical systems originating off the coast of West Africa — this is known as the wet season. Precipitation during the wet season comes mainly from tropical waves, depressions, storms, and hurricanes, which occur frequently over this region owing to its geographical location within the Atlantic hurricane belt. The tropical cyclone season typically lasts from June until November. On the other hand, a period of low precipitation is experienced between the months of December to May known as the dry season. However, rainfall trends are often variable, and severe droughts may occur every 5-10 years.

Saint Lucia faces a high risk of tropical cyclones and landslides and ranks 5th among small states for climate-induced events.¹ Among 182 countries in the Climate Risk Index, Saint Lucia was in the top

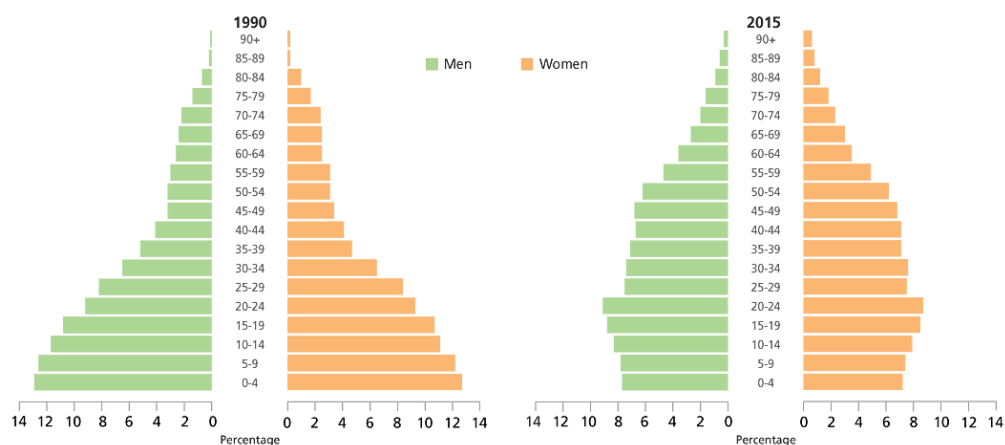
¹ UNCTAD (2018) Climate Change Impacts on Coastal Transport Infrastructure in the Caribbean: Enhancing the Adaptive Capacity of Small Island Developing States (SIDS) Saint Lucia: A case study

10% of countries that suffered losses to climate-related natural hazards during 1997–2016. Between 1980 and 2020, six major tropical cyclones along with four other climate-related natural hazards crossed or had effects on Saint Lucia's Exclusive Economic Zone (EEZ). Four of the tropical cyclones occurred between 2001 and 2013.

1.2 DEMOGRAPHY

According to the 2018 population and mid-year estimates, Saint Lucia's population stood at 178,694 of which 90,002 are males and 88,692 are females. Saint Lucia has witnessed a significant change in its demographic characteristics over the years. In 1990, the majority of Saint Lucia's population was below the age of 25 years. However, as of 2015, Saint Lucia's population structure has become transitional, evidenced by the narrowing of the population aged 25 years and below. This dramatic change in the structure of Saint Lucia's population presents new challenges, including increases in public outlays for health and social protection services for the ageing population, as well as a reduced workforce, among other things. As far as age distribution goes in 2018, 25.2% of the population was 19 years old or younger, 64.5% is between the ages of 20 and 64 years, and 10.4% of the population was over 65. The median age in Saint Lucia is 34.5 years. The average life expectancy for the population is 76.67 years, with men having a life expectancy of 75.3 and women 78.1. Infant mortality is 11.2 per 1,000 live births while the death rate is estimated at 14.5 per 1,000 people.

Figure 2: Population structure by age and sex in Saint Lucia from 1990 - 2015



Source (PAHO)

1.2.1 Employment

Saint Lucia attained independence on the 22nd of February 1979 and since then has evolved into an upper-middle-income country, with a per capita income estimated at US\$10,896.90 as of 2018, which serves as irrefutable evidence of its capacity to pursue its national development objectives. Despite these enviable socio-economic achievements, Saint Lucia is arguably at a developmental crossroad,

characterised by a growth rate averaging below 2%, high rates of unemployment, limited capacity for the economy to generate new and sustainable jobs, and elevated poverty levels. The unemployment rate for Saint Lucia as of December 2018 was 20.2%, representing 18.5% male unemployment and 22.1% of female unemployment. The rate of unemployment among the youth as of December 2018 was 36.3%. This disproportionate percentage of youth among the unemployed has been associated with high levels of crime among this sector of the population. The tourism sector is the major source of revenue and jobs in Saint Lucia, and one of the main sustainability-oriented pillars. The COVID-19 crisis has certainly impacted employment in the industry however, the actual magnitude of this impact is still uncertain.

1.2.2 Poverty

Saint Lucia has defined its annualized poverty line as individuals whose expenditure per annum is less than EC \$6,443 and an indigence line of EC \$2,123. Persons below the indigence line represent approximately 1.3% of the total population. The headcount poverty level fell during the 10-year period from 2006 to 2016 from 28.8% to 25.0%. This decline was most pronounced in the rural areas of Saint Lucia where a decline in poverty levels from 41% to 32.9% occurred. The poverty gap fell nationally by 1.5% between 2006 and 2016 to 7.5%. The poverty index also fell in all districts except for Castries city, where it increased by 6.9% to 10.3% in 2016. Castries City went from having the lowest poverty gap in 2006 (3.4%) to the fourth-largest poverty gap in 2016 (10.3%). This is consistent with changes in the distribution of the poor, where those living below the poverty line in Castries city rose from 3.8% of the poor in 2006, to 22.6% in 2016.

Poverty is expected to increase in 2020 because of income and job losses due to the pandemic resulting from COVID-19, despite the mitigation measures implemented by the government to mitigate the impacts. The pandemic has had severe negative impacts on the job market and livelihoods, disproportionately affecting the poor. According to the World Bank, the current standstill in tourism in Saint Lucia is anticipated to result in a Gross Domestic Product (GDP) contraction of 9-15% and a surge in debt by 12% in 2020 due to additional expenditure. The GOSL has determined that almost 45% of the labour force lost jobs (Central Statistical Office, 2020) and the poverty headcount index is estimated to have increased by about 3 percentage points. Over 70% of households saw their incomes decrease since the beginning of the pandemic. Poor households who already have limited access to basic services and goods are also facing difficulties to ensure sufficient food security.

1.2.3 Saint Lucia's Human Development Index (HDI) Value and Rank

The United Nations Development Program (UNDP) ranks Saint Lucia 89 out of 189 countries, with a score of 0.745 on its 2018 Human Development Index. Saint Lucia's HDI between 2000 and 2018 increased from 0.694 to 0.745. Saint Lucia's progress in this regard is due to improvements in each of the HDI indicators, including Saint Lucia's life expectancy at birth, which increased by 5.0 years. Mean years of schooling increased by 1.5 years and expected years of schooling increased by 1.3 years. Saint Lucia's Gross National Income (GNI) per capita has also increased by about 34.8% between 1990 and 2018.

1.3 ENVIRONMENT AND NATURAL RESOURCES

Saint Lucia is surrounded by the Atlantic Ocean and the Caribbean Sea; its tropical location and mountainous landscape have gifted the island with a range of terrestrial and aquatic habitats. The island has a steep rugged landscape, surrounded by a narrow coastal shelf that supports its diverse marine ecosystem of mangroves, seagrasses, coral reefs, and beaches. The island's biodiversity is imperative to the country for food, shelter, medicines, water, sustainable livelihoods, agriculture and tourism industries, and future untapped industries of the country. The key economic sectors are tourism and agriculture, with the economy and both sectors relying heavily on the country's natural/biological resources for their sustainability, yet also impacting on it, sometimes adversely.

The stated intention of the Government of Saint Lucia, like members of the Organisation of Eastern Caribbean States (OECS), is to pursue both Blue and Circular economies, further underscoring the importance of its biodiversity. The island's coastal and marine ecosystems also contain a wide range of biologically diverse habitats. These include seagrass beds, coral reefs, mangrove forests and other wetlands, beaches, and dry scrub forests. These ecosystems provide a variety of ecosystem services as described below.

1.3.1 Coral Reefs

The continental shelf of the island of Saint Lucia is host to a variety of reef systems. Saint Lucia has coral reef systems along both coasts, with the reefs along the West Coast being more diverse than those of the East Coast. Coral reefs perform important physical functions as they act as a coastal barrier, reducing wave energy and protecting the shoreline from erosion and storm damage.

There have been several agents of serious coral decline in Saint Lucia. Water quality changes threaten many reefs. The removal of mangrove and seagrass habitats, siltation from construction or dredging, runoff from roads and agriculture, sewage discharge, and fertilizer and pesticide-laden runoff, all contribute to the increased incidence of coral decline. Also, widespread overfishing of reefs has depleted many of the herbivorous fish that keep algae in check, creating conditions which favour algae

over coral. Climate change is beginning to pose an overarching threat to coral reefs, as warming seas contribute to widespread coral bleaching. Additionally, battering and damage from storms are a factor, as increasingly intense storms in recent years are creating increased pressure. Despite long-term coral degradation, recent positive stabilization trends have been seen, with 30% of national reefs now in “good condition,” as measured by the Reef Health Index.

Coral restoration is fast becoming established as a conservation technique for marine biologists, dive centres and tourists, in more and more locations around the world. Saint Lucia has embarked on a coral restoration initiative, which is a public-private partnership implemented by The Centre for Livelihoods, Ecosystems, Energy, Adaptation and Resilience (CLEAR) Caribbean and the Sandals Foundation, with support from the Caribbean Aqua-Terrestrial Solutions programme (CATS), the Department of Fisheries and the Soufriere Marine Management Association (SMMA). This coral ecosystem restoration involves the rehabilitation of degraded coral reef areas and has been known to be effective in reversing biodiversity loss and recovering ecosystem services.

1.3.2. Seagrass Beds

Seagrass beds are common along Saint Lucia's coastline (although the species diversity is low) and comprise *Thalassia testudinum* (Turtle Grass), *Syringodium filiforme* (Manatee Grass) and to a lesser extent *Halodule wrightii* (Shoal Grass) species. Interspersed between this seagrass are benthically-rooted algae such as *Avrainvillea*, *Udotea*, *Penicillus*, *Halimeda*, *Amphiroa*, and *Caulerpa* species. In general, larger, and denser seagrass beds are found off the East Coast, compared to the infrequent and sparsely covered seagrass patches along the West Coast. Healthy seagrass meadows stabilize sediments, reduce beach erosion, and improve water clarity. Seagrass beds also provide key fish, conch, and lobster nursery areas, as well as sea turtle and bird foraging areas. Like coral reefs, these habitats have been subjected to stress resulting from silt-laden waters due to poor management of human and natural resources, development, pollution as well as direct damage.

1.3.3. Mangrove Wetlands

Mangrove systems in Saint Lucia, though comparatively small on an international scale, play a vital role in the protection of the marine and coastal ecosystems. This role includes coastal stability, serving as fish breeding and nursery grounds, as an avifauna habitat, silt trap and nutrient exporter. There are four (4) species of mangrove found in Saint Lucia: *Rhizophora mangale* (Red Mangrove), *Laguncularia racemosa* (White Mangrove), *Avicennia germinans* (Black Mangrove) and *Conocarpus erecta* (Buttonwood). The mangroves are primarily found on the East Coast. To date, several efforts have been made to prevent the destruction of these coastal habitats and in 1984 several mangroves on the

island were declared Marine Reserves. As of 2013, the Department of Fisheries stated that there were fourteen (14) remaining major mangrove wetlands in Saint Lucia, many of which have been declared as marine reserves under the Fisheries Act Number 10 of 1984. There are also, two RAMSAR sites, Savannes Bay and Mankòtè mangroves, both found in Vieux Fort, in the south of the island. However, monitoring and surveillance of activities within mangrove areas is difficult, since marine reserves have never been legally delineated, and ownership often lies in private hands.

The Mankòtè basin mangrove is the largest mangrove area in Saint Lucia, covering about 63 ha. The area is owned by the Crown and shelters various mangrove species like *Rhizophora mangle*, *Avicennia germians*, and *Avicennia schaueriana*. The Mankòtè Mangrove has been used as a source of fuelwood and charcoal since the 18th Century. Since the early 1980s, the mangrove has been managed based on sustainable harvesting for charcoal production, implemented with the active collaboration of the harvesters. Management is based on an agreed set of harvesting practices that serve as rules to be followed by the harvesters and which are intended to maximise regeneration of cut areas. A key element of the apparent success of management has been the agreement of sole access rights granted to the Aupicon Charcoal Producers, and their sustainable prescriptive harvesting and surveillance functions, supported by the management strategy endorsed by the relevant agencies, within a policy context set by the Saint Lucian government that has favoured protection and permitted the delegation of management authority.

1.3.4. Beaches

Saint Lucia has a 158 km long coastline, of which the beach length accounts for about 16.78%. The island's coastline is of astounding beauty and natural wealth, comprising of black and white sandy beaches, rocky shores, mangroves, and cliff areas. Beaches along the West Coast of Saint Lucia are washed by the relatively calm waters of the Caribbean Sea, while those of the East Coast are pounded by the much rougher waters of the Atlantic Ocean. The nearshore reefs, though limited in size, are quite diverse. In an inventory conducted in 1996/1997, sixty (60) beaches were recorded along the West Coast and forty-two (42) along the East Coast. Beaches along the West Coast are more readily accessible by land and sea; thus, they play a vital role in Saint Lucia's economy and are one of the island's main tourist attractions (CCA 1990). They are also extremely important to coastal stability and serve as a habitat for several invertebrates such as crabs and bivalves while providing a nesting area for green, hawksbill and leatherback turtles. Of the four species of sea turtles that nest on the beaches of Saint Lucia, the International Union for Conservation of Nature (IUCN) has classified two as endangered (the Loggerhead and Green turtles), one as vulnerable (the Leatherback turtle) and one

as critically endangered (the Hawksbill turtle). The beaches are also culturally and socially significant, as locals utilise them for recreational and aesthetic purposes.

1.3.5 Threats to the Marine and Coastal Ecosystems

The main threats to these existing ecosystems include hotel construction on the nearshore; housing, infrastructure and other developments; poor solid and liquid waste management; unregulated land development especially in coastal areas; sand mining; erosion from poor soil/land management practices in agriculture; mining and quarrying; conversion and reclamation of mangroves; marine invasive species; over-harvesting of commercially important species; illegal trade in coral and other protected species and illegal fishing methods. In addition, the island's vulnerability to natural disasters such as hurricanes and storms may have catastrophic effects on the natural resources of the island. The associated loss of ecosystems because of these will, in turn, result in the loss of invaluable ecosystem services. Thus, efforts are ongoing to better understand and manage these ecosystems and reduce these threats. The Government of Saint Lucia (GOSL) has in the recent past worked alongside stakeholders in the implementation of several projects such as the Sustainable Island Resource Management Mechanism (SIRMM), several projects funded by the Global Environment Facility (GEF) project Including the Integrating Water, Land and Ecosystems Management in the Caribbean Small Island Developing States Project (IWECo), Integrated Water and Coastal Area Management (IWCAM) project. These initiatives have sought to develop and strengthen stakeholder capacity and knowledge, to better manage and protect these ecosystems. In August 2020, the Saint Lucia National Trust (SLNT) launched a major Ecosystem-based Adaption (EbA) project which aims to incorporate biodiversity conservation and ecosystems management while also building climate change resilience. It also seeks to raise public awareness of the Pigeon Island National Landmark (PINL) and the rich ecosystems of Pointe Sable Environmental Protection Area (PSEPA). This project is funded by the Caribbean Biodiversity Fund (CBF), with co-financing provided by the International Climate Initiative (IKI) of the German Federal Ministry for Environment, Nature Conservation, and Nuclear Safety through KfW.

1.4 TERRESTRIAL RESOURCES

Saint Lucia has an average annual precipitation of 2 300 mm, or 1 427 million m³ and renewable water resources are estimated at about 300 million m³ /year (FAO 2015). The island is of volcanic origin, with many rivers, wetlands, streams and springs. Based on the drainage networks of the island, the landscape has been divided into thirty-seven (37) watershed basins, from which several perennial streams emanate. The main rivers in the country are Cul de Sac, Canelles, Dennery, Fond, Piaye, Doree, Canaries, Roseau, and Marquis. Surface water catchment areas are supply areas for drinking water. They are relatively small and characterised by steep terrain over which runoff occurs rapidly, resulting

in limited percolation. Surface water yields for drinking water purposes vary due to increased abstraction. In 2018, total dam capacity in Saint Lucia was estimated at 3.182 million cubic meters. At present, the country's water supply comes from four major water supply systems (WSS) and some 19 minor water supply systems. The Roseau dam has a reservoir capacity of 2.6 million cubic meters and stores water which is distributed across the island. Saint Lucia has no important lakes.

Surface water accounts for 100% of total withdrawals. Attempts to develop groundwater for public supply have had extremely limited success on the island. A 1998 study on improved water supplies for the south of the island concluded that ground sources are unlikely to make a significant contribution, except in small isolated rural communities, using hand pumps. Water demand continues to change rapidly in certain areas; for example, in the extreme north, due to high infrastructural development and the migration of people into areas in the north; and in the south due to the topography (which leads to water running back off into the sea) and inadequate storage facilities. Water outages occur regularly, in several communities including areas with significant population numbers. Therefore, persons who are impacted either must transport water or install water storage tanks.

Freshwater ecosystems provide habitats for many species including fishes, mollusks, amphibians, reptiles, insects, plants, and mammals. Freshwater fishes comprise almost 45% of all fishes and freshwater mollusks about 25% of all mollusks (IUCN, 2009). Data from Fishbase.org indicate the occurrence of 14 freshwater fish species, nine (9) of which are native to Saint Lucia.

1.4.1 Natural Vegetation

The biological diversity of Saint Lucia consists of approximately 1,300 known species of flowering plants, cycads and gymnosperms belonging to 143 families. There are also 144 species of ferns and club mosses, the majority of which are found within the forest ecosystem.

There are 21,692 hectares of natural vegetation types in Saint Lucia, with 7,487 hectares contained within the Government Forest Reserve. Saint Lucia's forest is home to a wide diversity of flora and fauna, possessing several endemic species (including the rare Saint Lucia Parrot: *Amazona versicolor*). The natural vegetation types of Saint Lucia are classified into seven broad categories: Elfin Woodland, Montane Thicket, Lower Montane Rainforest, Rainforest, Secondary Forest, Savanna and Grazing Land and Dry Scrub Woodland. Although forestry has been playing a minor role in the island's economy, the Government is acutely aware of the importance of forest conservation for the protection of water supplies, as well as biotic and non-biotic resources for the Saint Lucian people and visitors alike. About 56% of natural forest is found in the forest reserves and 43% on private lands. Scrub forests and mangroves are mainly found on private lands. There is a total of 256 hectares of plantation forest existing within the forest reserves, consisting of three main timber tree species, namely: Blue mahoe

(*Hibiscus elatus*); Honduras mahogany (*Swietenia macrophylla*); and Caribbean pine (*Pinus caribbaea*). There are also two species of Christmas trees in the reserve: the cypress (*Cupressus lusitanica*) and the araucaria (*Araucaria excelsa*).

In 2019, the IUCN had identified seventeen species in Saint Lucia's biodiversity as being critically endangered. (7 birds, 8 reptiles, 1 mammal, 1 fish). The main threats to biodiversity in Saint Lucia have been identified as habitat loss and fragmentation, overharvesting, pollution (including noise), climate change and introduction of invasive species (GOSL, 2014). There are twenty-seven endangered plants recorded in Saint Lucia, most of which are found in the coastal and lowland habitats. Of these, two species (*Tetrazygia angustifolia* and *Myrcia leptocelda*) are at immediate risk of extinction, because their limited habitat is threatened by urban development. There are ten endemic plants in Saint Lucia. Some species of plants such as "Lowye canelle" (*C. elongatum*), "balata" (*M. bidentata*) and "latanyé" (*Coccothrinax barbadensis*) are threatened because of over-exploitation and extensive destruction of habitat. In addition, findings from the National Forest Demarcation and Bio-Physical Resource Inventory Project 2009, indicate that 70 plant species have not been seen since the 1930s.

1.4.2 Soils

The currently available soil type map layer was generated in 2016 using data from 1966 UWI Imperial College of Tropical Agriculture (Stark et al., 1966). Soil formation on the island is determined primarily by the parent materials, topography and rainfall regime. Saint Lucia is made up almost totally of volcanic origin, presenting andesite, dacite and basalt rock formations resulting from the tertiary or late Quaternary Age. Sedimentary beds occur but are of small extent. Beds of mixed sedimentary and volcanic origin are common; they have good bedding and stratification such as tuffs, agglomerate tuffs and conglomerates (DeGraff, 1985; OAS, 1986). The mineralogy and weathering characteristics of the volcanic bedrock generally produce fine-grained soils, often containing high proportions of clay. Due to the widely varying rainfall pattern on the island, the parent materials are subject to different amounts of leaching. This, together with the steep topography and ash layers of the island, contribute to the differentiation of the soil types. Four distinct soil types are important in Saint Lucia, these are smectoid soils, kandoid soils, allophane latosolics and allophane podzolics (Rouse et al. 1986). It is also noted that high erosion rates have been leading to successive losses of soil fertility and the siltation of drainage systems.

1.4.3 Threats to Terrestrial Resources

Climate change is a significant threat to the stability of terrestrial systems since it threatens biodiversity, ecosystem health and ecosystem services because of environmental changes which place pressure on species, affecting their ability to survive and thrive. When environmental conditions

change rapidly because of climate change, some species may not be able to tolerate the new conditions, causing them to migrate or disappear from an area altogether. This disrupts the natural balance of the ecosystem, making it less resilient.

Some specific challenges to biodiversity and ecosystem stability in Saint Lucia are:

- i. Destruction of and damage to ecosystems and habitats with more frequent extreme weather events.
- ii. Changes in species' physiology, including life cycles, breeding, and flowering patterns, and migration patterns with higher temperatures.
- iii. Changes in the distribution of species and the composition, structure, and productivity of ecosystems due to the compounding effects of climate change.
- iv. Higher risk of forest fires with higher temperatures and extended drought periods.
- v. Higher risk of terrestrial, freshwater, and marine pest and disease outbreaks with higher temperatures.
- vi. Reduced availability of food and water for wildlife.
- vii. Damage to coral reefs and mangroves due to higher temperatures and increased sediment and nutrient deposition (during more frequent flooding events).
- viii. Physical damage to and reduced abundance of corals and crustaceans with ocean acidification.
- ix. Food chains affected by the loss of plankton and other species due to ocean acidification.
- x. Declining integrity and health of coral reefs and mangroves, leading to the loss of fish nurseries and breeding grounds and loss of coastal defences for land-based resources, communities, and infrastructure.
- xi. Higher risk of algal blooms with larger amounts of nutrients (from fertilizers and overflow of sewage and greywater) reaching the sea during flooding events.
- xii. Degradation of beaches, wetlands, and other low-lying ecosystems with sea-level rise.

To address these threats, under the NAP process, the GOSL has developed a Resilient Ecosystems Adaptation Strategy and Action Plan (REASAP) 2020–2028. This plan seeks to drive the implementation of actions which will safeguard Saint Lucia's biodiversity while reducing vulnerability and building resilience. The REASAP consists of 58 actions to be implemented in the short, medium, and long term, prioritized according to urgency.

Saint Lucia's Second Revised National Biodiversity Strategy and Action Plan, approved in January 2020, outlines the critical areas for conservation, relevant agencies, and actions to be taken to meet obligations of the Convention on Biological Diversity, the Aichi Targets and the Sustainable Development Goals (SDGs).

1.5 ECONOMY

Saint Lucia's economy depends primarily on revenue from tourism, agriculture, and manufacturing. In addition, construction, which is a significant component of government expenditure, is an important contributor to the island's GDP. According to the GOSL 2019 Economic and Social Review (ESR 2019), activity in the domestic economy continued to be most significantly influenced by the performance of the tourism sector, the key source of foreign exchange and employment. Preliminary GDP estimates suggest that notwithstanding growth, real GDP growth slowed from 2.6 % in 2018 to 1.7 % in 2019.

1.5.1 Tourism

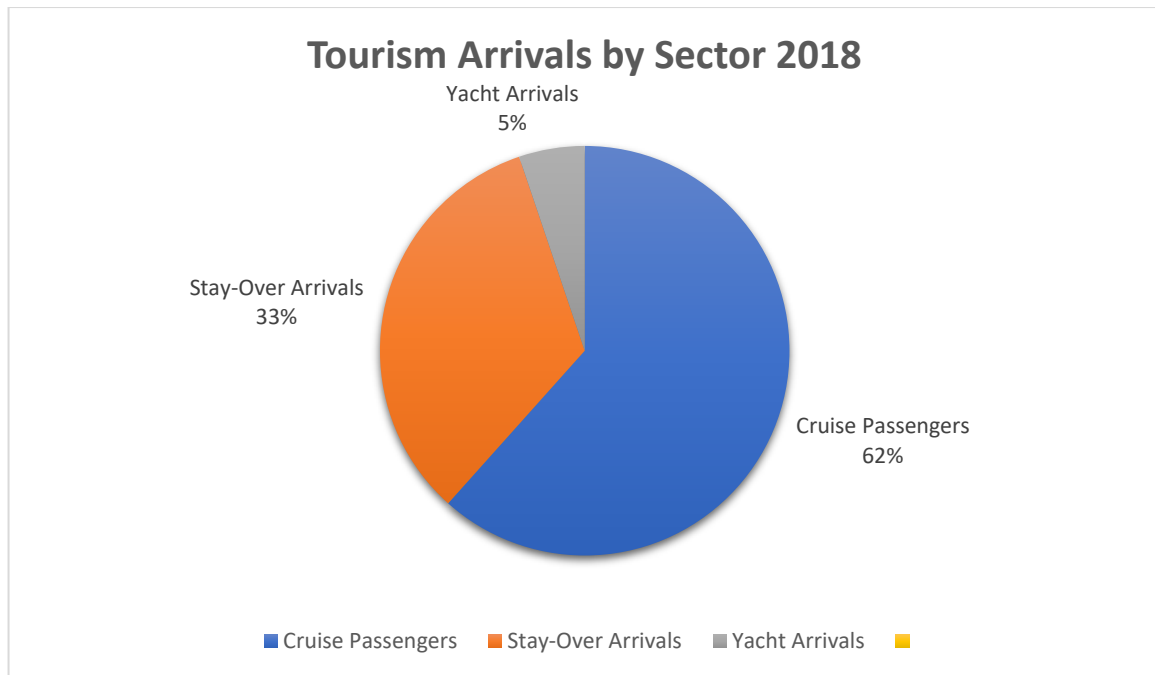
The tourism sector was, until March 2020, before the onset of the COVID-19 pandemic, the lead economic sector in Saint Lucia. In 2019 the total number of visitors to Saint Lucia amounted to 1,286,004 million, with 786,743 arrivals via cruise ship and another 66,546 via yachts.² According to the World Travel and Tourism Council (WTTC), the contribution of travel and tourism to Saint Lucia's GDP was 40.7%, an increase of 4.2% over the previous year. Not only is tourism a significant contributor to GDP, but also employment, accounting for 78.1% of total employment (WTTC 2020) and total visitor impact valued at USD 1,947.³ Tourists visiting the island come mainly from the United States of America (USA), Canada, the United Kingdom, the European Union, and other Caribbean islands, with USA visitors accounting for the largest proportion. Most hotels, both existing and proposed, are located in coastal areas, close enough to the sea to be impacted by sea-level rise. The tourism sector is vulnerable to the impacts of climate change at several levels, including:

- i. Loss of infrastructure due to storms and sea-level rise
- ii. Degradation of the tourism product through storm damage, loss of near-shore tourism resources and reduced attractiveness of environmentally based tourism attractions.
- iii. Frequency and intensity of storms which deter tourists from visiting the island.
- iv. Drought conditions placing pressures on the tourism product.
- v. Impacts on supporting sectors such as agriculture, fisheries, water, and transport.
- vi. Increased health pandemics reducing the attractiveness of the destination.

² Eastern Caribbean Central Bank (ECCB). 2020. Real Sector Statistics - Selected Tourism Statistics: Comparative Report. Available at: <https://www.eccb-centralbank.org/statistics/tourisms/comparative-report> (Accessed on 8th November 2020).

³ World Travel and Tourism Council (WTTC). 2018. Travel and Tourism Economic Impact 2018. Available at: <https://www.wttc.org/economic-impact/country-analysis/country-reports/> (Accessed on 8th November 2020).

Figure 3: Tourist Arrivals by Sector 2018



Source: GOSL Central Statistics Department

The outlook for Saint Lucia’s tourism sector has become clouded by the outbreak of the COVID-19 pandemic, which has significantly affected developed and developing economies worldwide. The United Nations Development Program (UNDP) in its initial analysis of the macro-economic impact of COVID 19, stated that the Latin America and Caribbean region are experiencing its worst economic crisis in a century due to the pandemic. The report further notes that the Gross Domestic Product (GDP) of countries of Latin America and the Caribbean will contract by a massive 8.1% in 2020. Since March 2020, the tourism sector in Saint Lucia, like the rest of the Caribbean, has experienced mass cancellations both from stay over visitors and cruise ships. With travel restrictions still in place at the beginning of 2021, and the relief of vaccines not expected to become noticeably effective until the middle of 2021, the economic fallout will be significant given the fact that Saint Lucia is one of several countries of the region that is extremely dependent on this industry for promoting economic growth.

1.5.2 Fisheries

The fisheries sector is a major contributor to Saint Lucia’s economy, with the most economically significant species being demersal, coastal pelagic, and offshore pelagic fisheries. Other fisheries harvested include reef, conch, and sea urchins (Singh-Renton and McIvor 2015). Although the fisheries are small, they supply most of the country’s need for seafood which is consumed locally and contributes to the food security of the nation. The GOSL reported in its 2019 ESR that preliminary data indicate a 4.9% decline in the overall wild marine capture to 1,552.9 tonnes for the third consecutive year. This declining performance has been attributed to climatic and human pressures.

Notwithstanding this outturn, the ESR 2019 further notes there was a 1.9% increase in the estimated number of fishing trips in the review period.

In 2016, the total annual production for commercial capture fisheries in the country was 1,732 metric tons. Although the sector contributed only 0.54% to GDP in 2016, fisheries provide a safety net to coastal communities as it is an essential source of income, provides employment and ensures food security. Marine fish capture production in 2016 was estimated at USD 10 million, employment at 3.4 per cent of labour in 2015/2016 and consumption per capita at 20kg in 2016.⁴

Saint Lucia is a participant and supporter of several regional and international initiatives including at the level of the OECS, CARICOM and the Western Central Atlantic Fisheries Commission (WECAFC) and sees appropriate representation at the level of International Convention for the Conservation of Atlantic Tunas (ICCAT) and the International Whaling Commission (IWC) as critical to the advancement of this fishery. The country has also sought to initiate measures to address the impacts of climate change on the fisheries sector. One such initiative is the Climate Change Adaption in the Eastern Caribbean Fisheries Sector (CC4FISH), financed by the GEF. There are three project components: increased awareness and understanding of climate change impacts and vulnerability for effective climate change adaptation in the fisheries and aquaculture sector, improved resilience of fisherfolk and coastal communities and aqua culturists, and climate change adaptation mainstreamed in multilevel fisheries governance. The project which commenced in 2016 is due to be completed in 2020.

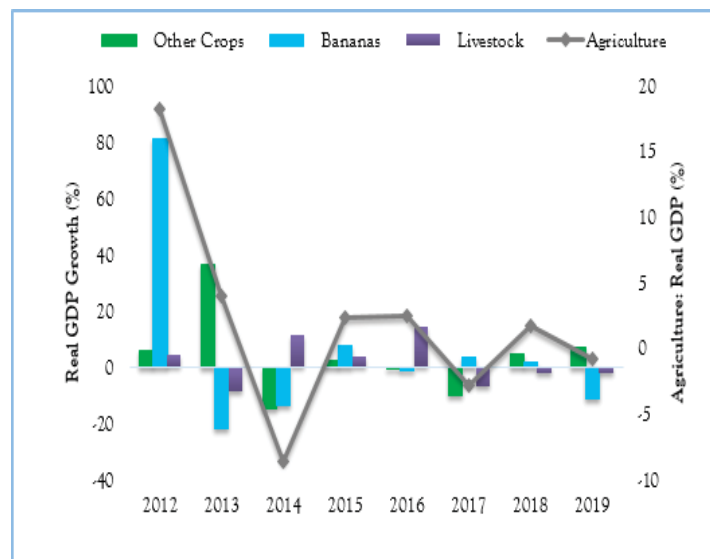
1.5.3 Agriculture

Saint Lucia is a tropical paradise. Blessed with fertile land, the island is known for its high-quality banana and tropical fruit production. Crop production and Livestock production were the most productive sub-sectors for agriculture in 2016, generating 12.3% and 4.7% increases in contribution to the sector, respectively. Special note should be taken of growth in the contributions of non-banana crops (17%), forestry (1.4%) and fisheries (1.8%), which contributed to an increase in revenue of EC \$7.53 million in 2016. In Saint Lucia, there has been a continuous decrease in the contribution of the agricultural sector to total employment in the country since 2010. Real growth in the agricultural sector is estimated to have contracted by 0.8% in 2019 (see graph). This trend is likely to continue, given the abandonment of farmlands, the loss of prime agricultural lands to physical development, loss of interest by the young in agriculture as a career and the impacts of extreme weather conditions,

⁴ Fishery and Aquaculture Country Profiles. Saint Lucia. 2018. Country Profile Fact Sheets. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 27 06 2019. Available at: <http://www.fao.org/fishery/>

among others. Notwithstanding, the sector will remain a key component of the local economy for employment generation, foreign exchange earnings and food security, as well as to retard urban drift. The sector's contribution to employment reached 9.92% as of September 2019, down from a high of 13.76% in 2010. The sector is sensitive to climate change, and plans must ensure its resilience against the key potential impacts of increased temperatures, precipitation variability, possible land degradation (including loss of productive topsoil), and storm events.

Figure 4: Agriculture Real GDP Growth



Source: Saint Lucia Economic and Social Review 2019

1.5.4 Construction

Construction activity, in both the public and private sectors, is a significant contributor to the island's economy. Saint Lucia SER 2019 report indicates that the construction sector declined for a second consecutive year, by 0.3% in 2019, following a contraction of 13.2% in 2018. As a result, the contribution of the sector to overall GDP dipped to 3.7% in 2019 from 3.8% in 2018. This downturn was attributed to a contraction in construction activity in the private sector in addition to lower imports of building materials, as well as a fall in commercial bank loans granted for land and house developments. Public-sector construction expenditure is expected to increase significantly in 2021 and beyond, as the vision of the Government, as articulated in the Medium-Term Development Strategy (MTDS) 2020 - 2023, is to enhance the infrastructure sector to enable it to support Saint Lucia's economic activities in tourism, agriculture, retail, and trade.

1.5.5 Manufacturing

Economic growth and development in Saint Lucia owe much to the manufacturing sector. The country's industrial sector is the largest and most diversified in the Windward Islands (Dominica,

Grenada, Martinique and Saint Vincent and the Grenadines), and its products are predominantly destined for export. The manufacturing sector contributed more than 50.1 million U.S. dollars to the country's GDP in 2018, as compared to 47.3 million U.S. dollars in 2017. The sector includes beverages, light manufacturing assembly plants, producing paper and cardboard boxes, apparel, electronic components, and plastic goods. In 2019 the sector reported an average capacity utilisation of about 68% which is on par with the levels in other countries. During 2018/2019, the GOSL reported a further increase in value added in manufacturing as the sector continued an upward path with real GDP growth estimated at 8.6%, up from 6.6% in 2018. Consequently, the sector's contribution to overall real GDP moved from 3.2% in 2018 to 3.4% in 2019.

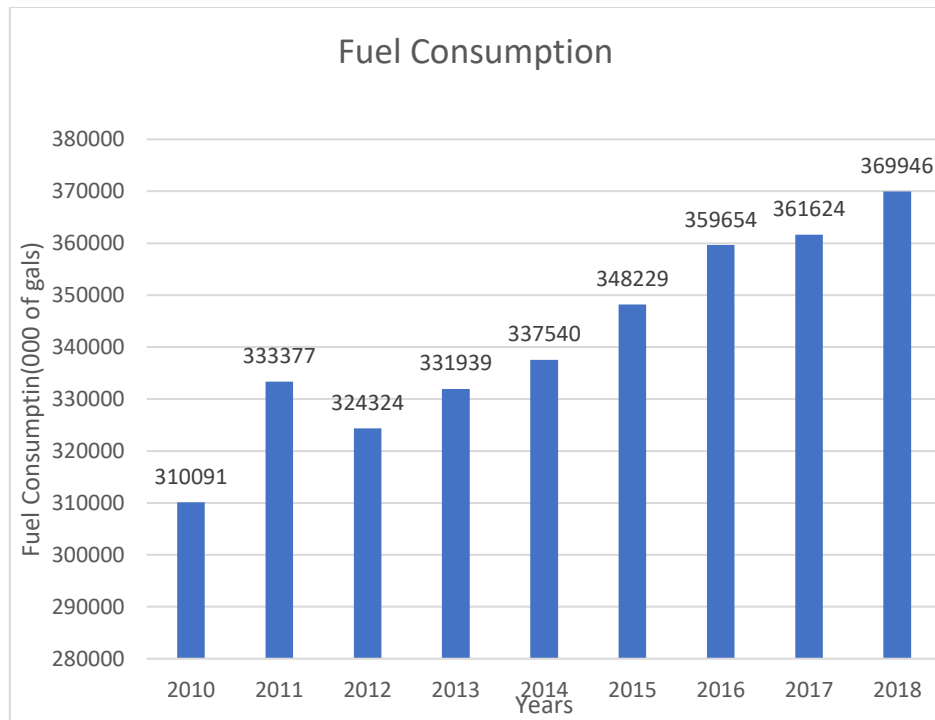
1.6 MITIGATION SECTOR: EMISSIONS, TRENDS AND ON-GOING ACTIONS

SIDS like Saint Lucia, contribute truly little to GHG emissions. The largest share of emissions is from the energy sector. The country is committed to implementing measures to grow its economy in a low carbon emission and sustainable manner. In this regard, Saint Lucia has embarked on a range of initiatives aimed at reducing its GHG emissions in several key sectors.

1.6.1 Energy Sector

Saint Lucia is a volcanic windward island, with large technical potential for geothermal, wind and solar renewable energy generation, as well as the use of solid waste generated by residents. Little technical potential for biomass or hydroelectric generation exists on the island. A biomass plant requires large tracts of agricultural land and is not economically feasible. Rivers and waterfalls on Saint Lucia do not have a base flow rate sufficient to power water turbines. The most promising hydroelectric spot is the Roseau Reservoir, which can supply 150 kilowatts (kW). Saint Lucia has no fossil fuel resources and as such, all fossil fuel products are imported from other countries, while the Hess Oil Buckeye facility stores and transfers crude oil. These products include Diesel, Liquefied Petroleum Gas (LPG), Jet Fuel and Gasoline— which are used for generating electricity, transportation (vehicular and aviation) and domestic or commercial consumption. The privately-owned Saint Lucia Electricity Services Limited (LUCELEC) is the sole electrical utility for Saint Lucia and has a customer base of more than 61,000. Demand for petroleum fuels overall has increased since 1980 at an average annual rate of close to 2.8 per cent. The fuel consumption for the island from 2010 to 2018 is shown in **Figure 5**.

Figure 5: Fuel Consumption in Saint Lucia from 2010 to 2018



Source: (World Data)

According to the International Renewable Energy Agency in 2018, renewable energies accounted for around 4% of actual total consumption in Saint Lucia up from 2% in 2017. LUCELEC the island's sole electricity provider has an installed electricity generating capacity of 88.4 megawatts (MW), with a peak demand of 62.5 MW in 2019. In 2018 LUCELEC took a major step towards embracing alternative sources of energy by commissioning the first utility-scale renewable energy system, a 3MW solar farm at La Tourney in Vieux Fort. The 6.84 million kWh of electricity produced by the solar farm reduced fuel consumption by 352,000 gallons for the year. At the end of 2019, there were 125 distributed generation (rooftop solar PV) systems connected to the LUCELEC grid which provided 1.09 MW of renewable energy capacity (LUCELEC, 2019).

Since 1994, Saint Lucia's energy policy has evolved with several important actions including promoting renewable energy production and use. These actions include:

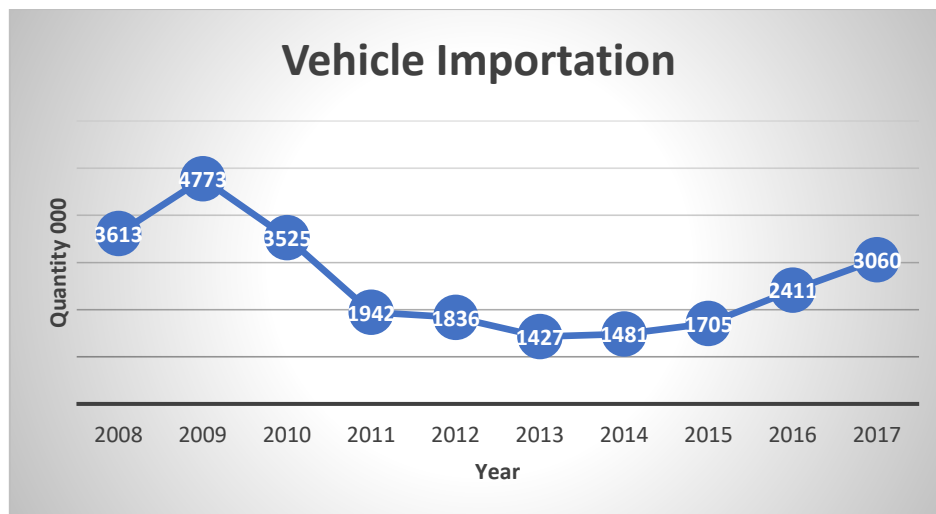
- 1994 – The Electricity Supply Act enabled the island's utility, LUCELEC, to advance the development of renewable resources through voluntary financial incentives.
- 1999 – The government waived import duties and consumption taxes on renewable energy equipment.
- 2001 – Solar water heaters became tax-deductible, and the government initiated a National Sustainability Energy Plan (NSEP), which aimed for a 35% reduction in greenhouse gas emissions by 2010.
- 2004 – A street lighting program reduced the island lighting load.

- 2005 – A Sustainable Energy Plan was prepared and a green paper on the National Energy Policy was written.
- 2002-2008 – Seven national energy efficiency labelling standards were developed, including air conditioning units, and tubular and compact fluorescent lamps.
- 2010 – The Government adopted the Saint Lucia National Energy Policy, outlining provisions to increase the use of renewable energy technologies, to offset the amount of fuel the country imports to meet its energy needs.
- 2014 – The Draft Geothermal Development Bill was prepared.
- 2014 -The 35% Renewable Energy Target by 2020 was established.
- 2015 – The Draft Revised Energy Supply Act (2015) was prepared.
- 2015 – A climate action plan was submitted to UNFCCC. This was Saint Lucia's First NDC.
- 2016 – The National Utility Regulatory Commission Bill was passed (which establishes an independent regulatory commission to regulate utility supply services including water, electricity and sewerage in Saint Lucia.
- 2018 – The GOSL in collaboration with LUCELEC developed the National Energy Transition Strategy (NETS) which was endorsed by Cabinet.
- 2018 – The Draft Revised Building Code was prepared (with the inclusion of energy efficiency measures).
- 2018 – Castries Vision 2030 was developed. The objective of the plan is embodied in this overall statement: "Making Saint Lucia's Capital a Vibrant, Resilient and Smart Heritage City for Residents and Visitors".
- 2019- The NDC Partnership Plan was endorsed
- 2021- Saint Lucia's updated NDC was endorsed and submitted to the UNFCCC

1.6.2 Transport Sector

Transportation is the largest consumer of fossil fuels in Saint Lucia. Recorded increases in vehicle imports between 1990 and 2015 display a cyclical trend, but with a longer sustained downward trajectory since 2009 (see **Figure 6**). In 2015, total recorded vehicle stock stood at 54,159.

Figure 6: Vehicle Importation to Saint Lucia



Source: GOSL Department of Statistics

Notwithstanding the growth in the number of registered vehicles, it is difficult to determine the exact number of vehicles on Saint Lucia's roads because the official databases do not contain accurate information on vehicles taken off the roads due to accidents, obsolescence, and other factors, nor do they reflect the number of unlicensed vehicles.

The public transportation system comprises privately-owned, twelve (12) to fifteen (15) seat minibuses and a smaller number of larger buses licensed by the Ministry with responsibility for transport assigned to specific routes. In 2018, the GOSL, with support from the Italian Government through co-operation on climate change vulnerability, adaptation and mitigation between the Italian Ministry for the Environment Land and Sea (IMELS) and CARICOM member states constructed a solar carport attached to the building housing the Ministry of Infrastructure and acquired three (3) demonstrative electric vehicles to promote the use of electric vehicles on the island. This decision is consistent with the GHG inventory prepared for the TNC and the pronouncement in Saint Lucia's NDC, policies and programmes to encourage the importation and use of more fuel-efficient vehicles as opposed to less efficient models.

1.6.3 Waste

The process of waste disposal can contribute to GHG emissions since waste produces mainly methane, as it breaks down. However, this is often overlooked in the context of climate change efforts. The use of efficient waste disposal systems and the reduction of the overall amount of waste generated can reduce these emissions and mitigate their impact on the environment.

The mandate for waste management lies with the Saint Lucia Solid Waste Management Authority (SLSWMA). The mission statement of SLSWMA is "to enhance Saint Lucia's environmental integrity and the health of her people through the provision and management of an integrated system of public

education and awareness, and for the collection, treatment, recycling, and disposal of solid and hazardous waste". The mandate of the Authority is enshrined in the Waste Management Act #8 of 2004, with a subsequent amendment by the Waste Management (Amendment) Act #10 of 2007. The legislation provides for the SLSWMA to "manage waste in conformity with best environmental practices and to provide for matters incidental thereto".

The SLSWMA arranges for the collection of municipal waste generated by homes and government-related institutions and does so through Private/Public Partnerships (PPPs). The SLSWMA provides a twice-weekly collection service to the entire population of Saint Lucia. In addition, the Authority provides a monthly bulky waste collection service to 100 per cent of households. The collection of commercial waste does not fall within the legal mandate of the SLSWMA. Commercial entities make provisions for the collection and transportation of commercial waste either through a licensed waste hauler or as part of their own operations. Other waste types include cruise ship waste, managed by shipping agents through private haulers, and street sweep managed by the towns and village councils.

The focus of the GOSL in waste management is to reduce the amount of waste generated, by focusing on improving waste management infrastructure, fostering the recycling sector, and bringing stakeholders together to develop solutions.

Additionally, the SLSWMA also stopped garbage disposal activities at the Vieux Fort Landfill, on October 1, 2019. The Authority has announced that this is the first phase towards a landfill-free Saint Lucia by 2030. The second phase will involve the introduction of pyrolysis units, specially designed for the disintegration of waste much closer to the various collection points, according to an SLSWMA release. The impact of the move to pyrolysis on GHG generation has not been quantified; however, it is expected there will be a reduction in GHG emission because of the associated reduction in the landfill gas generated. In addition, the by-products of the process include bio-oil, biogas, and biochar, all of which can be used to generate electricity. Biochar can also serve as a soil amendment with the associated benefit of increasing the soil water and nutrient holding capacity plus improved seed germination rates and crop yields.

Another initiative being pursued in waste management is the pilot Recycling Plastic Waste in the OECS (RePlast OECS) project, a two-year plastic recycling project which is currently being implemented by UNITE Caribbean Ltd. in Saint Lucia. It aims to set up an OECS-wide plastic waste collection and recycling system, starting with a pilot phase between Saint Lucia and Caribbean recycling plants, following a circular economy model. This project responds to a real need, as plastic waste, especially plastic bottles, have been a major source of environmental degradation for decades. The project is a joint initiative by the Government, public operators, civil society, and the private sector in Saint Lucia.

Similarly, the Plastic Waste Free Island (PWFI) Project is an initiative by the IUCN in cooperation with the Norwegian Agency for Development Cooperation (NORAD), the Governments of Antigua & Barbuda, Grenada, Saint Lucia and the OECS. The project, which began in January 2020, seeks to drive the circular economy agenda forward and to reduce plastic waste generation and leakage from the islands. To achieve this, the project has selected three plastic waste-related sectors to allow for comparison and best practice sharing. These are tourism, fisheries, and waste management. The project is expected to take place over three years (IUCN 2020).

Saint Lucia has also embarked on the banning of selected single-use plastic foodservice containers to reduce the amount of non-biodegradable and compostable material entering the landfill and the Saint Lucia environment, resulting in the Styrofoam and Plastic Food Service Containers (Prohibition) Act No. 22 of 2019 and the Styrofoam and Plastic Food Service Containers (Prohibition) (Amendment) Act No. 8 of 2020. The effective date for the restrictions of the manufacturing sale, distribution and use of styrofoam is 1st August, 2021. The effective date for the ban and importation of disposable single use-plastics (forks, trays, spoons, knives, straws, hinged take-away containers and stirrers) is 1st August, 2021 and the further restriction on their manufacturing, sale, distribution and use on 1st August 2022. This initiative encourages stakeholders involved in the sale and distribution of foodservice containers to supply more environmentally friendly, biodegradable and compostable foodservice containers with the implementation of a zero per cent import duty concession placed on biodegradable, compostable and plant-based food service containers.

The GOSL, through the Solid Waste Management Authority (SLSWMA), in collaboration with the Carbon War Room, the Clinton Climate Initiative and the Rocky Mountain Institute, (CWR/CCI/RMI), undertook a study in 2014 to determine whether a waste-to-energy solution was a feasible option as it relates to management and longevity of the landfill, and landfill diversion initiatives, including recycling and composting. The study concluded that waste generation levels and composition were unable to support this initiative.

The low levels of waste generation, coupled with the high costs associated with the collection and disposal of waste, continue to be a concern. Some of the main challenges facing the sector include but are not limited to inadequate final disposal facilities; inadequate waste disposal rates; insufficient financial resources to manage solid waste programmes; inability to deal with additional waste after disasters; and inability to deal with new waste. Notwithstanding, the island has over the last 20 years instituted enhanced programs for waste management, including its attempts at enhancing the management of hazardous waste.

1.7. NATIONAL PLANS AND POLICIES

From a national development perspective, the Medium-Term Development Strategy (2020 - 2023) represents the highest policy document as it seeks to establish a framework in which climate change issues are addressed in a cross-cutting manner.

1.7.1 Medium-Term Development Strategy (MTDS)

The MTDS is formulated to promote economic growth that is **Accelerated, Resilient, Inclusive, Sustainable and Equitably shared (A.R.I.S.E.)**. It outlines the Government of Saint Lucia's roadmap to grow the economy by 4.6% annually, over the next four years (2020-2023). The focus of the strategy is to improve the overall macro-economic position of the country and in so doing contribute to the enhancement of socio-economic conditions in Saint Lucia, through increased private investment, job creation and trade balance. Additionally, it will encourage investments in the social sectors, which will enhance the overall quality of life of citizens over the medium term, and consequently increase the Human Development Index (HDI) of the country. In 2015, cognisant of the global shift towards a sustainable development agenda which emphasises people, planet, prosperity, peace and partnership, Saint Lucia embarked on the process of crafting a new set of development pillars that embody and localize this new global policy paradigm. As a result, the MTDS is grounded in the SDGs and is anchored on seven (7) strategic development pillars to support its medium and long-term economic growth agenda. These seven strategic development pillars are as follows:

- i. Building productive capacity and expanding growth opportunities.
- ii. Building strong institutions that are a platform for growth and development.
- iii. Infrastructure, connectivity, energy - key for growth and competitiveness.
- iv. Adaptation for environmental sustainability, climate change & disaster vulnerability.
- v. Social transformation, building social resilience and social capital.
- vi. Enhancing the labour force through education, training, and workforce development.
- vii. Improving health and wellness.

The MTDS is anchored on the six (6) Key Result Areas (KRAs) which have been identified as the main drivers through which the medium-term goal of sustainable and inclusive growth will be achieved. The KRAs include three economic sectors: tourism, agriculture, and infrastructure; and three social sectors: healthcare, education and citizen security. In addition to the six KRAs, four cross-cutting thematic areas that are globally topical and locally relevant were also incorporated into the MTDS. Included in this list was climate change and disaster resilience, with the MTDS going on to note the relevance of climate change to sustainable development and what measures the Government has developed to integrate resilience and adaptation into the national planning process. Some of the climate specific plans and policies include the Climate Change Adaptation Policy, National Adaptation

Plan, and Nationally Determined Contribution. Other Climate Relevant Plans include the National Environment Policy, Revised National Biodiversity Strategy and Action Plan and Forest and Land-Use Policy.

1.7.2 National Climate Change Adaptation Policy

The Saint Lucia Climate Change Adaptation Policy (CCAP) (2015) is based on an acceptance that climate change is occurring and that it will continue to occur even if immediate steps are taken to reduce global warming. It is also accepted that the effects thereof are likely to have a profound, and in sum, adverse, impact on the economic, social, and environmental aspects of life in Saint Lucia and other SIDS. This Policy bears testimony to Saint Lucia's commitment to confronting and addressing the challenges posed by the climate change phenomenon.

The aim of Saint Lucia's CCAP is to foster and guide a national process of addressing the short, medium, and long-term effects of climate change in a coordinated, holistic, and participatory manner to ensure that, to the greatest extent possible, the quality of life of the people of Saint Lucia, and opportunities for sustainable development are not compromised. This policy guides the work of all Governmental, statutory, non-governmental and civic entities which are involved in, or which may seek to become involved in addressing climate change issues as they affect Saint Lucia. The CCAP provides a framework for addressing the impacts of climate change, in an integrated manner, across all key sectors. It also considers the fact that successfully adapting to climate change involves three interconnected processes, namely:

- Adaptation Facilitation, which entails creating the appropriate policy, legislative and institutional environment;
- Adaptation Financing, which involves putting in place measures to ensure adequate and predictable financial flows; and
- Adaptation Implementation, which entails taking concrete actions on the ground to prepare for or respond to the impacts of climate change.

1.7.3 National Adaptation Plan

In 2018, Saint Lucia completed the process for development of a National Adaptation Plan (NAP). The ten-year plan (2018-2028) serves as a means of identifying immediate, medium, and long-term climate change adaptation needs, and developing implementing strategies and actions to address those needs. The vision for the NAP is to ensure Saint Lucia and her people, their livelihoods, social systems and environment are resilient to the risks and impacts of climate change through continuous, coordinated and effective adaptation efforts. The MTDS notes that the Cabinet of Ministers, in 2018, endorsed the NAP as a symbol of the commitment of the policy directorate to the alignment of adaption planning across priority sectors and areas. (See more on the NAP in section 1.9)

1.7.4 Nationally Determined Contribution to the Paris Agreement

The NDC refers to the reduction in greenhouse gas emissions that Saint Lucia intends to achieve as a signatory to the Paris Agreement under the UNFCCC. Saint Lucia submitted its first NDC to the UNFCCC in 2015 and ratified the Paris Agreement in 2016. The 2015 NDC set a target of 16% reduction against the Business as Usual (BAU) emissions projections by 2025 and a 23% reduction by 2030 with a focus in the energy demand, electricity, and transportation sectors. Emanating from this first NDC, is Saint Lucia's Nationally Determined Contribution Partnership Plan (NDCCP); approved by cabinet in 2019. It was designed as a living document to attract coordinated donor funding to facilitate its implementation, and in so doing, respond to the emerging opportunities that will help achieve the targets of Saint Lucia's 2015 NDC.

Further to this, Saint Lucia submitted its updated NDC in January 2021 becoming the fourth country in the Caribbean to submit its updated NDC. This updated NDC reflects an increase in ambition, in mitigation, adaptation and loss and damage. A 7% reduction in GHG emissions relative to the 2010 emissions is anticipated from the energy sector (including electricity generation and transport) by 2030⁵. This is expected to be achieved through key proposed actions including efforts to harness our natural resources by way of increasing the use of renewable energy and energy efficiency technology; improving incentives and infrastructure to encourage a greater uptake in low carbon motor vehicles; improving the legislative framework; pursuing more public awareness; and encouraging strategic investment opportunities for the private sector in the transport and energy areas.

The updated NDC is accompanied by key supplements such as an Implementation Plan, Financing strategy, Pathways towards a climate budget tracking tool and Fossil Fuel Subsidy Tax Reform.

1.7.5 National Environmental Policy

The framework for environmental management is provided through the National Environmental Policy (NEP), whilst the specific directions and mechanisms for policy implementation is provided through the National Environmental Management Strategy (NEMS). The policy envisions that "Saint Lucia is a beautiful, clean, verdant and sustainably developed island state which respects and enhances the natural and built environment and conserves and shares the world's treasures with genuine appreciation and stewardship by all," and states its goal "to promote an integrated approach to the sustainable management of Saint Lucia's natural resources, and the maintenance of a healthy environment as an integral part of the country's social and economic development agenda." Main policy outcomes include:

⁵ The 2015 NDC was measured relative to a business-as-usual projection and the updated NDC is measured relative to a 2010 emissions base year.

- i. Improved policy, legal regulatory and institutional framework for sustainable development.
- ii. Diversity and productivity of ecosystems and ecological processes maintained.
- iii. Improved management of the natural and built environment, with a focus on adapting to, and mitigating the impacts of, climate change and reducing the risk of disasters.
- iv. Improved systems for managing waste and controlling pollution to enhance environmental health for optimised quality of life for citizens, protection of terrestrial and marine resources and the atmosphere.
- v. Improved generation and manage scientific data for the establishment of a knowledge platform to underpin environmental management initiatives.
- vi. Improved knowledge and awareness, attitudes, and behaviours among all sectors (private, government and civil society)
- vii. Integrated management and development of marine and ocean resources.

The NEMS seeks to implement the policy outcomes, by identifying objectives, activities, performance indicators and responsible agencies for each outcome. It was developed in 2004 and revised in 2014. However, it is yet to be approved by the GOSL.

1.7.6 The Revised National Biodiversity Strategy and Action Plan

Biodiversity can be significantly impacted by the effects of climate change, due to the stresses placed on ecosystems because of climate change impacts. Events such as changes in seasonal weather patterns or increasing severity of weather events can lead to a decrease in the biodiversity of an area as some species may not be able to tolerate sudden changes in their environment, causing them to relocate temporarily or even disappear from a habitat entirely. To address this, a revised National Biodiversity Strategy and Action Plan (NBSAP) for the period (2018 – 2025) has been prepared and was endorsed in 2020 by the Cabinet as a national policy instrument.

The NBSAP aims to achieve the mainstreaming of biodiversity into national strategies, policies, programmes, accounting, and reporting systems. The first goal of the NBSAP is to internalise and integrate biodiversity values into decision-making and national accounting to stimulate and advance national development. The principles and objectives of the NBSAP have been explicitly recognised and incorporated in the national policies, plans, and strategies described above. Also coming out of the NBSAP is the development of an enabling framework to facilitate the uptake of the Nagoya Protocol and implementation of measures to make the protocol operational in Saint Lucia.

With the assistance of several regional partners, Saint Lucia, under the GEF Funded and UN Environment and International Union for Conservation of Nature implementing initiative, has developed a draft national Access and Benefit Sharing (ABS) policy and proposed the establishment of

a multi-agency institutional structure for granting access to genetic resources and associated traditional knowledge. A multi-sectoral review committee has already been established to assess and review research and bioprospecting applications. The project has also supported the development of proposed ABS clauses for inclusion in the Biodiversity Conservation and Sustainable Use Bill. This mechanism is intended to create a formal structure that would ensure that Saint Lucia derives benefits from the use of its genetic resources (marine and terrestrial) and traditional knowledge. As such, various awareness-raising initiatives have helped to improve stakeholder understanding of this framework and the overall concepts of access and benefit-sharing. However, although legislative clauses on ABS have been drafted as part of the assistance provided under the ABS Regional project, they have not yet been enacted, and Saint Lucia has not adopted an ABS policy. Saint Lucia has also not become Party to the Nagoya Protocol. This protocol if adopted will provide greater legal certainty and transparency for both providers and users of the island's genetic resources and associated traditional knowledge. It will serve to ensure that if a genetic resource (plant, animal or microorganism) is used for research or development, any benefits obtained are shared equitably with the people of Saint Lucia.

1.7.8 Forest and Land-use Policy

More than 70% of Saint Lucia is forested and the country supports an incredibly rich diversity of wildlife. Saint Lucia's diversity of forest types supports a great variety of species, a remarkably high percentage of which are island endemics, including:

- 945 natives 'higher plants'
- 137 native ferns and club mosses
- 50 native resident birds
- 17 native reptiles
- 2 native amphibians
- 10 native mammals
- 1,400 beetles
- Over 1,000 other invertebrates

Saint Lucia's Forests and Lands Resources Department is responsible for the management of the island's forest resources and provides technical expertise on various aspects of forest management and biodiversity conservation. The island undertook a nationwide forest timber and biodiversity inventory in 2009. Some of the major achievements and findings of the inventory were: the development of a robust, user-friendly classification system for all forests and other major vegetation types on Saint Lucia, together with a new vegetation map; the discovery of well over 650 forest species not previously recorded in Saint Lucia - most of them invertebrates; and an updated and significantly

enlarged inventory of forest plants. The study also highlighted that the island's coastal dry forests are increasingly being destroyed for tourism development.

Other forest-related initiatives undertaken by the island include:

- Development of a natural resource management plan for the north-east part of Saint Lucia
- Preparation of a National Land Policy (2014)

In 2015 the island developed a ten-year Strategic Forest Plan to provide strategic guidance on how to manage the island's forests. The plan brought about a shift in how natural resources were managed and suggested ways in which the GOSL could bring more tangible benefits beyond the ecological services of the forests and transfer them to ordinary Saint Lucians who may own private forests, or maybe users of forested crown lands. The plan also involves a holistic approach to forest management, that takes both privately-owned, dry forests and the rainforest reserve into account. The plan highlighted the fact that most of the forest lands were in the hands of private individuals, some in the form of large plantations. Therefore, to encourage private landowners' preservation efforts, the Forests and Lands Department has sought ways in which conservation would also result in tangible economic benefits. In this regard, one of the aims of the department is to develop agroforestry, which is the simultaneous planting of woody trees on the same land units as agricultural crops. The aim is to provide fast-growing forest cover, which promotes not just reforestation but will also serve to reintroduce rare indigenous plants and fruits.

The production of marijuana is one of the biggest risks to Saint Lucia's forests, because of its illegal status and the need to hide it. Consequently, cultivators go into the forest to plant, threatening biodiversity with alien plants, cutting down the virgin forest as well as endangering natural flora. At least 69 native species have already disappeared.

In 2017 Saint Lucia developed a strategy to guide its effort at Reducing Emissions from Deforestation and Forest Degradation (REDD+). This initiative was developed to support the island's efforts to mitigate climate change by reducing deforestation, forest degradation, conservation of existing forests, and the enhancement of carbon stocks through reforestation and afforestation. In 2018, the Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Co-operatives in collaboration with stakeholders, undertook a Land Degradation NetZero (LDN) process, which provided operational guidance on how to define national LDN baselines and to identify voluntary targets and associated measures. The results of the analysis indicated 67.2% of the land showing early signs of decline reflected by stable but stressed conditions; 22.91% of the land recorded stable but not stressed reflected by increasing productivity conditions and 9.89% of the total area with no Land Productivity Dynamics (LPD) data. In addition, the spatial distribution of the Land Productivity

Dynamics for Saint Lucia records potential degradation on the East Coast and Northwest Coast and Forest Reserve.

To facilitate Saint Lucia's achievement of the 2030 Agenda for Sustainable Development - SDG target 15.3, Saint Lucia has established as a national target "Land Degradation Neutrality (LDN) is achieved by 2030 as compared to 2015 and an additional 15% of degraded lands of the national territory are improved (net gain)". In this regard, the island has also committed to implementing associated measures to address its land degradation process at both national and sub-national levels, to achieve a neutral (no net loss) or improved (net gain) state, with consideration given to degraded lands and critical hot spot locations.

The main direct drivers of land degradation in Saint Lucia include poor agricultural practices; deforestation; overgrazing; urbanization and resettlement; construction of roads and housing developments; unplanned development and natural causes. The indirect drivers are land tenure, population pressure, poverty, and climate change. The effects of land degradation in Saint Lucia are visible and are due to the many negative actions which affect the country. Some of these include high levels of sediment in coastal areas, increased levels of siltation of main drainage network, loss of productivity in cultivated areas, increased occurrences of landslides in areas of human settlement and a decrease of freshwater resources obtained from surface water. The GOSL has instituted several policy measures that are already contributing to achieving the LDN targets. The implementation of these targets and associated measures will serve to further affirm Saint Lucia's commitment to sustainable development and its compliance with the various international agreements it has acceded to, including the three Rio Conventions (UNCCD, UNFCCC & CBD). These Conventions seek to address issues like desertification, biodiversity and climate change amongst others and achieving the SDGs.

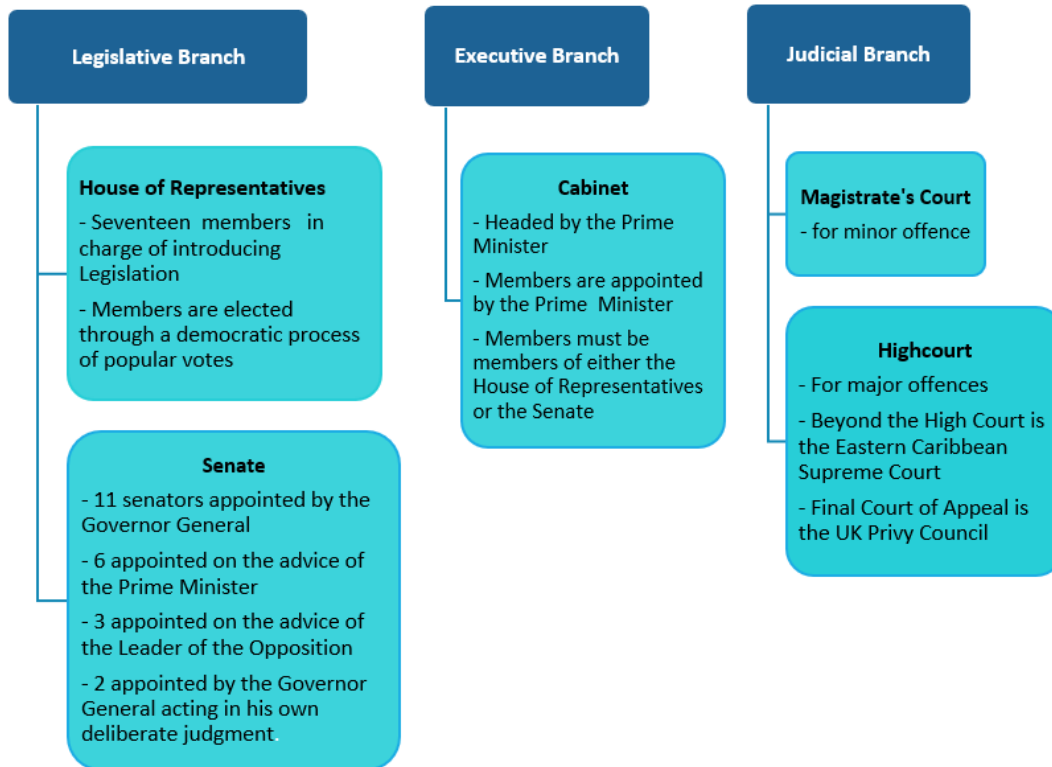
1.8. INSTITUTIONAL FRAMEWORK

1.8.1 Government

Saint Lucia has a British-style parliamentary system of government made up of a Senate (Upper House) and a House of Representatives (Lower House). The country achieved its full independent status on February 22, 1979. However, the Queen of England, as with many Commonwealth Countries, continues to be the head of State. The Queen is represented by the Governor General, who is a citizen of Saint Lucia. Elections are constitutionally due every five years. However, they could be called earlier, depending on whether the presiding government commands the vote of the majority of the Members of the House, or at the pleasure of the sitting Prime Minister. The last General Election was

held in June 2016, with the ruling party obtaining eleven of the seventeen seats. Error! Reference source not found. below depicts the structure of the Government of Saint Lucia as of 2021.⁶

Figure 7: Structure of Government in St. Lucia



Source: The Commonwealth.org

1.8.2 International Climate Commitments

Saint Lucia became a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) on June 14th, 1993 through the ratification of the agreement. Saint Lucia is required to communicate information on the actions taken or proposed to the Conference of the Parties (COP) through its National Communication and Biennial Update Report. This is a key implementation aspect of the Convention, as it enables the Parties to the Convention to be informed of each other's national level actions and serves as a basis for the COP to assess the implementation of the Convention by all Parties. Non-annex 1 parties, based on their capabilities and support received, should submit their Biennial Update Reports (BURs) by December 2014 and every two years after. As a SIDS, Saint Lucia may submit its BUR at its own discretion.

Saint Lucia became a member of the Kyoto Protocol, having signed the agreement 16th, March 1998 and ratified the agreement on 20th, August 2003. In addition, Saint Lucia ratified the Doha Amendment

⁶ <https://thecommonwealth.org/about-us>

to the Kyoto Protocol in 2018. The Kyoto protocol is based on the principles and provisions of the Convention and follows its annex-based structure. It only binds developed countries and places a heavier burden on them under the principle of “common but differentiated responsibility and respective capabilities”, because it recognises that they are largely responsible for the current high levels of GHG emissions in the atmosphere. The Doha Amendment establishes the second commitment period of the Kyoto protocol from 2013-2020.

The parties to the UNFCCC, in 2011, launched what is called the Durban Platform for Enhanced Action (ADP). The ADP presented a change with respect to the previous framework defined by the UNFCCC and the Kyoto Protocol in that for the first time all countries would have legal duties to reduce their emissions. The new binding agreement was adopted at the 21st session of the COP (COP21) in December 2015 and is known as the Paris Agreement. The 2015 Paris Agreement is a binding instrument with an objective to limit the increase in average global temperature to no more than 2 degrees, preferably to 1.5 degrees Celsius when compared to pre-industrial levels. Saint Lucia signed and ratified the Paris Agreement in April 2016.

1.8.3 Climate Change Governance Arrangements

Saint Lucia has over the years sought to create and strengthen the governance structure for climate change. There is the recognition that a strong and sustainable system of governance is important to ensure that the island can meet its SDG's as well as its obligations under the UNFCCC. To this end, one of the main objectives of the NAP is “to facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels”.

The island's commitment is reflected by the considerable progress which has been made in the integration of climate change into national policies. The enormous challenge of addressing the expected impacts of climate change is recognised as an important initiative which requires collective effort at the national level. Effective climate change action requires coordination, because it helps to avoid the duplication of effort, minimises the risk of maladaptation, and ensures the most significant needs of all national sectors and levels of society are identified, prioritised, and acted upon. Its success depends on the engagement and effort of all levels of government, industry, and civil society, and as such, planning and implementing adaptation is a national endeavour.

The responsibility for implementing and complying with the UNFCCC resides with the agency with responsibility for coordinating climate change efforts, which is presently the Sustainable Development and Environment Division (SDED) of the Department of Sustainable Development (DSD), currently housed under the Ministry of Education, Innovation, Gender Relations and Sustainable Development.

To ensure the mainstreaming of climate change issues into national development, as well as to create greater national ownership, the Cabinet of Ministers of the GOSL established the National Climate Change Committee (NCCC) in 1998 and entrusted it with the responsibility of overseeing the implementation of national actions to address climate change. The NCCC is a multi-sectoral advisory body that supports and facilitates the implementation of climate change-related actions of interest nationally and for various sectors. The NCCC comprises representatives of public, statutory, academic, and private sector bodies, and may co-opt other members on an 'as-needed' basis. The secretariat for this committee resides within the Department of Sustainable Development. The NCCC meets periodically as a formal committee, but members are constantly involved in guiding the climate change effort, electronically and in person, via specific programmes, projects, and activities. In its NAP coordination role, the NCCC will:

- Play a more critical role especially on financing matters to support the NDA of the GCF through readiness arrangements.
- Provide advice and guidance on the implementation of the NAP.
- Facilitate coordination of cross-sectoral adaptation interventions.
- Facilitate information and data sharing across ministries and stakeholders.
- Coordinate public communications and awareness-raising efforts on adaptation activities that involve various sectors, including the NAP.
- Facilitate the identification of emerging sectoral and national policy and public investment entry points for the integration of climate change adaptation considerations.
- Guide, promote and facilitate the inclusion of sectoral adaptation priorities in national policy and at national decision-making levels.
- Support non-state actor (including community and private sector) engagement in national adaptation initiatives.
- Coordinate and support resource mobilisation efforts for the implementation of NAP cross-sectoral adaptation measures.
- Support the creation of new, and strengthening of existing, partnerships for climate-resilient development.
- Promote coordination and synergy with other national and regional climate change and development projects, and other multilateral environmental agreements.
- Track activities conducted by the relevant stakeholders, contribute to achieving the objectives and outcomes of the NAP, even if these activities occur outside of the scope of the NAP or in sectors that were not targeted for the corresponding NAP cycle.

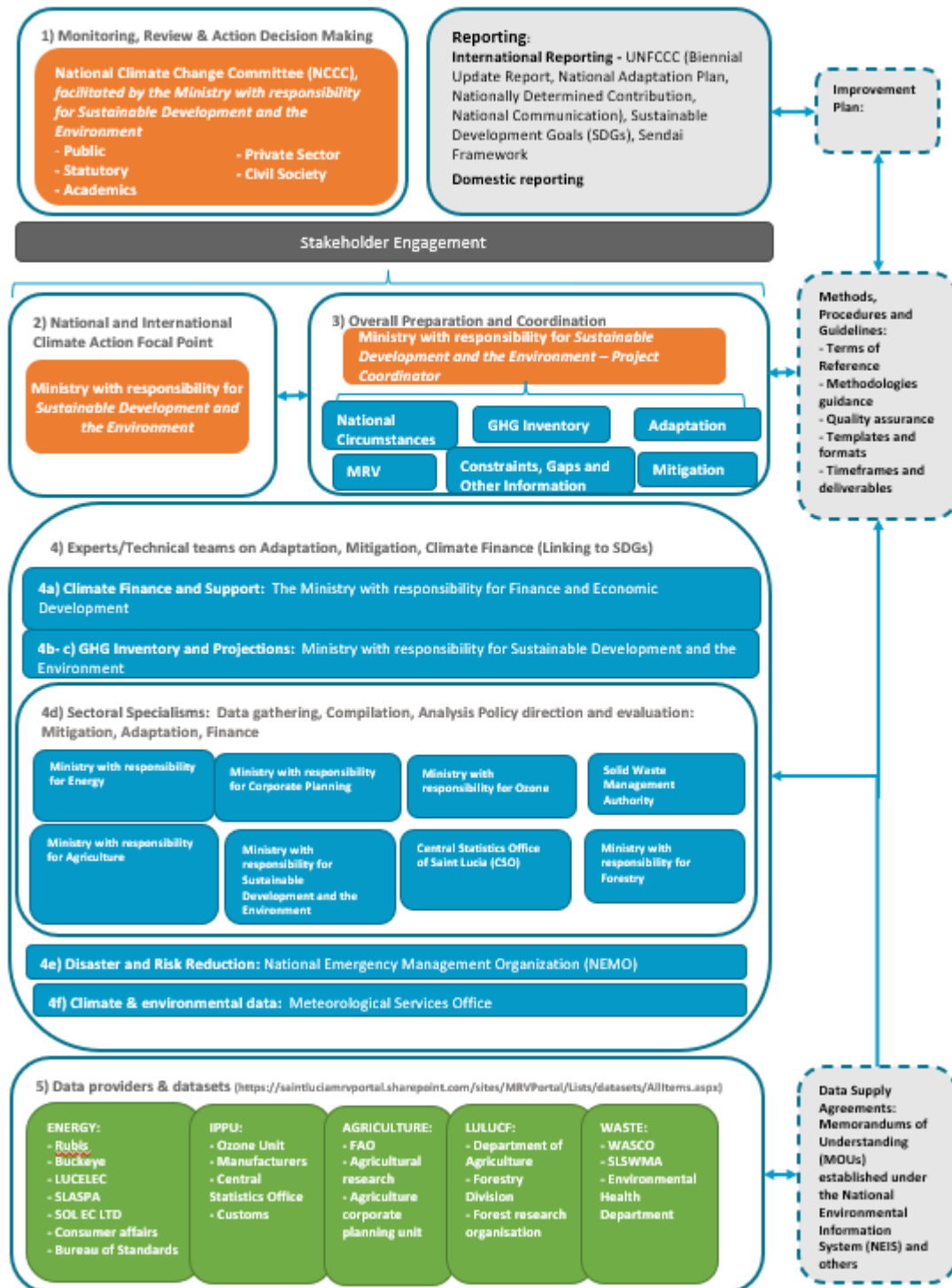
- Lead the process of monitoring and periodic review of NAP implementation progress, promoting best practices and steering the process to incorporate activities to solve unforeseen problems and gaps that might jeopardise the NAP's ability to achieve its goals, including funding opportunities.
- Lead the NAP implementation evaluation at the end of 2028.
- In advance of the expiration of the 2018-2028 NAP cycle, lead all necessary preparations for the formulation of its successor.

To support the institutional arrangements, the GOSL has created a robust policy and legal framework to support reforms, which will result in net greenhouse gas emissions reduction. Where required, a review of relevant policies and legislation will be undertaken to ensure that stronger implementation possibilities are explored.

1.8.4 Institutional Arrangements Relevant to the Preparation of the National Communications (NCs) and Biennial Update Report (BURs) on a Continuous Basis.

Saint Lucia has submitted three NCs to the UNFCCC; the INC in 2001, the SNC in 2012 and TNC with a National Inventory Report (NIR) in 2017. Financial support for all three NCs were provided by the Global Environment Facility (GEF). The Department with responsibility for the Environment, within the GOSL has coordinated all three reports and is presently SDED, within the Development DSD. The SDED coordinated the first BUR and is currently in preparation mode for the fourth NC. The SDED is currently setting up the institutional arrangements for regular preparation of NCs and BURs/BTRs. The overall institutional arrangement for reporting is depicted in **Figure 8**.

Figure 8: Organisational arrangement for the Preparation, Monitoring and Reporting of NC's and BURs



The Ministry with responsibility for Sustainable and the Environment, currently DSD, is responsible for compiling and submitting the NC and the BUR. This process is coordinated through the Climate Change

Team of the SDED and the cabinet approved National Climate Change Committee (NCCC)⁷. The roles, functions, and composition of the NCCC are included in the draft Climate Change Bill (2018) and in Annex 1. The draft Climate Change Bill (2018) also highlights the responsibilities of the SDED as it relates to reporting, preparing GHG inventories and setting GHG emission reduction targets and policies.

The Project Coordinator situated within the SDED oversees the overall preparation of the NC and BUR reports; this individual also coordinates the technical teams for compilation and review of these reports.

Data providers supply information to the technical teams and the Project Coordinator; all data received will be stored in the NEIS system and the MRV portal.

Draft reports are submitted to SDED for review and stakeholder engagements; the SDED then in turn submits to NCCC for additional review. Once a final review is completed and the reports are approved by the SDED, The SDED submits the final approved reports to UNFCCC.

1.8.5 Climate Change Legislation

As part of its efforts to strengthen the institutional framework for climate adaptation and mitigation, the Government of Saint Lucia received assistance from the OECS, under the Global Climate Change Alliance (GCCA) project for the development of a Climate Change Bill. That Draft Climate Change Bill which is now with the Attorney General seeks to:

- Develop a comprehensive framework to address climate change, including mitigation, adaptation and loss and damage.
- Allocate and coordinate legal and administrative responsibilities for climate change response within the State.
- Support embedding climate change considerations into existing and new sectoral laws, policies, strategies, plans, standards, programmes, and projects.
- Institute measures to reduce the vulnerability of the country's population and ecosystems to the adverse effects of climate change.
- Create a process to set greenhouse gas emissions reduction targets and maintain a greenhouse gas inventory.
- Facilitate compliance with regional and international climate change agreements to which Saint Lucia is a party.
- Continuously educate the public about climate change strategies; and

⁷ the NCCC comprises of representatives of government, quasi-governmental and non-governmental entities

- Promote low-carbon, climate-resilient development.

As part of its work plan for the year 2021, the DSD will be seeking to have this Bill approved by the Cabinet before going to Parliament for approval and assent by the Governor General.

1.8.6 Climate Finance Coordination

As a small island developing state, Saint Lucia is particularly vulnerable to the impacts of climate change and faces specific capacity constraints and circumstances. Climate change is one of the major threats to the country's ability to meet its developmental goals. However, the island's GDP and economic performance make it unlikely for the island to secure the resources required to address climate change impacts solely through local funds. This is further complicated by the country's international ranking as a middle-income country, which disqualifies the island from accessing some concessional financing.

This type of financing is based on GDP and not on the ability of the country to cope with an environmental disaster caused by extreme climate hazards change. This system represents an abandonment of the "polluter pays" principle and places a significant burden on the country to address a challenge which it has not caused and has no resources to address. The island is therefore duty-bound to mobilize significant international technical and financial resources to address climate change and its impacts. To this end, the GOSL has developed two financing strategies for the implementation of adaptation and mitigation actions. These strategies present a framework for accessing funding, identifying potential sources as well as establishing priority areas for funding. The GOSL has determined that these resources will come in a variety of forms (financial and non-financial); and from a variety of sources, including public, and private, and national and international, as follows:

- 1 International finance sources: - This includes both multilateral funds, such as the Green Climate Fund (GCF), the Global Environmental Facility (GEF), the Adaptation Fund (AF) and the World Bank (WB), —as well as bilateral support provided by individual countries, or groups of countries like the European Union. Saint Lucia has received adaptation support from Japan, Spain, Australia, the Republic of Korea, Canada, and the United Kingdom, for disaster prevention and preparedness, as well as general environmental protection (Atteridge, Canales & Savvidou, 2017). Saint Lucia is also involved in several regional projects for adaptation, including an ecosystem-based adaptation (EBA) facility; Climate Risk Adaptation and Insurance in the Caribbean (CRAIC); Enabling Gender-Responsive Disaster Recovery, Climate and Environmental Resilience in the Caribbean (EnGenDER) and a previous project to expand insurance related to medium-level weather extremes under the German Federal Environment Ministry (BMU, 2019). The German Federal Ministry for Economic Cooperation and Development (BMZ) is also a contributor to the NDC partnership and is supporting Saint Lucia in its efforts at achieving its climate goals. Saint Lucia is

also a beneficiary under several CARICOM and OECS led projects including the Caribbean Community Climate Change Centre (CCCCC).

- 2 Domestic public resources: - Saint Lucia has and continues to fund climate adaptation actions utilizing the country's resources. According to the International Monetary Fund (IMF), in 2016-2017 Saint Lucia's national budget included investments of XCD 325.9 million (USD 120.3 million), of which XCD 83.8 million (USD 31 million) was directed toward adaptation-related projects, or which comes out to approximately roughly 2% of GDP. Maintaining or increasing these levels of investment in adaptation would allow Saint Lucia to make substantial advances in resilience building and help demonstrate the country's commitment when approaching international partners.
- 3 Private sector financing: - The GOSL has also determined that private financiers and enterprises can make an important contribution to climate change adaptation and mitigation if adequately engaged and if they are adequately incentivised to invest in adaptation and mitigation from both a business and a corporate social responsibility perspective. The island has extremely limited information available on existing investment in climate adaptation and mitigation by its private sector, and most of the information gained thus far is anecdotal. Recognising the potential and the limited engagement of this sector to date, the GOSL has prepared a Private Sector Engagement Strategy under its NAP process (GOSL, 2020). This also included a mapping of private sector actors within Saint Lucia, which is expected to provide valuable input into the broader development of a NAP Financing Strategy for Saint Lucia.

Box 1 - Saint Lucia Climate Finance Strategy and National Adaptation Plan 2018 - 2028

The GOSL has, as part of its Climate Financing Strategy under the NAP process, determined that the process to access climate finance will be an ongoing iterative process involving a variety of steps:

- i. Defining funding priorities – The Government of Saint Lucia will need to maintain an iterative process of developing and updating funding priorities based on their priority in the NAP (short-term, medium-term, and long-term).
- ii. Soliciting and/or developing project/programme concepts – Once priorities have been identified, these need to be translated into project concepts that lay out the project and its objectives. How this occurs will depend on the nature of the project/priority. Line ministries or other key actors (such as fund intermediaries) may be requested to take the lead, or project/programme ideas may be solicited by the private sector or others.
- iii. Aligning concepts with funding sources – Alignment of project concepts with appropriate sources of funding will involve a review of nationally available resources, identification of available sources of international finance, and consideration of the appropriateness of private sector finance.
- iv. Elaborating full proposals – Once funding sources have been identified, proposals will be developed (as appropriate), these proposals will typically include feasibility studies and risk assessments and the requirements will be stringent if international public finance is being sought.
- v. Approving projects – Project ideas will then be submitted to appropriate authorities. For international climate finance requests, this will involve submission to the multilateral or bilateral source. For projects with a national budget component, this will require adherence to the budget process.
- vi. Implementing projects – Projects that are approved will then be implemented by the relevant entities and/or accredited intermediaries and executing entities.
- vii. Monitoring and evaluating project implementation – Once projects are in the implementation phase, their progress and impact will be monitored and reported on. Saint Lucia's NAP Monitoring and Evaluation plan (GOSL, 2018) provides a framework for reviewing the implementation of the NAP process.

These steps are presented as a cycle to represent the iterative nature of the process. However, lessons learned from each step of the cycle will be used to inform the next iteration. Financing of the next set of NAP priorities should not wait for the completion of the approved projects.

In addition to the cyclical series of activities identified above, there are several other activities that the GOSL will undertake to enhance the effectiveness of its efforts to address climate finance. These will occur on an ongoing basis, and include the following:

- i. Engagement with the private sector – This will be guided by the Private Sector Engagement Strategy and will be an ongoing process and consistent with their engagement as partners in NAP implementation and financing processes.
- ii. Strengthening relationships with accredited entities, implementers, and other relevant entities – Accessing international climate finance requires engagement with key entities who are well-placed to implement the types of activities identified in the NAP. This will mean developing and/or strengthening relationships with a wide variety of actors.

- iii. Enhancing accredited entities' capacity for project origination, development, and management, for national direct access/implementing entities –In this regard, the GOSL will continue to work with their domestic accredited entities to the GCF, to help improve their capacity to access funds for Saint Lucia.
- iv. Improving capacity to track and monitor public expenditure on climate resilience – Saint Lucia currently lacks a broader approach for tracking public investment in climate change adaptation. Tracking such expenditures will assist in raising awareness and understanding of climate change, mobilising resources (by demonstrating national commitments to adaptation) and improving monitoring and reporting of climate change policy and progress.
- v. Training relevant actors to effectively solicit and use climate finance – As per NAP measure, the National Climate Change Committee (NCCC), through the Department of Sustainable Development (DSD) and in collaboration with the Department of Economic Development, Transport and Civil Aviation (DEDTCA), will deliver hands-on climate finance training to relevant stakeholders.

Saint Lucia has accessed the GCF's Readiness and Preparatory Support Programme to strengthen the capacity of its National Designated Authority (NDA) and other national stakeholders. Saint Lucia's first readiness grant was awarded in 2018. The primary objective of that grant was the development of a Strategic Framework for accessing climate finance and development of a Country Programme for the GCF. In addition to capacity building on climate finance fundamentals, Saint Lucia launched its national Country Programme and submitted the document to the GCF in December 2020. To date, Saint Lucia has five prioritised concept notes in its GCF projects pipeline. Two project concept notes (Enhancing the Climate Resilience of the Water Sector in Saint Lucia and Implementing the Saint Lucia Fisheries SASAP) have been submitted, with others at various stages of development. These projects are:

- i. Creating a Low-Carbon and more resilient Health Sector in Saint Lucia; Creating a Greener and More Resilient Health Sector in Saint Lucia
- ii. Green Affordable Housing for All
- iii. Castries Vision 2030 – Low-Carbon and Resilient Downtown Castries (Focus on the City)

In addition, readiness support has been prioritised to strengthen information gaps and facilitate the advancement of these concept notes towards final submission.

While "Electric Mobility" and "Green Schools Nationally Appropriate Mitigation Actions" are also in the pipeline and were recognized as important areas during the Country Programme review process

and stakeholder consultations, to date these concept notes have not yet been advanced through the GCF process.

In addition, Saint Lucia is already in consultation with the GCF on another project and has been awarded its second readiness grant, with the support of the Caribbean Community Climate Change Centre as Delivery Partner. This second readiness grant will support the NDA in further strengthening its national capacities, including the digitisation of systems and processes for more effective coordination of climate finance and the development of a comprehensive climate finance Monitoring, Reporting and Verification (MRV) system. The initiative will also seek to develop a long-term vision for future readiness priorities and needs with the goal of developing a multi-year readiness programme, through a multi-stakeholder, structured dialogue process, that will respond to the needs of long-term climate strategies, plans, information gaps and challenges, including those identified in Saint Lucia's revised NDC and through its NAP processes, among others. Saint Lucia also intends to access readiness support for the enhancement of the NAP through the development of additional Sector Adaptation Strategy and Action Plans (SASAPs) for the remaining priority NAP sectors (education, health, infrastructure & spatial planning, plus a revised Tourism SASAP) and support towards capacity building and awareness-raising initiatives through the implementation of actions identified in the Private Sector Engagement Strategy under the NAP process.

Saint Lucia is also in consultation with accredited entities regarding the development of several regional projects/programmes and readiness initiatives that are currently at different stages of advancement. These are focusing on building the resilience of several sectors that align to Saint Lucia's priorities, including water resources management and efficiency, health, agriculture, and regional climate finance mechanisms. The NDA is also providing support to the Saint Lucia Development Bank to assist it in seeking to become an accredited agency to the GCF.

1.9 CLIMATE CHANGE PRIORITIES

The 2015 CCAP, outlines the general strategy for reducing the risks posed by climate change to the island. It seeks to "ensure that Saint Lucia and its people, their livelihoods, social systems, and environment are resilient to the risks and impacts of climate change."

In keeping with this policy, Saint Lucia developed the NAP (2018-2028) which serves as Saint Lucia's roadmap for the coordination and implementation of climate adaptation actions at the national level. The NAP includes cross-sectoral and sector-specific adaptation plans for eight key sectors.

The adaptation measures included in the NAP have been formulated to address identified needs and to directly contribute to the achievement of a series of strategic objectives. These include 6 cross-

sectoral and 26 sectoral outcomes and 2 overarching NAP goals, considered essential for Saint Lucia to realise its NAP vision and impact, and the objectives of the CCAP.

The prioritised sectors are:

- i. Water
- ii. Agriculture
- iii. Fisheries
- iv. Infrastructure and spatial Planning
- v. Natural Resource Management (coastal, marine, and terrestrial)/Resilient Ecosystems
- vi. Education
- vii. Health
- viii. Tourism

Along with the NAP, the Government of Saint Lucia developed SASAPS and associated supplements. To date, SASAPS have been developed for Water, Agriculture, Fisheries and Resilient Ecosystems. Efforts are underway to develop SASAPS for Infrastructure, Health, Education and to update the National Strategy and Action Plan that was developed with the Ministry of Tourism in 2015.

1.9.1 Water

Saint Lucia's rapidly increasing population and growing tourism sector, have in the past, contributed to significant increases in surface water withdrawal and consumption. It has been determined that Saint Lucia has a 35% water supply deficit (NAP 2018-2028) and as much as 56% of the water produced is lost as non-revenue water (NRW) due to factors such as leakages in the distribution systems, authorised unbilled consumption (e.g., mains flushing, water used for fire-fighting purposes and other operational uses), meter errors, errors in the estimate of unmetered use, and illegal use e.g., illegal connections. Climate change poses increased risk to the water supply as it impacts the global hydrological cycle and many of its most visible impacts is the disruption of the water supply. These impacts include changes in precipitation, runoff and streamflow patterns, an increased frequency of intense rainfall events and flooding, and frequent tropical storms, more severe droughts, and Sea Level Rise (SLR), all of which exacerbate current vulnerabilities and threaten development gains. It must be further noted that the need for adaptation in the water sector is not limited to freshwater supply. In recent years, the impact of floods as well as poor wastewater management are also important considerations, Development that has increased impervious surface cover and constricted drainage also contributes to this vulnerability.

Saint Lucia has undertaken several adaptation initiatives between 2012 and 2017 to help the island combat these threats. These measures, though significant, must be sustained and strengthened if the existing vulnerabilities in this sector are to be reduced. To this end, the SASAP for this sector that was

developed in 2018 has identified 70 adaptation measures deemed critical for improving water resource and service management and reducing water-mediated climate change impacts in the country. The measures have been endorsed by relevant stakeholders and addresses issues of the technical, institutional, financial, regulatory and policy limitations hampering adaptation in the water sector.

The Water SASAP has been designed as a 10-year framework for action to reduce water-related risks induced by climate change and climate variability in Saint Lucia. It also seeks to build capacities of relevant actors for facilitating the sustainable management of water resources and the adequate supply of water and wastewater services under current and future conditions. The Water Sector SASAP seeks to institute measures which are expected to contribute to four major outcomes, namely:

- i. Enhanced enabling environment and improved behaviour for water-related climate adaptation action.
- ii. Increased water access, availability, and quality.
- iii. Increased water efficiency and conservation.
- iv. Strengthened preparedness to climate variability and extremes.

The Water SASAP which forms part of Saint Lucia's wider policy response to climate change, builds on previous efforts and projects and is the product of a highly consultative process which gained impetus in May 2017. In addition, the island developed a wastewater management strategic plan in 2017 which further supports the water sector's response.

A water sector GCF programme concept was developed in coordination with the Caribbean Development Bank (CDB) and has been submitted to the GCF. This project includes proposed energy efficiency and renewable energy integration in measures for the water sector, a revolving fund for adaptation, efforts to enhance the resilience of water supply, and efforts to build the awareness and adaptive capacity of the Saint Lucia Water and Sewerage Company (WASCO) and its consumers.

A significant percentage of the operational cost of WASCO is directed to payments for electricity for water pumping, wastewater and water treatment, transport of water and water losses. In Saint Lucia's NDC Partnership Plan, several projects and activities have been implemented or have been planned with the aim of reducing the operational cost and fossil fuel consumption of WASCO. These projects include:

1. In 2018, WASCO with financial support from the CDB carried out a comprehensive Energy Audit at its island wide facilities. This Energy Audit report listed several energy efficiencies measures (EEM) and renewable energy options (REO) whose implementation could help WASCO to reduce its electricity cost.

2. In 2018 under the leadership of Saint Lucia's Water Resource Management Agency and supported by the CDB, an application entitled 'Enhancing the Climate Resilience of the Water Sector in Saint Lucia' was prepared for submission to the Green Climate Fund (GCF).
3. In 2020, a Prefeasibility Study entitled 'Assessment of Solar Photovoltaic Electricity Generation Options on WASCO's Water and Wastewater Treatment Facilities in Saint Lucia' financed by the EU Technical Assistance Project Technical Assistance Programme for Sustainable Energy in the Caribbean (TAPSEC) was completed. This study concluded that a total electricity generation capacity of 5.8 MWp could generate approximately 9,000 MWh of renewable electricity and thus cover approx. 80% of its annual electricity requirements based at an electricity consumption rate in 2017 and without consideration for storage options. With the installation of this PV capacity, WASCO would significantly reduce its carbon footprint. Annual greenhouse gas emission savings would amount to more than 6,000 tons of CO₂e per year. It is expected that the energy legislation which is under review will facilitate the installation and utilization of the proposed generation capacity.

1.9.2 Agriculture

This sector is highly vulnerable to the impacts of climate-related hazards, including drought, flooding and other weather extremes (including tropical storms), causing substantial damage and exacerbating soil degradation (erosion) processes. Climate change is expected to affect Saint Lucia's agricultural production in several ways, including through the direct effects of increasing temperatures, changes in precipitation patterns, increasing storm intensity (and flooding) and high winds on crop production. Climate change could also increase the incidence of pests, weeds and disease as well as negatively impact crop yields. In 2018 the GOSL developed a SASAP plan for this sector intending to achieve the following:

- i. Enhanced enabling environment for climate adaptation action in the agriculture sector.
- ii. Enhanced nutrition, food availability, quality, and security through adaptation in the agriculture sector.
- iii. Strengthened partnerships for scaling up climate-resilient agriculture.

The GOSL has taken other concrete measures to address this sector's needs, and, in this regard, a multi-component project was developed, submitted, and approved by the Adaptation Fund (AF) Readiness Programme for Climate Finance in 2019. This project entitled, "Building Resilience for Adaptation to Climate Change and Climate Variability in Agriculture in Saint Lucia" includes three components: building resilience and sustainability of farming systems through interventions for water security, soil conservation and management; integration of renewable and other energy-efficient practices in intensive agriculture value chains; and knowledge management and transfer to improve

adaptive capacities. Within the AF programme, significant support is provided to address several of the priorities identified in the concept notes developed for the Agriculture SASAP. These include strengthening the capacity of agriculture extension officers, establishing climate-resilient agriculture demonstration centres, developing alternative water solutions for building climate resilience in vulnerable groups dependent on rain-fed farming (rainwater harvesting systems, conservation, and protection of water resources, and agricultural diversification) and agro-processing.

1.9.3 Fisheries

Saint Lucia's fisheries will also be affected by climate change. The potential impacts include damage and loss of vital fish nursery and breeding habitats (coral, mangrove, and seagrass ecosystems) with a consequential decline in reef fish densities. This has already been reported as a noticeable change in the fishing sector. Additionally, the predicted increase in sea temperature may drive pelagic species away from the tropics in search of cooler temperatures and could potentially alter breeding and migration patterns. Other climate-related concerns of the sector are an increase in the frequency of algal blooms that can contaminate some seafood species, as well as stronger winds, rainfall events and hurricanes which will increase risks to fishermen.

The impact of climate change on this sector is significant as Saint Lucia's marine environment and fisheries are important contributors to the country's lifestyle and cultural heritage, with commercial fishing forming a large part of the social fabric and economy of many coastal communities. It should also be noted that although the contribution of fisheries to GDP is less than 1%. The fisheries sector is an important contributor to livelihoods and food security since it is an important source of employment and income for rural fishing communities island wide. Fisheries provide the livelihood for 1,170 fishing households and support other important industries, such as tourism, which depends on fisheries to stock hotels and restaurants. Saint Lucian fishers are still engaged in traditional fishing methods like trolling, netting and pots, using manually operated trolling gear and long lines, set from small (5-9 m) fiberglass pirogues and wooden canoes and they target multiple fisheries.

The GOSL in 2018 developed a Fisheries SASAP in 2018, which has been designed on a similar 10-year framework as under the NAP process, with the aim of strengthening the sustainability of Saint Lucia's fisheries and fishery-dependent businesses, food security and livelihoods under a changing climate. This SASAP consists of 31 adaptation measures deemed critical for building resilience in the country's fisheries and fishery-dependent livelihoods and seeks to:

- i. Enhance the enabling environment for climate adaptation action in the fisheries sector.

- ii. Enhance nutrition, food availability, quality, and security through adaptation in the fisheries sector.
- iii. Strengthen partnerships for building sustainable and resilient fisheries in a changing climate.
- iv. Strengthen preparedness to climate variability and extremes in the fisheries.

Coming out of the Fisheries SASAP is the preparation of a GCF adaptation readiness proposal, to enhance national capacities to prepare a broader Concept Note to be submitted to the GCF. This concept note will highlight the need for increasing capacity of persons involved in the fisheries sector to manage climate risks, strengthening freshwater aquaculture and marine aquaculture; pilot testing climate-resilient and fuel-efficient fishing fleets; and piloting water and feed-efficient aquaculture systems, among other elements.

1.9.4 Infrastructure and Spatial Planning

Approximately fifty-eight thousand nine hundred (58,900) households of the island are located within 10 km of the sea,⁸ along the coast or inland along ridgelines, spurs, and plateaus. In addition, approximately half of the population lives in and around Castries, the island's capital, which is a low-lying city heavily affected by flooding. Saint Lucia's vital infrastructure, including its major road and bridge networks, airports and seaports, medical facilities and tourism developments are also situated in low-lying terrain and are directly adjacent, or extremely near, to coastal areas. The island's urban centres are also located primarily within harbours and bays, and or associated with a watercourse.

Saint Lucia prioritised nineteen (19) infrastructure related projects for funding under the Disaster Vulnerability Reduction Project (DVRP). The Project works are being undertaken throughout the island and focuses inter alia on the rehabilitation and reconstruction of existing road infrastructure, retrofitting of key health and education facilities and new facility construction, geotechnical studies, and engineering supervision for slope stabilization along critical road segments and river defence works.

The GOSL continues to designate this sector as a priority sector for climate adaptation and is working towards developing a SASAP to build on the efforts made in the past. The SASAP will seek to achieve four key outcomes from the adaptation measures as defined in the NAP, which will be implemented.

These are:

- i. Enhanced enabling environment for climate adaptation in infrastructure and spatial planning.

⁸ GOSL. (2016). National Circumstances Report for the Third National Communication to the UNFCCC.

- ii. Strengthened infrastructure to withstand climate impacts.
- iii. Enhanced infrastructure-based climate adaptation.
- iv. Strengthened preparedness to climate variability and extremes.

1.9.5 Natural Resource Management (Coastal, Marine and Terrestrial)

Saint Lucia has established an extensive policy framework to guide national action on a wide range of environmental and sustainable development issues. The general approach has been the formulation of policies to address specific areas, however, there have also been attempts to address environmental management from a more holistic standpoint. The policy measures which have been adopted include the National Environment Policy (NEP) and the National Environmental Management Strategy (NEMS) (2004) and the 2015 CCAP. These measures have set the stage for implementing an integrated response to the impacts of Climate Change on the island's natural and built environment. Other relevant instruments include the National Water Policy, the National Land Policy, Resilient Ecosystems Adaptation Strategy and Action Plan (REASAP) (2020–2028) and the National Biodiversity Strategy and Action Plan. The critical importance of the island's biodiversity to its sustainable development is recognised as such the GOSL have established three actions which will be instituted to assist it in its climate adaptation:

- i. Enhanced enabling environment for Ecosystem-based adaptation and natural resource management under a changing climate.
- ii. Increased ecosystem quality and coverage.
- iii. Strengthened ecosystem-based adaptation.

1.9.6 Education

Education discontinuity occurs during and after extreme hydrometeorological events, such as when schools close due to emergencies that may or may not directly affect school facilities (for example hurricanes); or simply when the water supply is disrupted due to extended dry periods; or because of high levels of siltation in reservoirs after strong rainfall events, all of which may become more common as global warming progresses. At the same time, school facilities often double as emergency shelters, protecting vulnerable groups during climate-related disasters.

Effective national adaptation demands high quality formal and non-formal climate change education, based on up-to-date information and reaching all country residents. This requires flexibility and the capacity to update learning materials, periodically train teachers, journalists, social communicators, and other groupings that can help disseminate and tailor key messages to the various segments of society.

Climate change adaptation in the education sector involves taking the necessary steps to safeguard education continuity; retrofitting and building the climate resilience of education facilities; continuously updating the knowledge transferred; and ensuring that all members of society receive, in a systematic manner, the information they need to make informed decisions. This entails taking necessary steps such as:

- i. Enhancing the enabling environment for climate adaptation education
- ii. Improving and expanding climate change education as the basis for effective adaptation
- iii. Enhancing professional capacities for leading future climate adaptation planning and implementation
- iv. Strengthening preparedness for climate variability and extremes weather events

1.9.7 Health

Saint Lucia has many endemic and environmentally sensitive disease vectors. It has also been anticipated that higher temperatures and changes in rainfall patterns in Saint Lucia may lead to increased heat waves, floods, storms, fires, and droughts. These, in turn, could increase the incidence of injuries, vector, water, and food-borne diseases such as *schistosomiasis*, and cholera, dengue, *Leptospirosis*, and yellow fever. Malnutrition, respiratory diseases, and cardio-respiratory diseases could also see higher incidence rates. The WHO⁹ has determined that many of the public health gains that have been made in recent decades are at risk of being undone due to the direct and indirect impacts of climate variability and climate change. Additionally, a 2011 study commissioned by the Economic Commission for Latin America and the Caribbean (ECLAC) in 2011 estimated that without adaptation measures being put in place for supporting health care, the cost of increased morbidity and mortality due to climate change in Saint Lucia could reach USD 182.4 million per year by 2050. As such priority actions have been identified for the sector with a view to:

- i. Enhance the enabling environment for health-related climate adaptation action.
- ii. Improve public health under a changing climate.
- iii. Strengthen preparedness to climate variability and extremes.

1.9.8 Tourism

Major tourism developments and environmental attractions in Saint Lucia are concentrated along the coast, exposed to rising sea levels, coastal erosion, high winds, high energy waves and storm surges. In addition, Saint Lucia's economy depends primarily on tourism, a sector that places great demands

⁹ WHO et al (2019) HEALTH & CLIMATE CHANGE COUNTRY PROFILE 2020 Small Island Developing States Initiative, (Saint Lucia's profile)

on energy, water, and environmental resources. This means that this sector must receive attention to strengthen its economic resilience. In 2015, a National Strategy and Action Plan for the Tourism Sector was developed by the GOSL in collaboration with the CCCCC. Some of the measures presented in this document, which have not yet been implemented, are included in the NAP (2018-2028) to ensure coordination and coherence with the other seven sectors. The NAP has outlined measures which will ensure a viable and productive tourism sector through direct interventions and collaborations and synergies with all other sectors. To this end, the measures which will be implemented include:

- i. Improved policy, legal, regulatory, and institutional framework for the tourism sector.
- ii. Improved technical and institutional capacity for the tourism sector.
- iii. Enhanced and improved training and awareness about climate change and the tourism sector.

In 2018, the project “Transforming tourism value chains in developing countries and Small Island Developing States” was launched to accelerate more resource efficient, low carbon development. This 4-year project aims to reduce GHG emissions and improve resource efficiency in key tourism sector value chains with high resource use i.e., accommodation, food & beverage, and meetings, incentives, conferences, and events. In this regard an assessment of the sectors value chain as well as the undertaking of activities aimed at increasing the sustainable consumption and production practices by businesses and tourists through coherent in- country actions is being undertaken. The project is being implemented by The Travel Foundation in collaboration with Saint Lucia Department of Tourism. The project is expected to reduce the sector’s greenhouse gas emissions while helping Saint Lucia meet its NDC targets under the UNFCCC.

Saint Lucia has also commissioned a ten-year Tourism Strategy and Action Plan (2020-2030) which takes cognizance of the need to adapt to and mitigate climate and environmental related threats as well as address sustainability.

The plan recognises the need to find a suitable and sustainable balance between accelerating tourism growth and maintaining social and environmental quality as a critical prerequisite for the expansion and survival of Saint Lucia’s tourism sector.

1.9.9 Mitigation

The Government of Saint Lucia is one of eight countries who received support under the Japan-Caribbean Climate Change Partnership (J-CCCP) to advance the process of low-emission risk-resilient development by improving energy security and integrating medium to long-term planning for adaptation to climate change. One of these activities is the preparation of a National Appropriate Mitigation Action (NAMA) in the energy sector of Saint Lucia, covering renewable energy and energy efficiency solutions and technologies in school buildings in Saint Lucia, the “Green Schools NAMA”.

The NAMA priority areas for Saint Lucia were identified as transportation or energy during a NAMA workshop with the United Nations Development Programme (UNDP). However, due to price stabilization, self-reliance, foreign exchange rates, and climate sensitivity, a recent decision was made to select “Greening Schools (related to energy)” as the NAMA focus; this effort also will support adaptation efforts. Saint Lucia’s NAMA for school was developed and submitted in 2018. This NAMA will be supported by initiatives aimed at securing finances to facilitate its implementation.

In 2018, the Energy Division of the Ministry of Infrastructure, Ports and Energy with technical and financial support of the Rocky Mountain Institute (RMI) prepared the Government Fleet Transition Strategy. The report assessed the cost implications, and how the transition of the government fleet to more energy sustainable options would assist with Saint Lucia achieving its international climate change targets. In addition, Saint Lucia is currently in the project development phase for two projects that deal with electric mobility. The first project has been submitted to the Global Environment Facility (GEF) for funding and is part of the “Global Programme to Support Countries with the Shift to Electric Mobility”, which will be implemented by the United Nations Environment Programme (UNEP). This project will seek to strengthen the enabling environment for the shift to Electric Mobility in Saint Lucia through a series of interventions including the development of a sustainable mobile transport policy, the establishment of a national coordinating mechanism, a national low-carbon strategy. The project will also assist in the government’s effort to demonstrate the use of electric vehicles through its procurement of ten (10) vehicles and the establishment of a maintenance policy for electric vehicles in the fleet. Increasing the number of publicly available charging stations will also be a focus of this project as having a national capacity building for mechanics, drivers, and emergency responders is an important component of the project. The project’s total value is USD 4, 642, 273 or XCD 12,479,358.30 and will be implemented over a three-year period.

The second project is being financed under the German International Climate Initiative (IKI), and is a regional project entitled, “Supporting the Implementation on NDCs in the Caribbean- transforming the energy and transport sectors towards a low-carbon and climate-resilient future (NDC-TEC). This project is being implemented by a consortium of international and regional institutions and is led by the German Agency for International Cooperation (GIZ). The project will work directly with the University of the West Indies (UWI) on the development of courses that focus on climate change, and electric mobility. Vocational courses will also be established at the Sir Arthur Lewis Community college. This project is expected to start by mid-2021 and will be implemented over a five-year period with an allocated budget of approximately €3,380,000.00 or XC\$10,106,200.00. These two projects will ensure that Saint Lucia stays ahead of the curve as it relates to electric mobility and ensure that the people of Saint Lucia will reap the benefits of electric mobility.

The GOSL, through the Climate Enhancement Package (CAEP) funded by the NDC Partnership worked closely with partners such as The Global Green Growth Institute (GGGI), the OECS, Climate Analytics and the World Resources Institute (WRI) to revise and fast-track implementation of its Nationally Determined Contribution climate change goals under the Paris Agreement. The collaboration resulted in the development of an updated, more ambitious, NDC for Saint Lucia. Some of the key accompaniments to the updated NDC include:

1. Fossil Fuel Subsidy and Taxation Reform Scenarios Modelling Report- It is thought that changes in the subsidies and taxation schemes for fossil fuels in the country could help reduce their consumption, lowering the country's carbon emissions.
2. Climate Finance Strategy - To meet its NDC targets, Saint Lucia will need to find ways to finance relevant projects and programs. Thus, a strategy was devised for the country to put in place innovative financing mechanisms such as national financing vehicles, debt-for-climate swaps, green bonds, or public-private partnerships, to catalyse investment from domestic, international, and private sector sources and make these goals achievable.
3. Climate Change Budget Tracking Tool - When trying to achieve climate goals, it is important to track spending on projects related to those goals. The climate budget tracking tool would help to incorporate tracking of climate change-related spending into the current budgeting process so that spending and investments related to NDCs, and climate action can be accurately tracked and measured.
4. NDC Implementation Strategy- formulated to guide the implementation of measures to achieve the transitions envisions within the document.

CHAPTER 2: INSTITUTIONAL ARRANGEMENTS FOR DOMESTIC MEASUREMENT REPORTING AND VERIFICATION (MRV)

Saint Lucia is in the process of developing its Measuring, Reporting and Verification (MRV) system. It will use this system to help it track challenges and their impacts, action and to secure investment and finance for the implementation of climate action. The system focuses on data to help decision makers drive ambitious climate action. The system will provide a transparent repository for information on projects, plans and opportunities requiring finance, investment, and support. An MRV Portal has been developed to hold all necessary information to support the MRV system and in time, identify and track “Bankable Projects”¹⁰. The portal will additionally to highlight gaps in information required to effectively monitor action implementation as missing information is flagged. Further work is now needed to engage stakeholders, and to fully populate the MRV portal with relevant re-usable information and in doing so, strengthen the MRV System. The portal and the wider MRV system will support national teams in effectively coordinating effort towards meeting Saint Lucia's obligations under the UNFCCC and the Paris Agreement. Saint Lucia's MRV System is an arrangement of data flows, expertise, tools, and stakeholder engagements that enable a designated focal point (in the case of Saint Lucia, this is the DSD) to regularly inform decision makers on key problems/challenges, potential solutions and progress with climate change across a range of themes. The MRV system is in its early stages and will be developed through a process of continuous improvement. The long-term goals for Saint Lucia's MRV system are to:

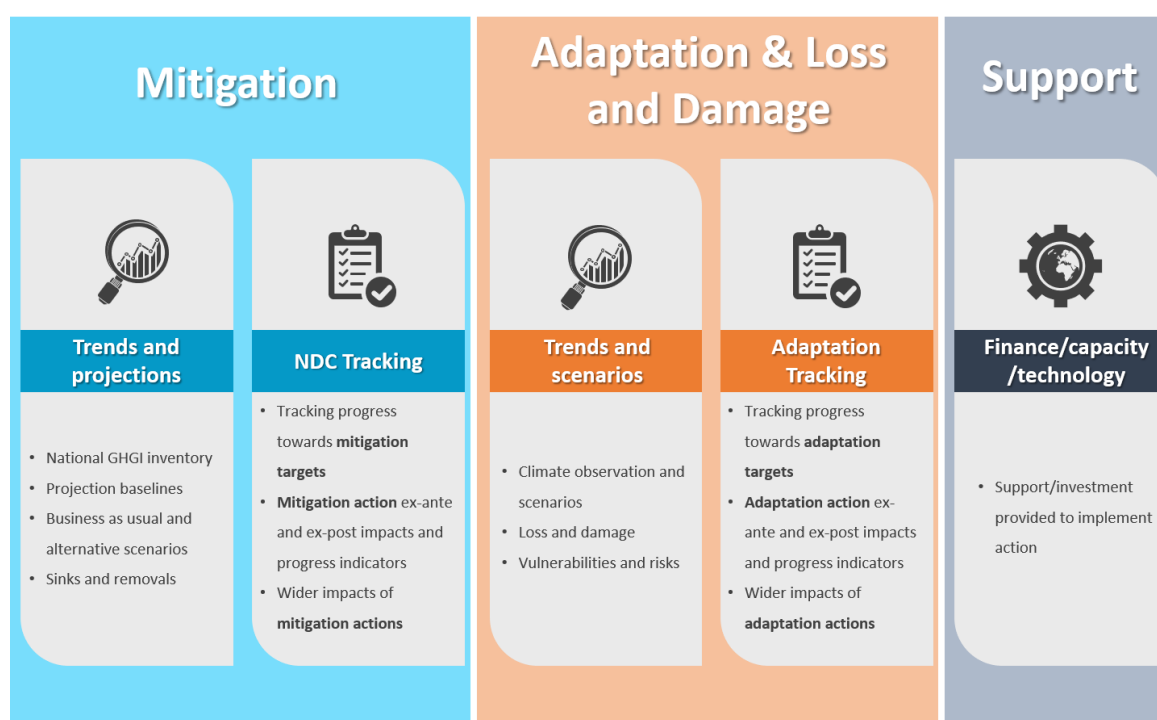
1. Gather evidence on Saint Lucia's climate challenges (e.g., GHG emissions, vulnerabilities and impacts) and opportunities (e.g., GHG removals, low carbon development, new economic opportunities).
2. Inform decision makers and to report information on Saint Lucia's adaptation and mitigation progress, ambition, actions, their support (including climate finance) and their co-benefits.
3. Establish and maintain national expertise in climate change and climate actions to support Saint Lucia in developing its low carbon, well adapted and climate resilient economy.
4. Provide technical advice and guidance to government staff for decision making and planning, informing discussions on agency project priorities, national action implementation, businesses/private sector and the public on climate challenges, action, and progress.
5. Provide transparent and high-quality outputs, in the form of automatically generated tables and summaries of information, for national reports (e.g., National reports, NCs, Biennial

¹⁰ Any development project that will give a financial return and is therefore worth investing in.

Update Reports (BURs), NDCs) and in response to requests for information from the public or non-state actors.

6. Inform the preparation of climate change annual reports, consistent with the Cabinet-approved Monitoring and Evaluation Plan under the NAP process and in response to the call for such reports under the draft Climate Change Bill.
7. Provide input to the NEIS and facilitate the sharing of public facing information on climate change. As signatories to the Escazú Agreement, Saint Lucia has a responsibility to implement rights of access to environmental information, ensure public participation in environmental decision-making and facilitate access to justice in environmental matters.

Figure 9: Summary of Climate Transparency Themes included in the MRV System.



Source: GOSL

2.1 INSTITUTIONAL ARRANGEMENTS

The policies and draft legislation in Saint Lucia that form and strengthen the MRV system are highlighted in **Table 1**. The most relevant is the draft Climate Change Bill, which provides mandates for the responsibilities of DSD and other institutions within the MRV system. These existing policies need finalisation and further refinement to strengthen the MRV system in Saint Lucia.

Table 1: Relevance to Saint Lucia's Policies and Draft Legislation to the MRV System.

Policy/draft legislation	Relevance to MRV system
Draft Climate Change Bill	Provides a framework for the MRV system, mandates regular data collection by the Department of Sustainable Development (DSD) and addresses duty of data providers as part of this data flow. ¹¹
Freedom of Information Act	The Freedom of Information act was passed in 2009 to give the public a general right of access to official documents and to make provisions for incidental and connected purposes. The Bill binds the State and applies to all public bodies and official documents with stated exemptions.
SGD 2040 (Saint Georges Declaration of Principles for Environmental Management) <i>supported by the SGD Reporting Framework</i>	<ol style="list-style-type: none"> 1. Offers a mechanism for managing resources and ecosystems that are shared by Eastern Caribbean Member States 2. Provides a foundation for pooling expertise on environmental management 3. A regional policy statement can help small states increase their voice and influence in international processes 4. Regional policy can fill gaps in international policy frameworks that do not fully reflect the development contexts of specific countries <p>The reporting framework outlines the reporting levels (1-3) for tracking progress measures against the SGD's strategic priorities, goals, and objectives. Data captured under this process represents the primary source data for monitoring and evaluation for SGD 2040. It also outlines the roles and responsibilities for reporting under the declaration.</p>
National Adaptation plan and sectoral adaptation strategies and action plans	Development of the National Adaptation plan and sectoral adaptation strategies and action plans (SASAPs), and investment strategies for sectors that are particularly vulnerable to climate change
Implementation of the Kigali agreement	The Kigali Amendment to the Montreal Protocol is intended to generate climate mitigation benefits
Saint Lucia Climate Change Research Policy 2020-2030	The National Climate Change Research Strategy will be implemented through the establishment of research collaboration

¹¹ Data flows will be formalised when the Climate Change Bill has been passed. At the time of drafting the bill has been submitted to the Attorney General's office for review

Policy/draft legislation	Relevance to MRV system
Saint Lucia Climate Change Research Strategy 2020- 2030	agreements between the Government of Saint Lucia and research partners, in accordance with the provisions and protocols set for this purpose in the National Climate Change Research Policy

The roles and responsibilities within Saint Lucia's current MRV system are outlined in the draft Climate Change Bill (2018). This Bill will support the embedding of data gathering, analysis and reporting on climate change related issues. The draft Climate Change Bill will provide the legal mandate for the operation of the MRV system in Saint Lucia. The Bill provides the organisational mandates to DSD to function as a focal point and can be used as a basis for creating sub agreements with data providing institutions on data flows.

The proposed organisational structure for the MRV system is presented in **Figure 10**. The elements of the MRV system are as follows:

1. **The National Climate Change Committee (NCCC)** facilitated and chaired by the Ministry with responsibility for Sustainable Development and the Environment, meets periodically to provide guidance on, and monitor the implementation of, national and regional climate change activities, which is a key function of the MRV system. The full terms of reference of the NCCC are given in the Annex I.
2. **The MRV Manager and Coordinator** will be the Ministry with responsibility for Sustainable Development and the Environment.
- 3/4 **Defined focal points coordinating data gathering and expert analysis and reporting** across adaptation, mitigation, and climate finance/support. Memorandums of Understanding (MoUs) have been established under the NEIS with several parties included below, although others remain to be formalised¹².
 - i. **GHG Inventory** – The Ministry with responsibility for Sustainable Development and the Environment, currently the DSD acts as the Inventory Agency; this includes the compilation of data provided by ministries responsible for sectoral action implementation. The DSD also coordinates the flow of information between inventory experts and data providers. Quality Assurance and Quality Control (QA/QC) is to be carried out by the Inventory Team Leader, within the DSD. Expert organisations and experts will be engaged according to their areas of

¹² MOUs have been established with Saint Lucia National Trust, Department of Agriculture, Fisheries, Natural Resources and Cooperatives including Water Resources Management Agency, Ministry of Health and Wellness, Department of Public Service, Central Statistical Office Department of Economic Development, Transport and Civil Aviation, Saint Lucia Solid Waste Management Authority, Water and Sewerage Company Ltd, Department of Physical Planning, Ministry of Infrastructure, Ports, Labour and Energy, Saint Lucia Metrological Services, Department of Sustainable Development, National Conservation Authority.

existing expertise on sectors (Energy, Industrial Processes and Product Use (IPPU), transport, agriculture, Land Use, Land Use Change and Forestry (LULUCF) and Waste) and cross cutting activities such as the GHG inventory and projections, adaptation, loss and damage, disaster risk reduction, climate measuring and the tracking of climate data and climate action support. The draft Climate Change Bill states that *“the Department may periodically request data and information from relevant organisations, including national public sector, private sector, civil society, academia and media, who are duty bound to provide this data and information within a reasonable timeframe”*. The types of expertise needed for the MRV system to function have been identified below for each reporting element. The DSD continues to work to build up and sustain this national capacity across a range of organisations. Specific sectoral expertise on the **GHG inventory** is provided by:

- the Energy Division of the Department of Infrastructure, Ports and Energy for Energy,
- the Central Statistics Office of Saint Lucia (CSO) and the Ozone Unit of the DSD for IPPU,
- the Corporate Planning Unit of the Department of Agriculture, Fisheries, Natural Resources, and Cooperatives, for Agriculture,
- the Forestry and Lands Division for LULUCF; and,
- the Saint Lucia Solid Waste Management Authority (SLSWMA) for Waste.

Data gathering, compilation and analysis for specific sectors is organised by the appropriate expert and also directly by specific industrial and energy installations.

- ii. **GHG projections** was handled by external consultants compiling scenarios for the BUR development. Training was provided to local experts from the Department of Sustainable Development, the Energy Division, Forestry Division, LUCELEC and the Department of Agriculture. Further training was done under the NDC Revision process. However, it is hoped that, with sufficient resources available for people and training, internal capacity within Government of Saint Lucia will be developed and maintained to undertake GHG projections
- iii. **Mitigation Actions** – The implementation and monitoring of actions will be taken on by a range of stakeholders and government ministries. Collation, compilation and reporting of information on mitigation action will be led by the DSD. Other Ministries and agencies covering energy, tourism, agriculture, natural resources, water, economic development, transport, climate finance, infrastructure etc will need to be responsible for engaging with the DSD to inform on policy and on progress with sectoral action. These links and mandates are still to be formalised.

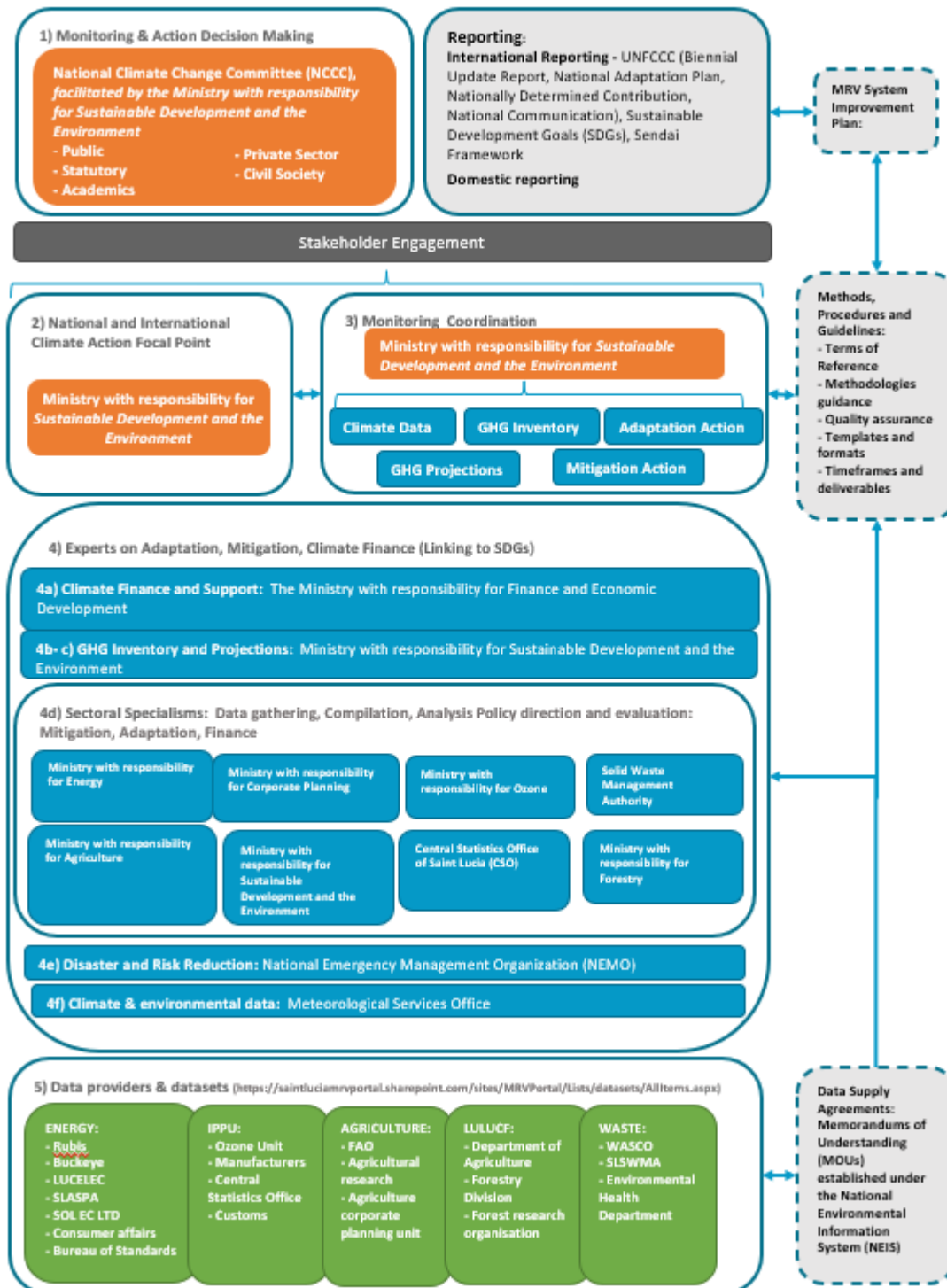
- iv. ***Vulnerabilities, Adaptation Actions, Loss and Damage*** – The implementation and monitoring of loss and damage and adaptation action will be taken on by a range of stakeholders and government ministries, including the National Emergency Management Organization (NEMO), that is responsible for Disaster Management and Recovery. Collation, compilation and reporting of information on risks and vulnerabilities, loss and damage and adaptation action will be led by the DSD. Other ministries covering energy, tourism, agriculture, water, natural resources, economic development, education, health, transport, infrastructure, housing etc. will need to be responsible for engaging with the DSD to inform on challenges, policy and on progress with sectoral action.

The National Adaptation Plan (NAP) outlines that participation of line ministries and agencies in the NCCC will be managed through the NAP coordinating mechanism. The NCCC will take the lead of this mechanism. The 2018 Monitoring and Evaluation Plan for the NAP is now in place and will be the mechanism through which adaptation actions are monitoring, and if required, adjusted.

- v. ***Climate Observations*** – Gathering of information on climate observations will be led by the Meteorological Services Office (Met Office). The Met Office will provide the DSD with regular updates that can be incorporated in reports and indicators. The Met Office has an established MOU for data provision under the NEIS. Climate and environmental data, for example meteorological data, flooding and sea levels, is provided by the Meteorological Services Department.
- vi. ***Support and Climate Finance*** – The Ministry with responsibility for Finance and Economic Development, will lead on gathering climate related budget information. The DSD will support other ministries in gathering information on the support and finance of specific climate actions and projects. These links and mandates are still to be formalised. A Climate Budget Tracking tool developed under the NDC is currently being further developed through the Green Climate Fund (GCF).

- 5 **Data Providers** – Includes individuals and organisations from a range of ministries, national statistics and measurement agencies, civil society organizations (CSOs), non-governmental organizations (NGOs) and private sector agencies that provide regular data and insights to the MRV systems.

Figure 10: Proposed Institutional Arrangements for Saint Lucia's MRV System



2.2 THEME SPECIFIC DETAILS OF THE MRV SYSTEM

2.2.1 GHG Inventory

There has been a significant improvement in both the quality of Saint Lucia's GHG inventory and the capacity of in-country experts during 2020 through a GHG inventory development and training programme provided by external consultants. The 2020 GHG inventory built upon the previous inventory and experience of the national team. The process facilitated the establishment of a sustainable GHG inventory system, run by Saint Lucian experts, capable of producing GHG inventory updates and continuous improvement. An overview of the GHG inventory MRV system is provided here, more detailed information is available from Saint Lucia's National Inventory Report¹³.

Figure 11 shows the organisational structure for the GHG inventory, produced as part of the recent inventory compilation project. It identifies the DSD as holding overall responsibility for the GHG inventory system and its compilation and development. **Table 2** provides a summary of the roles of stakeholders involved in the GHG Inventory process. The Department coordinates the work, consolidates and reports the data and provides central QA/QC of the data. The National Climate Change Committee (NCCC) as a multi-sectoral committee with membership across many actors, will also play a key role for the development and use of the GHG inventory.

The data flows and the associated underlying organisational mandates are not yet fully set-up and agreed between DSD and its stakeholders, although MOUs have been established under the NEIS for several organisations. This system sets a precedence on which Saint Lucia can develop a similar consolidated organisational structure or agreed mandates to collaborate for the broader MRV system including mitigation and support. Initial work to create this structure with a list of stakeholders including assigned roles and responsibilities needs to be undertaken.

¹³ NIR (2020), Saint Lucia National Inventory Report 2020, August 2020

Figure 11: Institutional Arrangements for the GHG Inventory

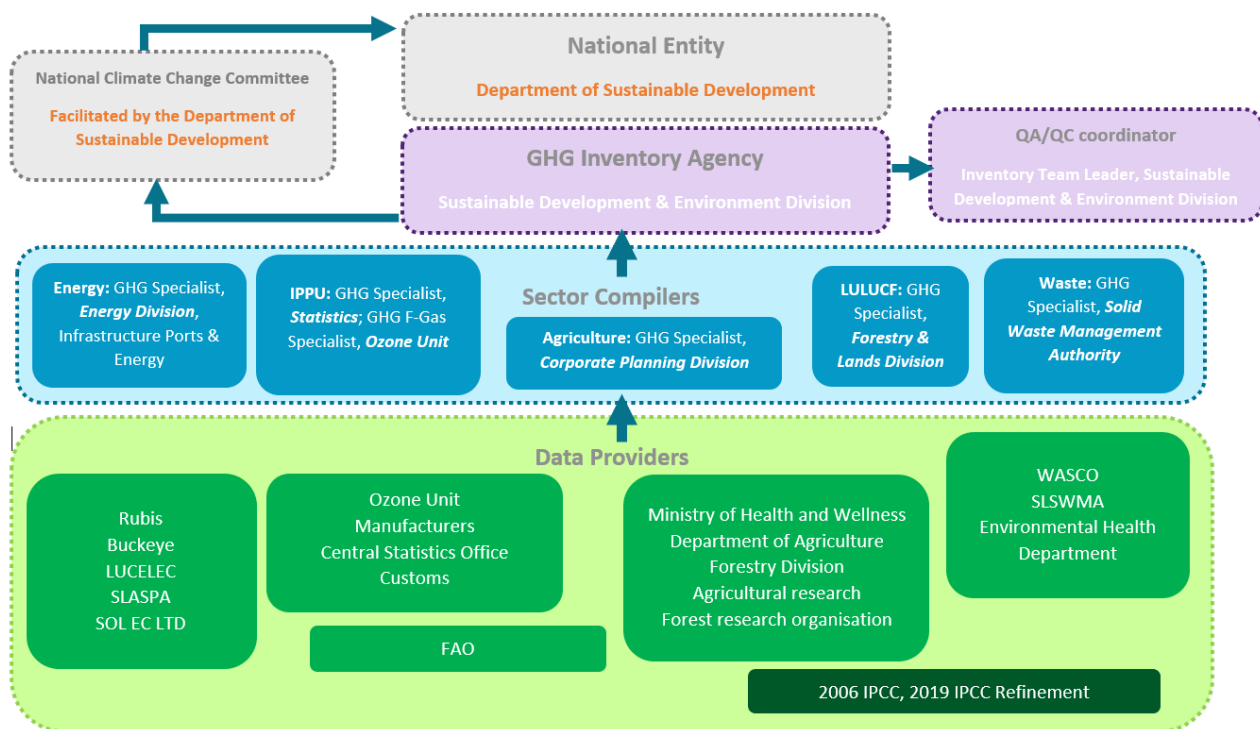


Table 2: Roles of Stakeholders for GHG Inventory

Stakeholder	General Roles	Necessary Capacities
Single National Entity The Department of Sustainable Development	Overall responsibility that MRV System produces expected outputs such as NCs, BURs.	Administrative skills, government authority
Steering Committee Chaired by The Department of Sustainable Development and including other data providers and sectoral experts	Provide overall planning, coordination, management and technical facilitators of inputs and outputs.	Technical and administrative expertise, government authority
Management team The Department of Sustainable Development	Responsible for overall planning, coordination, and management of MRV System.	Technical and administrative expertise, government authority, capacity to coordinate and lead the process
Sector Experts The Department of Sustainable Development and other departments	Undertake data collection, calculations, drafting, quality control, archiving, and documentation.	Technical expertise including knowledge of the UNFCCC reporting requirements and IPCC methodologies

Data Providers	Timely delivery of input data in appropriate format	Technical skills, legal authority to improve and enhance data collection
A range of public and private organisations including national statistics.		

Saint Lucia currently has between 8-10 active GHG inventory team members who all participated in the 2020 inventory compilation cycle. Individual sector experts (from a range of departments) are responsible for the compilation of their sectoral categories and the quality control of the estimates. Through participation in this inventory cycle, all national experts were guided through data collection, compilation, and QA/QC processes by a counterpart mentor from the external consultant team. Additional training sessions were provided on key inventory concepts with the aim of building capacity and expertise within the national inventory team.

It remains a priority to maintain expertise and capacity within the national team. One sector lead expert per group of sectors, sector or group of sub-categories is required to support the development of higher tier methods, which may also require external expert assistance. This process will require continued training and capacity building of experts through courses, exams, as well as engagement with the UNFCCC annual review process. Experts relevant for the GHG inventory will be registered and listed in the MRV portal in the Stakeholder list. Ensuring that information and skills are passed from existing members of the national team to new members is a key part of ensuring institutional memory is maintained. This is supported through an archiving process and the MRV portal with guiding handover processes and training to be further developed.

Data providers for the GHG inventory are identified and range from public and private organisations, including national statistics. Currently, there is no legislation that further specifies which organisations are required to provide data, the format of the data or the regularity of data provision.

The data supply process could be strengthened through the development of data supply agreements or MOUs with key stakeholders. This can be achieved through the expansion of agreements already in place under the NEIS. With standardised templates for data providers and a secure data supply chain, the GHG inventory can ensure the timely delivery of updates to critical datasets. The MRV portal can be used as a platform to retrieve excel sheets and templates and submit data.

Saint Lucia ensures continuous improvement in inventory data by adhering to the timeline of the annual inventory cycle and updating the full time series of the inventory for each submission. Planning and improvement phases of the inventory cycle enable new data and improvements to be implemented and documented in an organised way. In addition to the detailed MRV portal, institutional memory is also maintained through the archiving of all key annual inventory documents

on the Central Data Storage Facility (CDSF), which is part of Saint Lucia's National Environmental Information System (NEIS), at the end of the inventory cycle. The CDSF and NEIS are hosted by the Government of Saint Lucia and provide a platform for archiving environmental information.

The NEIS has a public facing element which has been developed for the public to view information about climate change covering mitigation, adaptation, and climate finance in Saint Lucia. The NEIS website was developed by the *Increase Saint Lucia's capacity to Monitor MEA (Multilateral Environmental Agreements) Implementation and Sustainable Development project* (funded through the Global Environment Fund). It hosts reports relevant to MEA reporting, along with a list of climate change, land degradation and biodiversity indicators. This can provide one focal point for information sharing. Summary information from the MRV portal may be disseminated through the public facing part of the NEIS.

Under the same project, a public education film "Saint Lucia: Into the Future" has been produced. This broadcasted as a series of episodes on different future environmental scenarios based on increasingly severe climate conditions, land degradation and biodiversity loss.

There are several tools in use in Saint Lucia for the compilation of the GHG inventory including:

- compilation templates and tools in excel
- IPCC software
- Collect Earth for LULUCF data
- Other compilation background files and tools

These tools will be securely stored in the MRV portal available for review and future use.

Saint Lucia's MRV system needs to be developed so that it has close engagement with a wide range of stakeholders through consultations, publications, briefings, data visualization and the regular publication of indicators. The NEIS provides the platform by which this can be achieved, and significant progress has been made in engagement; however, flows of information need to be formalised between the MRV portal and the NEIS. These processes and tools need to be developed internally with national government.

2.2.2 Mitigation Projections and Climate Action Analysis

Saint Lucia's MRV system development will have a focus on tracking quantifiable, reportable, and verifiable nationally appropriate mitigation actions across several key sectors.

DSD is the main point of contact for the consultant-based projections development activities for the BUR. This includes the collation and analysis of mitigation actions and their GHG mitigation potentials. DSD has overall responsibility for project outputs (projections scenarios and details of mitigation actions) and will, in the future, drive engagement with stakeholders and updates through its advisory

bodies and/or technical support. DSD will need to appoint a coordinator, or team leader, to manage the mitigation work programme, improvements, QA/QC, data gathering, stakeholder engagement and compilation of projections and estimates of mitigation impact by experts. This is an equivalent role to that of the GHG inventory team leader.

Saint Lucia will need to further develop the legal framework around both implementing and tracking climate action MRV. This involves developing an institutional arrangement that will establish a national MRV system for compiling projections, gathering data on, and estimating the impacts of mitigation action. Some work has already been conducted to establish an MRV Framework for mitigation assessment, including the development of an inter-agency MOU, a mitigation actions reporting tool which is for agencies to report data back to the DSD on the mitigation actions that they are responsible for implementing, and the Mitigation Action Implementation Report which allows the DSD to aggregate this information. Appropriate laws are still required to provide the legal mandate for the gathering, processing, and reporting of data related to mitigation actions and to legally form the National System. Key stakeholder representatives of organisations relevant for information on climate action and projections can be tracked in the MRV portal.

Expertise relating to mitigation, projections, and climate finance is based around specific project work carried out by international/regional experts. Saint Lucia engaged with external consultants for its mitigation chapter of the BUR. This involved the development of projection models and modelling and analysis of mitigation action. The existence of this project, whilst highlighting gaps in current country expertise to compile mitigation actions and provide projections, has provided the opportunity for the training of local experts in modelling and analysis of mitigation actions.

To date, there has been relatively little consolidation of expertise in any one organisation or group of national experts on projections across the different sectors, or on understanding and collating information on actions and their mitigation impacts. Therefore, there is a need to establish a sustainable team, beyond the timeframe of current project requirements, with members from the appropriate organisations. Sustainable teams encompass a team of individuals/experts that will be nominated per organisation and led at the institutional level to retain expertise and overcome possible staff retention/capacity problems longer term. This will involve building on the expertise gained through recent project experience and establishing a team of nominated individuals who will report to the Mitigation team leader. This team needs to develop experience in projections modelling and an understanding of the mitigation actions that could play a role in Saint Lucia's GHG reduction. (e.g., renewable and or low carbon energy systems, energy efficiency (in manufacturing, buildings, and transport), land and forest management, agriculture practices and waste and wastewater management). Saint Lucia's inventory experts understand the key sources of emissions and GHG sinks,

and this knowledge can be further developed to estimate projections and mitigation action impacts. Key expert stakeholders and organisations relevant for the compilation of projections and information on climate action can be listed in the MRV portal. Similarly, to the inventory experts, efforts will be required to ensure institutional memory and retain expertise through archiving of information on the MRV portal. The NDC partnership plan, and the NDC Support team working on NDC Implementation in the country, are well positioned to support this team.

The framework for a central archive of projections and climate action information has been developed in the MRV Portal system. Datasets and sources are linked to data supplying stakeholders, which strengthens the data flows and encourages regular reporting of data.

The TNC lists gaps in the data required for addressing mitigation needs, with the agency with responsibility for implementation assigned. These recommendations are split into two categories: baseline emission projection gaps and mitigation actions. Listed improvements therefore include:

- Identify and elaborate appropriate laws that provide the legal mandate for the gathering of data.
- Engage with relevant data providers from different ministries via DSD.
- Gather data from relevant stakeholders and set-up regular data update processes.
- Construct data supply agreements and templates to ensure consistent reporting.

The MRV portal has been designed to support Saint Lucia with the maintenance of its tools for projections and mitigation action analysis and will act as a store of datasets, workplans, models, documented methods, processes (e.g., for engaging with stakeholders and updating datasets), systems (e.g., QA/QC, databases, models, and tools).

Work is underway to consolidate relevant information on mitigation actions and their associated challenges, impacts, indicators, costs, and support providers into the MRV portal. Regular and transparent reporting of projections will also require the development of key analysis tools (e.g., models for energy and agriculture, forestry, and other land uses (AFOLU)) and a training programme with country specific training material. The training should enable the activities and analysis needed to produce high quality outputs and regular updates on progress (e.g., internal NDC tracking updates for the NCCC) with indicators to share information on progress with monitoring.

The technical engagement of the NCCC offers an appropriate channel for the DSD to highlight mitigation related trends, challenges, and priorities at a political level. As the Climate Change coordinating focal point for this Committee, the DSD could produce regular updates on indicators and analyses to inform wider stakeholders and decision makers. The DSD could additionally use this compiled information to develop communication and awareness raising activities on mitigation related trends, challenges, and priorities at a high political level and to the public as well as public and

private decision makers. The MRV portal will support further engagement using climate data of relevance and of interest, which links climate actions to wider co-benefits (economy, health, ecosystems, flood protection, water quality, energy security etc.) and will also assess the links between Saint Lucia's climate action and its Sustainable Development Goals.

2.2.3 Support and Climate Finance

Saint Lucia is currently in the process of developing clearly defined formal institutional arrangements for the collection, assessment, management and reporting of information on support and finance of climate actions. Initial assessment provided under the first GCF readiness on climate finance on coordination/capacity indicated the use of the NCCC as a national mechanism for distributing support and finance.

A comprehensive MRV climate finance tracking system is being developed under the NDC Partnership CAEP. This online platform will monitor public budget and expenditure related to climate change activities. This is supported by the Implementation and Financing Strategy that will complement the current NAP Climate Financing Strategy to provide a comprehensive national approach for Saint Lucia in accessing climate finance. Future work is planned to bring the two aspects together in a comprehensive MRV system that includes national, international, public, and private sources of finance. By strengthening these capacities, the system will collate robust data and prepare analyses on existing climate flows. This will help to identify key interventions that have the potential to contribute towards making all financial flows compatible with low-emission, climate-resilient pathways. The development of this comprehensive climate finance tracking system will be addressed under the second GCF readiness in 2021.

The MRV portal will provide support to the summarising of the detailed information from the MRV climate finance tracking system. Whilst the MRV climate finance tracking system will act as the main repository for climate finance information, it is important for the MRV portal to contain updatable snapshots of this information for alignment with more detailed information on actions/projects and their wider impacts. Datasets relating to support and climate finance, from the National Designated Authority (NDA) and from other data providers, should be stored on the MRV portal and this data can be used to inform policy and can be included in national reports and strategies. A list of funders and supports will be maintained and updated from the MRV climate finance tracking system and other sources where possible to include relevant information such as the type of fund, the fund administrator, the primary contact of the fund and information on how to apply. Where possible, this list will be linked to specific climate action, linking supplier and amount to climate action and impacts.

An initial assessment has been undertaken which has identified the central role that the NCCC should take as a central mechanism for coordination of climate finance in Saint Lucia, under the DSD with responsibility for Economic Development. Engagement of the NCCC should also obtain high-level public and private support for the tracking of progress of the NDC with the assistance of the DSD and its MRV system.

GOSL is currently developing a co-ordinated team of climate finance experts. A technical subcommittee of the NCCC has been formed, primarily to meet on climate finance; however, this is not yet formally active. In the interim, regular meetings occur between the DSD and the NDA. Current projects have developed self-paced online training modules and plan to conduct training sessions for key stakeholders to cover key topics of climate finance including budget analysts and support has been identified from current climate budget tracking work carried out for NDC revision. However, there remains a need to fully develop roles and responsibilities for expertise needed for the MRV system. This includes training of experts that will gather, archive, analyse and report information needed by decision makers and the public. Therefore, there is a need to establish a small team of support and climate finance tracking experts from DSD or others from key ministries involved in the support and climate finance landscape, as envisioned under the NCCC. This team will need to be trained on tracking of support and climate finance and can support/train sectoral experts in gathering information on support and climate finance at a project level. This could include experts involved with accreditation to multilateral and bilateral donors and international climate funds.

Engagement of stakeholders and decision makers needs to be pursued by the NCCC and the DSD would need to take on responsibilities for producing regular updates on indicators and analyses to inform wider stakeholders and decision makers.

2.3 MRV PORTAL

Saint Lucia has developed an online MRV portal. This portal provides a management overview for the MRV system. It consists of components that structure data, support good practice activities, and reinforce the institutional memory. The portal provides a coordination platform for managing information on stakeholders, engagement activities, datasets, QA/QC activities, document archive, data storage and management of improvements to the MRV system. The MRV portal also provides a structured database for information on the climate challenges (e.g., vulnerabilities, loss and damage, GHG trends etc), climate actions, their direct and wider impacts and support.

The MRV Portal has been designed to meet the following system requirements:

1. Tracking outcomes and or targets: This includes listing, in the MRV portal, the climate change outcomes/targets for Saint Lucia around climate change that are of National Priority and need tracking. These outcomes and targets will shape the design of the MRV system and the

contents of the MRV portal. These include goals, ambitions, or targets set by Saint Lucia that address certain challenges (GHG trends, vulnerabilities, loss, and damage), require actions and investment, and may have positive and or negative wider impacts on society, the environment and/or the economy.

2. Hold live information on MRV system administration including lists of engaged individuals and organisations, keeping track of stakeholder events and supporters of action. Documentation of QA/QC activities including quality objectives and the improvements plan.
3. Provide an understanding of the threats/challenges, actions, support, climate finance, wider impacts, and constraints/ gaps: The MRV portal will provide a place to structure, classify, and document these elements to support the MRV system in engaging with stakeholders, decision makers and action takers. Structuring these elements in the MRV system will help its users to standardise data inputs and outputs to engage with wider stakeholders, decision makers and action implementors to drive action.
4. Supporting communications to engage stakeholders and maximise successful outcomes. The MRV Portal needs to regularly produce and update a range of reports, indicators, and other stakeholder engagement pieces (e.g., briefings, documents, strategies, workshops, websites etc.) regularly and transparently (clear datasets, indicators, narratives and method descriptions).

The portal supports communication between stakeholder organisations and allows DSD to better link data to policies. Going forward, the portal will be an important repository for stakeholders to contribute updated information as well as a source of information that will help to produce transparent outputs for reports such as NDCs, BURs, NCs and NAPs. Training has been provided on the use of the system to key stakeholders, and a user manual has been developed that document key functionality of the system and will act as a reference manual for all users of the system.

The MRV portal maintains a list of stakeholders, their roles in the system and an improvement plan, which documents and prioritises improvements needed to the MRV system to fill gaps in understanding. The improvement plan also serves as a live list of improvement items for the portal itself, as it is intended that the portal will continually develop alongside Saint Lucia's wider MRV system. Further information currently provided in the MRV system includes:

- Definitions and nomenclature that will help stakeholders to identify, classify and prioritise measures across the different mitigation areas and sectorial strategies.
- An improvement plan to register and prioritise the improvement of the MRV system.
- Templates for documenting key methods, data sources and assumptions used in the production of analysis and outputs.

Planned additions to the MRV system include:

- A set of quality objectives to underpin data flows.
- A workplan to gather, check, analyse and regularly report relevant information on projections and mitigation and for its NDC.
- Processes/operations manuals, including defined interactions with other related systems.

Figure 12: Data Structuring Components of the MRV Portal



2.4 RECOMMENDATIONS FOR IMPROVING THE MRV SYSTEM

A sustainable MRV system will provide a range of useful outputs using well understood terms and indicators to help inform stakeholders on the implementation of the Climate Change Bill and to fulfil Saint Lucia's international reporting requirements.

Recommendations are based on feedback from a stakeholder workshop and a scoping exercise carried out on the current state of the MRV system in Saint Lucia. This section outlines recommendations across five areas: organisational, technical capacity, data flows, systems and tools, and stakeholder

engagement. Specific recommendations for the MRV portal are presented in orange boxes within each section.

2.4.1 Organisational Mandate Recommendations

Organisational mandates will include the agreements and terms of reference that ensure organisations and individuals can work together to monitor progress on the national climate agenda and the Paris Agreement. The mandates should be flexible and sustainable to facilitate reporting and allow for continued improvements.

The organisations involved might include government ministries, agencies, academic/research institutions, local self-government, private organisations, and consultants.

Along with organisational mandates, national climate laws can be used to define and formalise overarching organisational structures and agreements.

The Draft Climate Change Bill, 2018, sets out a framework for data collection, analysis, and reporting.

The Department of Sustainable Development is responsible for serving as the national knowledge and information centre on climate change.

2.4.1.1 Create an Organisational Structure

The DSD will plan to create a consolidated organisational structure with appropriate mandates for the regular MRV system activities and data updated including:

- the GHG inventory
- projections of future GHG emissions
- analysis of loss and damage
- analysis of vulnerabilities risks and resilience
- tracking mitigation action and wider impacts
- tracking adaptation action and wider impacts
- tracking climate finance and support

Specific actions include the creation of:

- a) An organisational diagram illustrating the individuals and organisations involved across the different areas of MRV.
- b) A directory of stakeholders containing the people and organisations and assigned roles and responsibilities for various aspects of the MRV system.
- c) Specific MRV system roles and responsibilities of the DSD and other organisations need to be confirmed. This list should be updated at least yearly to ensure continued relevance.
- d) Climate finance tracking systems which will need engagement from the Department of Finance, and Department of Economic Development, along with the private sector, civil society, and development partners. A comprehensive MRV climate finance tracking system is

being developed under the NDC Partnership CAEP. This online platform will monitor public budget and expenditure related to climate change activities. The MRV portal will host summary information from the climate finance tracking system for national reporting on climate action.

- e) Clearly defined datasets and data flows identifying roles and responsibilities of organisations to provide data and analysis by national experts.
- f) Regular and standardised processes to consolidate data from different projects using standardised data collection templates and data formats.

To start this, an initial list of stakeholders assigned roles and responsibilities, datasets and data structures for climate finance tracking needs to be created in the MRV portal.

2.4.1.2 Create Formal Agreements

The formal organisational and institutional agreements needed to install expertise and data flows will support the Climate Change Bill. These agreements should be developed around a prioritised list of stakeholders, compiled in recommendation 2.4.4.

Organisational mandates and Memorandums of Understanding(s) should be developed to ensure that:

- a) The DSD can collect data yearly where possible (especially for the GHG inventory).
- b) There is a regular flow to the DSD of climate finance from and through the national budgeting systems at the Department of Finance as well as Department of Economic Development along with any necessary climate finance expertise.
- c) Mandates for data collection in the Draft Climate Change Bill, 2018 are honoured. This includes data flows for other non-environmental national statistics (e.g., energy imports and consumption, transportation and product use) that are needed to develop transparent and trusted climate indicators to assess actions and their wider impacts.

2.4.1.3 Attract and Track Project-based Climate Finance.

In Saint Lucia, projects are mostly reliant on large contributions from development partners. Information on projects, their outcomes and potential sources of funding need to be collated and communicated in an accessible attractive form to ensure projects can attract and secure funding. For

Information on projects and their support should be collated in the **MRV portal**, using the linked structured templates on actions/projects and support/climate finance. This can include links to the climate finance tracking system.

existing projects with funding, data already compiled in the governments climate finance tracking system, a flow of summary information, into the MRV portal, is needed for the purpose of national reporting.

2.4.1.4 Collate Information on Gaps and Needs for Action Implementation

Recommendations on improving adaptation and mitigation action already exist in a range of documents. However, they are produced as part of individual projects, rather than tracked as part of an overarching MRV system. The MRV system needs to maintain a list of the problems (gaps, needs, barriers) facing the implementation of climate action, possible solutions and their status.

The **MRV portal** includes a list to track the gaps and needs related to actions. This can be used to collate information on gaps and needs (barriers) and linked to the

2.4.2 Technical Capacity Recommendations

The technical capacity of experts refers to both the knowledge and the time available of in-country experts. Currently, technical capacity relating to GHG inventory compilation, tracking mitigation actions, projections, and climate finance is based around specific project work carried out by international and transient experts.

2.4.2.1 Recruit, Train and Sufficiently Resource National Experts

National expertise is required to gather, archive, analyse and report information needed by decision makers and the public. The MRV system needs sufficient capacity and expertise to perform its functions of gathering and analysing data, producing reports, and fully engaging with stakeholders. There is a need to establish a list of technical roles and responsibilities across all areas of the MRV system and associated terms of reference.

The technical team necessary to support the MRV system needs to be sufficiently resourced to perform the range of thematic technical data gathering, analysis and reporting and the managerial activities required including:

- set up and maintenance of new organizational relationships.
 - securing data flows for long term use
- recruitment, training, and retention of expertise
 - implementation of systems and tools to support expert teams.
- gathering, reviewing, compiling, and analysing data.
- development and delivery of new outputs such as Biennial Transparency Reports (BTRs)
- stakeholder engagement and communications.

Table 3 provides a guide for estimating the trained human resource needs for the MRV system. The specific resource needs should be adjusted to reflect the demands of information gathering and reporting. An additional 30% full-time equivalent (FTE) time can be added (as additional trainees) for training and back-up support. This helps to secure adequate succession and to provide a positive work environment for both junior and senior experts.

Table 3: Estimate of basic resource needs for MRV systems for small to medium-sized countries

Transparency Area	Suggested resources			
	Number of people and workload (% of time)	Full Time Equivalent (FTE)	FTE for backup and succession (+30%)	Total FTE
Transparency system administrator	1 Person @ 50%	0.5	0.2	0.7
Adaptation				
Adaptation MRV coordination	1 Person @ 100%	1	0.3	1.3
Climate variables	3 People @ 35%	1	0.3	1.3
Vulnerability, risks, loss and damage	10 People @ 30%	3	1	4
Adaptation action[1]	15 People @ 20%	3	1	4
Mitigation				
Mitigation MRV coordination	1 Person @ 100%	1	0.3	1.3
GHG inventory[2]	5 People @ 50%	2.5	1	3.5
Projections	3 People @ 50%	1.5	0.3	1.8
Mitigation action	15 People @ 20%	3	1	4
Investment (Climate finance and support)				
Investment & support	1 Person @ 50%	0.5	0.2	0.7
Total	30–55 Stakeholders	17	6	23

Source ([UNFCCC](#))

Most of the team (except for coordinators) will be Lead Experts who will gather, analyse, and report on information for their technical area. In addition to their primary roles, lead experts should also act as support experts to review methods, data sources and assumptions for another lead expert. This builds wider collaboration and contingency so that support experts can stand in for lead experts if needed. Expertise can come from a range of organizations so long as appropriate terms of reference and coordination is in place.

While it should be a long-term goal to install a national team of experts within the MRV system, specific assistance from external consultants can provide advantages during the establishment of the MRV system, for longer term mentoring and training and for some more complex technical areas. Therefore, the MRV system should be equipped to make use of external expert assistance. This should be provided in a way that builds local capacity from the start.

Where possible the team should include junior experts supporting lead experts. Junior experts will provide succession, back-up, fresh insights, and new skills (often in data processing and engagement). In addition, the team should be able to draw on Information Technology skills from within or from available external services.

The expertise outlined above may not be readily available within the existing institutions. Resources need to also support recruitment activities, retain expertise, and subsidise salaries/contracts to fill any gaps in the available expertise where external support is required. This facilitates the retaining experts in the long run and reduces the reliance on stop-start project-based availability.

Where existing experts are taking on new responsibility (gathering, compiling, reporting data), resources will need to be channelled into a range of different training activities. Where possible, training should be delivered to multiple staff to build a broader knowledge base across the organizations, support teamwork and succession management. Those receiving the training can also in turn train others utilizing training material stored in the MRV portal.

Regular training and engagement with outside experts will keep national experts up to date on the latest thinking surrounding MRV. This could include specific technical training for activities such as GHG inventory compilation, QA/QC or climate change vulnerability and impact assessments, action impact quantification, GHG projections and assessment of wider impacts. It could also include training on any new systems or technologies introduced, for example training for coordinators on any new IT systems.

The **MRV portal** should house the training plans and the training material used by the MRV system. Engagement activities can track training activities for stakeholders.

2.4.3 Data Flow Recommendations

2.4.3.1 *Establishing New MOUs*

There is a need for GOSL to consolidate information on critical datasets and secure data flows for long term input to the MRV system. To do this, it is key to identify and engage with stakeholders who supply data, building upon existing MoUs ¹⁴. Data Sharing Agreements can be established where appropriate.

¹⁴ MoUs between the DSD and the following organisations already exist:

- Saint Lucia National Trust
- Department of Agriculture, Fisheries, Natural Resources and Cooperatives including Water Resources Management Agency
- Ministry of Health and Wellness
- Department of Public Service
- Central Statistical Office, Department of Economic Development, Transport and Civil Aviation
- Saint Lucia Solid Waste Management Authority

Several MoUs have been established under the NEIS; however, there needs to be an analysis to determine the missing critical agencies, such as Customs, Economic Development and Finance.

Efficient data flows are required on:

- trends in loss and damage and climate related events and changes in GHG emissions and removals
- risks and vulnerabilities from climate change across a range of sectors
- adaptation and mitigation actions and whether these are sufficient to meet goals/targets/objectives set.

This includes information on:

- character
- costs
- benefits
- impacts

The **MRV portal** should house details of MoUs linking stakeholders to the MRV system. It should also include, in the improvement plan, a list of MoUs, that are not yet developed but are needed. The MRV system should include the details of the ongoing thematic work on vulnerabilities and risks, climate change analysis etc.

2.4.3.2 Map Data Flows and Datasets Linked to Data Providing Stakeholders

The MRV system needs to remember where data came from and when/how updates can be provided. The list of the datasets and data providers should cover the full scope of the MRV system across mitigation, adaptation, and climate finance.

The **MRV portal** includes a list for storing meta data on datasets along with details of the data provider. Where possible, datasets should be linked to data providing stakeholders.

-
- Water and Sewerage Company Ltd
 - Department of Physical Planning
 - Ministry of Infrastructure, Ports, Labour and Energy
 - Saint Lucia Metrological Services
 - National Conservation Authority

2.4.3.3 Create Data Supply Agreements

Data sharing and data supply agreements need to be developed in collaboration with key contributors to ensure timely updates to critical datasets. Existing rules and regulations and laws could be reviewed, and additional DSAs or MoUs with data providers can be established if necessary. The DSD could consider means to incentivise the development and agreement of data supply agreements and MoUs. The DSAs and MoUs will help to clarify (and specify) data needs and ensure that data can be collected on time and with minimal effort. If appropriate, incentives can be included in these agreements to facilitate data collection.

2.4.3.4 Consolidate Existing Data into the MRV System

Existing data should be consolidated into the MRV system from a range of reporting projects including:

- Data collection for GHG mitigation reporting e.g., for the compilation of the BUR, NC and NDC.
- Data on adaptation, risks and vulnerabilities, loss, and damage, GHG emissions and climate indicators collected for reports including NCs and reviews of adaptation finance.
- Data flows from the climate finance, budget tracking and associated stakeholders. This can include links to reports generated by the climate budget tracking system. A few sources can also provide analysis methodologies and classification systems for tracking climate finance.
- Any databases of ongoing and proposed environmental projects including funding amounts from donors such as the Green Climate Fund (GCF), the Adaptation Fund, and the Global Environment Facility (GEF)

The **MRV portal** contains a list which can include information related to all climate support funding from public, private and international development aid investors. The **MRV portal** contains lists of challenges and indicators that can incorporate all the above. The **MRV portal** can store thematic datasets along with associated metadata. The **MRV portal** can incorporate the above and other material into its systems and archives.

2.4.4 Systems and Tools Recommendations

The MRV system must effectively manage the data from the data flows described above. This involves:

- developing templates for data collection
- developing and maintaining indicators

- using data analysis tools
- Quality Assurance and Quality Control (QA/QC)

The MRV portal will provide a key tool for tracking mitigation and adaptation action and associated finances on a project-by-project basis against targets. Complimentary tools should be developed to enhance the MRV system.

2.4.4.1 Create a Central Store of Tools within the MRV System

While the GOSL has access to several tools for GHG inventory compilation, there is no central system for documenting and securely storing these tools.

The **MRV portal** can store or link to tools and provide information about them.

2.4.4.2 Develop and Maintain an Improvement Plan

The GOSL will consider establishing a list of proposed, planned and implemented improvements for the MRV system. This list can be used to engage stakeholders in improvement and to present MRV gaps and needs in reports. There are existing recommendations for improvements in Saint Lucia relating to the MRV of climate change mitigation, adaptation, and support; however, they are produced as part of individual projects, rather than part of an overarching MRV system.

A range of relevant recommendations for improvement that need to be managed have been identified in reports such as the BUR, NCs and in engagements with the CCMRV Hub and the UNFCCC. These improvements can be consolidated into the MRV systems improvement plan. Ongoing work on the NC, Adaptation plans and the NDC Implementation Plan can also feed into this plan.

The improvement plan can be developed and managed through the **MRV portal**. The implementation of the improvement plan also be tracked in the portal.

2.4.4.3 Continue Managing Work Plans, TORs, and Templates for Outputs

The GOSL will continue to manage its workplans, terms of reference and document templates associated with its MRV activities. This includes templates for key documents such as the NDC implementation plan, NAP, NCs, BURs and BTRs provided to the UNFCCC and wider national audiences.

2.4.4.4 Developing Tools for the GHG Inventory, Mitigation, Adaptation, and Impact Tracking.”

The GOSL will continue to develop tools and processes for gathering data, compilation and analysis and developing indicators, reports, and outputs.

GHG inventory and projections: This should include the use of tools for GHG data collection and calculations including country specific tools for more complex calculations and pre-processing of data. The DSD will aim to consolidate knowledge and tools for GHG projections to 2040/50 including LEAP (Low Emissions Analysis Platform), GACMO (Greenhouse Gas Abatement Cost Model), PROSPECTS+ and other models. This should also include links with approaches and tools used to estimate the impacts of projects and mitigation and adaptation actions.

Mitigation and adaptation action tracking and impact quantification: The GOSL can use the MRV portal to capture information on mitigation and adaptation actions, their support, and wider impacts.

This can include:

- Sustainable Development Goals (SDGs)
- wider environmental and biodiversity strategies
- National Growth and Development strategies
- Just Transition

As well as tools for gathering, structuring, and sharing information, the DSD will give consideration to the development of tools for estimating and tracking the various expected outcomes of action/projects. These can include calculation tools for different sectors to estimate GHG savings as well as parameters to quantify resilience and adaptation.

The GOSL will continue to develop and consolidate its tools (and training material) for assessing climate resilience, risks, vulnerability and loss and damage. This also includes tools for analysing meteorological, hydrological and other monitoring data.

The **MRV portal** can store or link to tools and provide information about them including guidance and training material.

2.4.4.5 Indicator Development and Management System

The GOSL hopes to develop a comprehensive set of climate change related indicators that underpin its NDC, NAP and climate finance objectives and help stakeholders track regular progress. An initial set of indicators for mitigation action can be compiled for the BUR and integrated with the indicators required for Multilateral Environmental Agreements reporting under the Cross-Cutting Capacity Development (CCCD) project (2020) for the National Environmental Information System (NEIS) ¹⁵. In

The **MRV portal** provides facilities for managing indicator lists, indicator data. DSD should use this to develop a list of indicators for consultation and refinement with stakeholders.

¹⁵ <https://www.neis.govt.lc/#/>

addition, Saint Lucia can consider a range of suggested United Nations Statistics Division (UNSD) climate indicators in this work.

2.4.4.6 Metadata Categorization

The GOSL will consider developing a comprehensive set of classifications to manage information within the MRV system and for communication with stakeholders. Classifications used in existing reports and statistical systems can be consolidated into classification libraries in the MRV system.

Sources of classifications include:

- The IPCC system for categorising sources and sinks of GHGs, used in the GHG inventory
- Classifications for GHG mitigation action and technologies
- National Adaptation Plan Monitoring and Evaluation Guide
- Tabulated and classified information on:
 - Hazards
 - financial flows
 - target sectors for resilience analysis and adaptation investments
- UNSD Climate Change Indicators across all of the climate change themes

A comprehensive classification system will support clear communication and decisive action on climate change.

The MRV portal can house the classifications needed and used in the **MRV system**.

2.4.4.7 Public Information and Stakeholder Engagement Tools

The GOSL will aim to develop a clear single point of entry and standardised communication approach for updating stakeholders on progress. This can be based on the Climate Change Communication Strategy compiled through the NAP but expanded to mitigation as well as adaptation themes.

The lists of challenges, indicators and lists of actions/projects will form a central resource for communication. The DSD can collaborate with related mitigation and adaptation projects and wider impacts to develop wider engagement strategies and use the MRV portal to structure and maintain regularly updated datasets.

The GHG inventory and GHG reduction (mitigation) reports and associated projections are starting to use graphs to highlight key messages in reports. The DSD is also engaging in the NEIS that will assist in visualizing data relevant for reporting to the Rio Conventions. These reports and data presentations

The **MRV portal** can house the strategies and link to the relevant material used for communications (indicators, actions, wider impacts etc). It can also provide the structured data ready for extraction and use in communications as well as communication templates.

should be developed together to provide a transparent perspective on progress and ambition for a wide range of stakeholders.

2.4.4.8 Quality Assurance and Quality Control

The GOSL will give consideration to the development of a comprehensive QA/QC system that provides overarching as well as sector/project/activity specific QA/QC and guidance on meeting quality objectives. This will include compliance with national and international guidelines on public consultation.

The **MRV portal** can house the QA/QC system (with structured lists highlighting quality objectives, QA/QC activities and QA/QC logs). It can provide tools for managing guidance and training material.

2.4.4.9 Enhance the MRV Portal

The MRV portal will act as a workspace for gathering and archiving information on climate change.

The development of the MRV portal should include:

DEFINING THE PORTAL ADMINISTRATION ROLES: Individuals gathering data and compiling information within the portal will need defined roles (see recommendation 3.1.1).

ALLOCATING SUFFICIENT RESOURCES TO MAINTAIN THE PORTAL: Sufficient staffing is needed for the maintenance of the portal and adequate provision of contents (see recommendation 3.2.1).

DEFINING DATA FORMATS: Data formats will need to be made compatible with the system using data supply agreements (see recommendation 3.3.2).

VERIFICATION OF DATA STORED IN THE PORTAL: A quality assurance and quality control process to maintain data integrity (see recommendation 3.4.8).

2.4.5 Stakeholder Engagement Recommendations

Stakeholder engagement is required for collecting data and using MRV system outputs for evidence-based decision making. Stakeholders can include:

- the public
- academia
- national and local government
- private sector
- NGOs
- other decision makers

Stakeholders need to be engaged in ensuring efficient outputs for mandatory publications (BUR, NC, NDC) and rewarded with improved transparency and decision-making tools. An important link, for stakeholder engagement, is between the impacts of climate change action and National Economic and Sustainability goals. The MRV portal can facilitate this by structuring the information on action and linking it to wider impacts.

A wide range of stakeholders can be engaged through consultations, briefings, data visualization and the regular publication of indicators. These processes and tools need to be developed internally with national government.

2.4.5.1 Develop the DSD's Public Awareness and Communications Strategy

The DSD is already advancing its institutional proficiency in communication strategies and channels to prompt urgent climate action. A comprehensive Public Awareness and Communications Strategy for the Department that gives due consideration to existing thematic communication strategies will support the implementation of activities and mandates reflected in the DSDs core objectives. It will also support "Article 12" of the Paris Agreement to enhance climate change education, training, public awareness, public participation, and public access to information. The MRV systems core tools should incorporate the strategy along with key principles for communication.

The strategy would support the DSD to establish mechanisms for building necessary social partnerships, intensifying public dialogue and advocacy for environmental appreciation and protection. A long-term plan is needed for intensifying public activism in support of environmental issues at all levels of society and embedding it in decision making processes. This plan can build upon the Escazú Treaty, ratified by the Government in 2020, however it needs to be specific to the DSD within Saint Lucia.

Stakeholder workshops and the development of public engagement websites and infographics should be considered a priority. These will provide updates on progress against climate change mitigation, adaptation and support targets and provide engagement mechanisms to accelerate action and its investment.

Timelines for engagement activities should focus on the timelines for NDC, NAP and wider growth and development plans. The GCF - Adaptation Priorities in the Caribbean Study – recommends developing a communication programme to raise awareness of the need to invest in adaptation creating a platform to discuss adaptation opportunities.

High level engagement may be possible through the Minister responsible for Sustainable Development as the ambassador for the work of the DSD and the MRV system.

2.4.5.2 Under Auspices of NCCC establish a Technical Advisory Committee (TAC)

A Technical Advisory sub-committee could convene an active multi-sectoral committee informed by the MRV system and representing relevant government agencies and NGOs. The TAC would review emerging challenges, terms of reference and project progression informed by the MRV system.

The TAC will aim to engage with key decision makers on project progression and data gathering needs. Other stakeholder engagement activities will need support from the TAC, with the aim of enhancing the value of the MRV system outputs in the eyes of users.

TAC stakeholders and events can be organised with the help of The MRV portal by providing lists of stakeholders and workspaces for this group and tracking engagement activities.

2.4.5.3 Collate Information on Workshops and Events

Material and results from relevant workshops and events need to be gathered and shared to improve stakeholder engagement in and understanding of climate change impacts.

These is a structured template available in the **MRV portal** to store this information.

2.4.5.4 Ensure Collaboration with the NEIS

The NEIS is a website developed to allow the public to view MEA reports along with a list of climate change, land degradation and biodiversity indicators. While the NEIS produces some standard MEA reports, it does not produce complex and evolving reports such as those for the BUR, NC and BTRs. Communication with the NEIS team is required to understand data outputs that can feed directly into other reports so that effort is not duplicated. The MRV system should therefore complement and enhance the NEIS and vice versa. This principle extends to other current and future systems.

There will be data sharing between the MRV portal and the NEIS. The MRV portal will need to recognise and manage this.

CHAPTER 3: NATIONAL GREENHOUSE GAS INVENTORY

3.1 GHG INVENTORY

Saint Lucia's GHG inventory provides a key evidence based on the trends and key sources of emissions and removals in the country. This resource can be used for reporting as well as informing different decision makers and stakeholders in the country. The GHG inventory is managed and maintained by The Department of Sustainable Development on behalf of Saint Lucia.

Geographical coverage

This inventory covers the entirety of on island emissions from Saint Lucia and national waters.

GHG's reported

Direct GHGs have a radiative effect in the atmosphere. Indirect GHGs are gases that have indirect radiative effects through reacting/breaking down in the atmosphere and produce a direct GHG. NO_x , CO and NMVOC are indirect GHGs which can increase tropospheric ozone concentration and hence radiative forcing. SO_2 contributes to aerosol formation in the atmosphere which is believed to have a negative net radiative forcing effect, tending to cool the surface.

The direct GHG's reported are:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)

The following GHGs have not been included due to their low significance and complexities in collecting and compiling their data.

- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF_6)
- Nitrogen trifluoride (NF_3)

The indirect GHG's reported are:

- Non-Methane Volatile Organic Compounds (NMVOC)

The following other indirect GHG's have not been included in this inventory:

- Nitrogen oxides (NO_x , as NO_2)
- Carbon monoxide (CO)
- Sulphur dioxide (SO_2)

The summary tables of the national GHG emissions for the year 2018 are included in Annex III, **Table 78**. Further explanation on the notation keys used can be found in the NIR (2020). Furthermore, continuous efforts are being made to improve data collection and estimation of emissions as outlined in Chapter 2.

3.2 GLOBAL WARMING POTENTIALS

The direct GHGs have different effectiveness in radiative forcing. The global warming potential (GWP) provides a simple measure of the relative radiative effects of the emissions of the various gases. It is defined as the cumulative radiative forcing between the present and a future time horizon caused by a unit mass of gas emitted now, expressed relative to that of CO₂. It is necessary to define a time horizon because the gases have different lifetimes in the atmosphere. Emissions and removals from non-CO₂ pollutants have been converted to CO₂ equivalent (CO₂eq) using GWP values from the IPCC Second Assessment Report (SAR). The applied GWP values are presented in **Table 4**. By weighting the emissions using each gas GWP, it is possible to estimate the total GHG emissions of Saint Lucia.

Table 4: Global warming potential (GWP) values applied in the inventory, source: SAR

Gas		GWP
Carbon dioxide	CO ₂	1
Methane	CH ₄	21
Nitrous oxide	N ₂ O	310
HFC-32 *	CH ₂ F ₂	650
HFC-143a *	CH ₃ CF ₃	3,800
HFC -125 *	CHF ₂ CF ₃	2,800
HFC 134a *	CH ₂ CHF ₂	1,300

Note: * An annual GWP value for the assumed blend of f-gases used in the Refrigeration and Stationary Air Conditioning has been calculated from these HFC

3.3 INVENTORY PREPARATION

3.3.1 Overview of inventory preparation and management

The inventory cycle is presented in

Figure 13 below. This cycle ensures that there is continuous improvement in the inventory data each time it is updated. Planning and improvement phases enable new data and improvements to be implemented in an organised way.

Figure 13: The GHG inventory cycle ¹⁶



3.3.2 Data collection, processing, and storage

The data and information required for compiling national GHG inventories can include data from a range of different data collecting organisations. This data can be in the form of online datasets, data from hard copies of reports, and expert judgement information from discussions with experts. All this information and data must be collated, reviewed, and analysed to ensure it is appropriately and accurately used within the inventory estimates.

Throughout the inventory compilation process, the sector experts applied the good practice guidance from the IPCC Guidelines to identify, select, collect, review, and incorporate data gathered in a consistent and accurate manner. All datasets and information used have been transparently

¹⁶ Institutional arrangements template. Developing a national inventory system template workbook. US EPA, December 2011.

documented in the **Excel compilation spreadsheets** and through the **method statements** (refer to the NIR, 2020).

3.4 KEY METHODS AND DATA SOURCES

As far as possible, national datasets and statistics are used in the inventory. However, there are instances where the national datasets are not available, and information has been taken from international datasets e.g., FAO data for livestock trends. Throughout the data collection process, the sector experts have been conscious of the prioritisation of categories. These are sectors which are likely to have a more significant contribution to total national emissions and therefore deemed a higher priority. The data gathering process has focussed on the key categories by putting resources into the investigation and collection of data to support the estimates in the key categories. See the NIR (2020) for all activity data sources and justification for the methods applied. An overview of the methods and data sources used for each sector is provided below.

Energy: All methods in the energy sector use Tier 1 approaches outlined in either the 2006 IPCC Guidelines, or in the case of charcoal production, the 2019 Refinement to the 2006 IPCC Guidelines. Default emission factors are used in all cases for CO₂, CH₄, and N₂O in the absence of country-specific information. In most cases, activity data is derived from the historic balances for the period 2000 to 2012. From 2000 – 2009, these were compiled by Saint Lucia Government, whilst from 2010 – 2012 they were instead compiled by the Latin American Energy Organization (OLADE). Since 2012, however, information on fuel used and type of fuel used is absent across all sectors apart from 1A1a Public Electricity and Heat Production. Extrapolations are instead applied to the latest available energy balance data, assuming that fuel use can be approximated by the trend in a number of proxies. Due to insufficient data provided in a timely manner for supply of fuel, only a sectoral approach was used in the Energy Sector. Efforts have been made to have more consistent data provided to allow for the inclusion of both a reference and sectoral approach in future NCs and BURs.

IPPU: Methodologies for estimating emissions from N₂O from Product Use (2G) and Stationary and Mobile Air conditioning and Refrigeration (2F), are sourced from the 2006 IPCC Guidelines. Emission estimates are derived from assumptions applied to import data and emission factors taken from the 2006 IPCC Guidebook. The EMEP/CORINAIR Emission Inventory Guidebook (EEA, 2005) has been utilised to generate NMVOC emission estimates from categories Solvent Use (2D) and Other Industrial Production (2H). Activity data is sourced predominantly from import and customs data on mass of product entering Saint Lucia (e.g., coating applications) applied to default emission factors taken from the EMEP guidebook. National production data has been collected from manufacturers of food and beverages within Saint Lucia.

Agriculture: A Tier 1 methodology approach was taken in the agriculture sector as outlined in the 2006 IPCC Guidelines. Default emission factors were used in all cases for CO₂, CH₄, and N₂O. In most cases, the activity data used was taken from the previous inventory, which covered the period 2000-2010. The majority of this data was compiled by the Ministry of Agriculture. Due to a lack of later data available after 2010, the time series was extrapolated based off a trend analysis carried out on international FAO statistics. For the fraction of animal waste management systems, this was taken from a report by Dr George Joseph the Chief Veterinary Officer in 2000, and these fractions were assumed to be the same across the time series. In the case of liming and composting, this data was applied from local expert judgement. In the case of crop yields, where there were no IPCC default assumptions for percentage of dry matter, the Jamaican GHG inventory was used.

Assumptions for region and average temperature were made following the Tier 1 methodology. Saint Lucia was assumed to be 'Latin America' where possible, if not 'Developing Country'. The climate was assumed to be 'warm'. As there are no cattle bred strictly for dairy on the island, all cattle are categorised as 'non-dairy' according to the definitions set in the 2006 IPCC Guidelines.

LULUCF: The land use and land-use change matrix for time series is obtained with the use of Collect Earth tool developed under the CfRN project. The land use data is categorised into 16 different land uses; 2,501 land area parcels (24.63 ha each) were analysed over the period. Disturbances and the year they occurred are recorded and accounted for. Emission factors are obtained mainly from the 2006 IPCC Guidelines and 2019 Refinement to the 2006 IPCC Guidelines, with high level of uncertainties. Country-specific emission factors are used for biomass stock in forestland from data arising from the National Forest Inventory (2009). Chave *et al.* (2014) pantropical biomass allometric equation was selected to estimate biomass in Saint Lucia. Detailed methodology information is provided within the NIR (2020) and "*GREENHOUSE GAS INVENTORY REPORT FOR THE FOREST AND LAND USE SECTOR (FOLU) OF SAINT LUCIA 2000 –2018*"¹⁷.

Waste: Calculation of CH₄ emissions from Solid Waste Disposal Sites (SWDS) used the Tier 1 First Order Decay (FOD) Model from the 2006 IPCC Guidelines. Data on amount of waste disposed of in the SWDS has been used where available. However, this data is only available from when weighbridges came into operation. For the years prior the amount of waste disposed in landfill was calculated using population and the IPCC regional default for waste generation. The weighbridge data was used to calculate an average waste generation value for the years available and this confirmed that the IPCC regional default is applicable. Saint Lucia specific waste composition data was used.

¹⁷ This document is currently under review and is pending publication

CH₄ and N₂O emissions from composting was calculated using the 2006 IPCC Tier 1 methodology. Data on the amount of waste composted at the Vieux-fort disposal site was used, however this was only available for 2015 and 2019. It was estimated by the Saint Lucia Solid Waste Management Authority that half the amount of waste composted in 2015 was composted in 2016-2018. IPCC default emission factors for CH₄ and N₂O from composting were used. CH₄ emissions from domestic and industrial wastewater were calculated using 2006 IPCC Tier 1 methodology. The Saint Lucia specific activity data used was population and the fraction of utilisation of the different wastewater treatment types. Population was adjusted to include tourism to give a more accurate estimation of emissions. The volumes of industrial wastewater produced was calculated using production and the IPCC default for wastewater production. N₂O emissions from wastewater were calculated using protein consumption of the population, adjusted to include tourists. A correction factor for co-discharge of industrial wastewater was also used.

3.5 KEY CATEGORIES

The GHG inventory key category analysis as detailed in the 2006 IPCC Guidelines (V1, Chp4), provides a useful analysis of the inventory estimates by highlighting the more significant categories. By highlighting these categories, the inventory compilation team can better assess the prioritisation for improvement of data gathering and methodologies. Other users of the inventory can also clearly identify those categories that may be more applicable for mitigation to reduce national GHG emissions.

A level and trend key category analysis were performed using Approach 1 and Approach 2, with LULUCF. No additional key categories were identified when conducting the key category analysis without LULUCF. The results are summarised in **Table 5** below. The top three sectors of 1A1 Energy Industries CO₂, 1A3b Road Transport CO₂ and 3B1a Forest Land Remaining Forest Land CO₂ make up the majority of emissions/removals in Saint Lucia.

For the full results of the key category analysis refer to the NIR (2020).

Table 5: Summary of the identified key categories according to Level and Trend assessments with LULUCF using Approach 1 and Approach 2

L1 = level, approach 1, T1 = trend, approach 1, L2 = level approach 2, T2 = trend, approach 2, BY = base year, LY = latest year. Note, the most significant category is denoted by a rank of 1.

Category	L1 BY	L1 LY	T1	L2	T2	Overall Rank
1A1: Energy Industries - CO ₂	1	1	2	1	2	1.4
1A3b: Road Transport - CO ₂	2	2	3	4	N	2.8

Category	L1 BY	L1 LY	T1	L2	T2	Overall Rank
2F1: Product Uses as Substitutes for Ozone Depleting Substances - Refrigeration and Air Conditioning - HFCs	7	4	1	2	1	3.0
3B1a: Forest Land Remaining Forest Land - CO ₂	3	3	7	3	N	4.0
4A: Solid Waste Disposal - CH ₄	4	5	5	5	N	4.8
1B1: Fugitive emissions from fuels - Solid Fuels - CH ₄	6	N	4	N	5	5.0
1A4: Fuel Combustion Activities - Other Sectors - CH ₄	8	N	6	N	4	6.0
1A2: Manufacturing Industries and Construction - CO ₂	N	7	N	N	N	7.0
3C4: Direct N ₂ O MS - N ₂ O	10	N	9	6	3	7.0
3B1bi: Land Converted to Forest Land - CO ₂	N	8	N	7	N	7.5
1A4: Fuel Combustion Activities - Other Sectors - CO ₂	5	6	15	N	N	8.7
1A3b: Road Transport - N ₂ O	N	9	N	N	N	9.0
3A1aii: Enteric Fermentation Non-Dairy Cattle CH ₄	9	11	8	N	N	9.3
3A2i: Manure Management Poultry N ₂ O	N	N	10	N	N	10.0
3B1bii: Land Converted to Forest Land - CO ₂	N	10	N	N	N	10.0
3A2h: Manure Management Swine N ₂ O	N	12	11	N	N	11.5
1A3d: National Navigation - CO ₂	N	N	12	N	N	12.0
1A3a: Domestic Aviation - CO ₂	N	N	13	N	N	13.0
3C5: Indirect N ₂ O MS - N ₂ O	N	N	14	N	N	14.0
2G: Other Product Manufacture and Use - N ₂ O	N	N	16	N	N	16.0
1A4: Fuel Combustion Activities - Other Sectors - N ₂ O	N	N	17	N	N	17.0

3.6 QUALITY ASSURANCE/ QUALITY CONTROL (QA/QC)

The implementation of QA/QC is essential for ensuring that the national inventory reporting is credible and can be relied on by its users. QA/QC focuses on ensuring that the GHG inventory is transparent, complete, consistent, comparable, and accurate in accordance with the 2006 IPCC Guidelines. QA/QC activities include:

- **Quality Control (QC):** Routine activities to maintain quality during compilation to ensure data integrity and correctness, identify and address problems and document and archive inventory material and QA/QC
- **Quality Assurance (QA):** Review procedures by those not directly involved in inventory compilation
- **Verification:** External cross comparison and review processes, this could include checking country specific data against online resources or comparing the reference and sectoral approach

The QA/QC system put in place for the Saint Lucian GHG Inventory is focused around three linked elements:

1. The QA/QC plan. The QA/QC plan provides centralised documentation of the inventory teams, for relevant training material (to identify and track the engagement of key experts and stakeholders with the inventory team); for the storage of internal document templates and specific QA/QC guidance for e.g. data collection, review and analysis. The QA/QC plan sets out the objectives, roles and responsibilities and activities for ensuring the GHG inventory is of the best possible quality. It provides a working framework and enhances the transparency of inventory compilation and reporting by defining structured QA/QC activities and documentation as well as wider documentation. The roles and key responsibilities of those involved with preparing the inventory documented in the plan include:
 - QA/QC Coordinator: overall responsibility for the annual design of QA/QC and improvement activities and for ensuring that the QA/QC Plan is kept up to date and reviewed at least annually.
 - Sectoral lead: the sectoral lead is the main knowledge holder on individual inventory sectors. They are responsible for completion of QC activities.
 - Sectoral support: each inventory sector has an identified 'second'. The role of the second is to provide support to the sectoral lead and to protect institutional memory. The second has specific QC activities assigned to them at key milestones in the annual inventory cycle.
2. An Improvement Plan. This plan is used for tracking possible and agreed improvement work.
3. The QA/QC Log. This provides documented evidence of QA/QC activities. Logging of QA/QC is done at different levels and is often embedded in the compilation files using specialised tools. QA/QC activities are also documented within the check library sheet and are maintained by sectoral leads. The QA/QC Coordinator is responsible for ensuring that all compilation files show complete QA/QC documentation as defined in the QA/QC Plan and for summarising the QA/QC activities undertaken for the QA/QC log.

The following summarises the QA/QC applied to the GHG inventory estimates:

- 1) Cross-cutting QC: performed for all categories
 - Recalculations: where available emissions/removal estimates have been compared to available estimates in the previous inventory and reasons for any changes have been explained. A summary of the recalculations was provided as is available in Section 1.9.2 in the NIR.
 - Trend checks: sense checks on the time series to identify outliers.

- 2) Cross-cutting QA: performed for all categories
 - QA review: all compilation files were reviewed by someone not directly involved in the compilation of the emission/removal estimates
- 3) Sector-specific QA/QC: performed during the data collection and emission/ removal compilation. These checks are documented in the sectoral method chapters and category-specific method statements available in the NIR.
- 4) Peer review and consultation: the inventory as a whole and sector-specific estimates underwent in-country peer review during a Validation Workshop which took place between the 29th June – 8th July 2020.

Further Information on the current QA/QC system in Saint Lucia and the sectoral QA/QC checks applied is provided in the NIR (2020).

3.7 UNCERTAINTY ANALYSIS

An uncertainty analysis was undertaken using the Approach 1 (error propagation) method described by the 2006 IPCC Guidelines (V1, Chp3). Approach 1 provides estimates of uncertainty by GHG according to IPCC sector. Trend uncertainty between the base year and 2018 and a combined uncertainty of activity data and emission factor uncertainty was undertaken. The total uncertainty for the inventory was determined to be $\pm 24\%$, with a trend uncertainty of $\pm 41\%$. For a full description of the uncertainty analysis refer to the NIR (2020).

Energy: The primary uncertainties associated with the energy sector emissions estimates are those associated with the activity data time-series, in particular from 2013 to the latest year. There is no current available dataset which can either replace or validate the assumptions currently made to extrapolate activity data from the latest available energy balance. Therefore, the CO₂ emissions estimates, which dominate the emission profile of the sector, carry large uncertainties that are a priority to improve in future submissions of the inventory.

IPPU: The most significant sources of uncertainty are in the 2D Domestic Solvent use sector, where emission estimates are compiled using a Tier 1 default emission factor applied to population data. Reducing uncertainty in this sector would require import data on domestic solvents and a national survey to categorise solvent use in households. The other Tier 1 estimate is emissions from lubricant use, however reducing uncertainty in this sector relies on improvements made to the energy balance. As emissions from F-gases are the most significant within the sector, addressing uncertainty in both the activity data and assumptions used to choose emission factors is important. Uncertainty arises in

import data used to determine the stock of f-gas containing equipment within Saint Lucia and choosing parameters which impact the emission factor e.g., total charge, lifetime.

Agriculture: Most uncertainty factors for the activity data and emission factors have been taken from the 2006 IPCC Guidelines as default emission factors were being used, and no country-specific studies of uncertainty have been carried out in Saint Lucia. The overall average uncertainty was calculated to be $\pm 46\%$ which is high, according to the 2006 IPCC Guideline definitions. Indirect N_2O emissions were particularly uncertain ranging from a $\pm 92\%$ uncertainty for indirect N_2O emissions from manure management, and $\pm 180\%$ uncertainty for indirect N_2O emissions from volatilisation. There is however relatively low uncertainty for CH_4 emissions from enteric fermentation and manure management, which have an uncertainty of around $\pm 20\%$, considerably lower than other sectors and gases.

LULUCF: The land uses and land-use changes that have a minor representation in Saint Lucia's total area have fewer sample plots in Collect Earth analysis, consequently with a higher uncertainty. Forest land remaining forest land has the lowest uncertainty of all land use areas with an activity data uncertainty of $\pm 3\%$. In contrast, croplands, grasslands, and settlements converted to forest lands have activity data uncertainty values of ± 38 , 37 and 100% respectively. Emission factors from the 2006 IPCC Guidelines and 2019 Refinement to the 2006 IPCC Guidelines have high level of uncertainties. Uncertainty of the country-specific emission factors used for biomass stock in forestland from the National Forest Inventory is unknown.

Waste: Solid waste disposal on land had a high uncertainty of $\pm 72\%$. The largest contribution to this estimate was the uncertainty in the amount of waste disposed to the SWDS as while weighbridge data is available for the later years it is not available across the time series. The use of IPCC default emission factors in estimating emissions from composting and N_2O from domestic wastewater was the highest contribution to their respective uncertainties. The uncertainty in N_2O emissions from domestic wastewater was the highest from the waste sector, along with CH_4 emissions from industrial wastewater, at $\pm 106\%$. CH_4 emissions from industrial wastewater treatment the largest contributing factor to this uncertainty is the use of IPCC defaults for the volume of wastewater produced per unit of production and Chemical Oxygen Demand (COD) which may not be reflective of Saint Lucia.

3.8 OVERVIEW OF COMPLETENESS, RECALCULATIONS & IMPROVEMENTS

3.8.1 Completeness

The majority of categories have been estimated using a Tier 1 methodology. A Tier 2 methodology was applied to 2D3d: Non-Energy Products from Fuels and Solvent Use - Coating applications, 2F1: Product Uses as Substitutes for Ozone Depleting Substances - Refrigeration and Air Conditioning and

3B1b: Land Converted to Forest Land. Some minor categories have not been estimated due to a lack of available activity data.

For a full list of the categories which have been estimated, are not estimated (NE) and are not occurring (NO) in the current inventory refer to the NIR (2020).

3.8.2 Recalculations

The previous inventory was prepared in 2015 and prepared emission/removal estimates for 2000, 2005 and 2010 from all major sectors. **Table 6** below provides the total emissions in the current and previous inventory for the overlapping years and the recalculations.

Table 6: Recalculations between the current and previous inventory for 2000, 2005 and 2010

Year	Total with LULUCF (Gg CO ₂ e)		Recalculation (Gg CO ₂ e)	Recalculation (%)
	Current inventory	Previous inventory		
2000	310.8	347.9	-37.1	-11%
2005	340.2	409.3	-69.1	-17%
2010	571.7	442.6	129.1	29%

The recalculations on a sector level are presented in the NIR (2020), the primary causes for recalculations in each sector are as follows:

- **Energy:** only small recalculations. Primary reason for recalculations is the adjustments to improve time-series consistency of activity data in a few cases (impacting CO₂ emissions mainly), particularly in the early part of the time-series, and the use of CH₄ and N₂O emission factors from the 2006 IPCC Guidelines rather than the Revised 1996 IPCC Guidelines.
- **IPPU:** HFC emissions from Refrigeration and Stationary Air Conditioning and Mobile Air Conditioning have been recalculated using a Tier 2 methodology which has resulted in much higher emission estimates as a result of assumptions on the number of equipment and amount of refrigerant in use (and hence leaking). Previous estimates assumed that the bulk imported amounts were emitted and did not accurately account for emissions from refrigerant imported in equipment.
- **Agriculture:** the reduction in emissions in the current inventory compared to the previous inventory is driven by lower emission estimates from fertiliser application. Similar

estimates from enteric fermentation, slightly higher emissions in the current inventory due to emission factors from Latin America from the IPCC being applied, the previous inventory used emission factors from North America.

- **LULUCF:** new land use data from the use of Collect Earth tool for the entire period resulted in new activity data values, along with a change in the source of information of biomass loss.
- **Waste:** estimated CH₄ emissions from solid waste are much lower in the current inventory. This is driven by recalculations in solid waste disposal on land. There have been recalculations in the amount of waste disposed to landfill between 2004 and 2010, however this alone does not explain the large differences seen. It is unclear from the information available what assumptions were made about the percentage of waste sent to solid waste disposal sites before 1996 in the previous inventory. In this inventory, it was assumed no waste was disposed of in solid waste disposal sites before 1996. A different assumption for this could explain the recalculations.

3.8.3 Improvements

The Improvement Plan is a list of the identified actions required for improvements for the GHG inventory. For each action, a description of the improvement is provided, and the specific weakness is identified e.g., institutional arrangements. The actions are then prioritised and allocated to a responsible organisation. The progress in implementing the actions is tracked through the Improvement Plan. The Improvement Plan is maintained by the QA/QC coordinator with input from the sector leads. The Improvement Plan is reviewed and updated at the start and end of each inventory cycle.

The key cross-cutting improvements include ensuring that there are at least two (senior and junior) experts for each inventory sector, developing a system to process the energy balance and implementing a QA/QC log. The key sectoral improvements are as follows:

- **Energy:** to attain better data for the energy balance. Other high priority improvements include developing country-specific factors to enable a Tier 2 method for electricity generation to be applied and improving estimates for fuel use in the road transport sector. There are also some sectors for which only aggregated data is available and improvement items have been defined to provide better data, this includes:
 - Splitting the fuel used for domestic and international aviation
 - Establishing the split of fuel between the subcategories of Manufacturing Industries and Construction
 - Splitting the fuel used between domestic and commercial uses

- **IPPU:** to set up a survey of suppliers of air conditioning and refrigeration units and servicing facilities of mobile air conditioning units to capture information on recovery, re-use and charge required to improve estimates of the F-gases. Arranging Data Supply Agreements (DSA) to gather data from manufacturers and production facilities.
- **Agriculture:** to obtain up-to-date, robust, and good quality activity data for the whole time series, including livestock populations, synthetic fertiliser data, crop production data, urea and liming application data, and updated data on manure management systems.
- **LULUCF:** to develop country-specific factors using local or regional studies for non-forest land uses and to improve forest land factors using local data on biomass losses. Other key improvements include collecting data on biomass burning, harvested wood products (HWPs) and soil organic carbon (SOC).
- **Waste:** to collect data where currently no activity data is available and therefore emissions have not been estimates, this includes:
 - the amount of waste composted at waste disposal sites, farms, households, and schools,
 - the amount of open burning, and
 - the volume of wastewater from breweries and distilleries.

For the full Improvement Plan refer to the NIR (2020).

3.9 TRENDS

3.9.1 Overview of Sectors

GHG emissions and removals are presented in five main sectors. These sectors are defined as:

- **Energy:** emissions from fuel combustion dominated by carbon dioxide (CO₂) released from the conversion of carbon in fuel to CO₂ and generation of heat. Energy also includes emissions of methane (CH₄) and other carbon rich volatile organic compounds associated with fugitive emissions from fuel production and storage. Typically, this sector is dominated by the big fossil fuel users including electricity generation and road transport.
- **Industrial Processes and Product Use (IPPU):** non-fuel related emissions from industrial processes and use of products with global warming impacts. This is often dominated by CO₂ and sometimes nitrous oxide (N₂O) emissions from large industrial process biproducts (such as converting limestone and dolomite to cement (CO₂) or hydrocarbons to base chemicals (CO₂, CH₄ and N₂O)). In Saint Lucia (which does not have this sort of industry), the main IPPU contributors are the users of refrigerants for air conditioning and refrigeration and associated emissions of the high global warming potential "F-gases" which are substitutes for Ozone Depleting Substances (ODS).

- **Agriculture:** non-energy use emissions only from livestock and crop production. This category can be broadly split into emissions from livestock and emissions from agricultural soils. The main source of emissions from livestock is from gases released from animals (enteric fermentation), a digestive process in herbivores which emits CH₄, and manure management (from the management of animal manure) which contains and emits CH₄ and N₂O. The methods of storage and treatment of manure (the animal waste management systems) impacts the quantity of CH₄ and N₂O emitted. The application of organic manure and synthetic fertiliser to land results in both direct and indirect N₂O from soils. Additional products which can be added to soils include liming and urea, which react with the soils composition to release CO₂. Finally, the process of burning crop residues left on agricultural soils is typically a small source of CH₄ and N₂O from the combustion as well as biogenic CO₂ (which is not counted in national totals).
- **Land use, land use change and forestry (LULUCF):** emissions and removals from land, this sector focuses on the different carbon pools (areas where carbon is stored). These include living biomass (growing vegetation within an agreed definition), dead organic matter, soil organic matter and harvested wood products. Removals occur through carbon sequestration (absorption of carbon from the atmosphere by growing vegetation), emissions are dominated by wood removals (harvesting and fuelwood), natural disturbances (fires, natural disasters e.g., hurricanes, pests and disease) and land management practices (e.g., ploughing cropland and disturbing the land for settlements etc.).
- **Waste:** non-energy use emissions associated with the management of solid and liquid waste. Emissions from waste are split into four main categories – solid waste disposal, biological treatment of solid waste, incineration/open burning, and wastewater. The main gases emitted are CH₄ through the anaerobic (absence of oxygen) decomposition of solid or liquid waste, N₂O from the oxygenation of protein rich compounds (e.g., foods) in the waste streams and CO₂ from incineration of fossil-based waste materials (e.g. plastic). CH₄ is emitted in solid waste disposal sites where organic matter decays over a period of many years, at a declining rate. Anaerobic conditions in wastewater treatment also produce CH₄. The biological treatment of waste, such as composting, also results in CH₄ emissions (from anaerobic decomposition) and N₂O emissions from oxidation of nitrogen rich materials (e.g., protein). Incineration and open burning of fossil-based wastes (e.g., increasingly plastics) are the most important sources of CO₂ emissions from waste incineration activities.

- **Memo:** emissions which are not included in the national totals in accordance with international reporting agreements, include international navigation, international aviation, and CO₂ from biomass (bio-CO₂).

3.9.2 Key trends

GHG emissions and removals in Saint Lucia have fluctuated throughout the period between 2000 and 2018, as seen in

Figure 14 and **Table 7**. Total emissions have increased by over half since 2000, both with and without LULUCF. The categories that have experienced the most significant changes include Energy and LULUCF. The energy sector is by far the largest contributor to emissions in Saint Lucia, this is due to the contribution from the electricity generation and road transport sectors. The trend in increasing emissions is driven by a rising population with an increasing demand for electricity. The number of road vehicles in Saint Lucia doubled between 2000 and 2018. Whilst emissions from energy and other sectors have risen gradually over time, the LULUCF sector has experienced the largest changes year to year and has contributed most to the total trend. Projects to reforest areas of degraded land contribute to increase carbon stocks, but natural disturbances, particularly from hurricanes cause large spikes in emissions such as Hurricane Tomas in 2010.

The IPPU sector has seen the largest percentage change over the time series due to a sharp increase in F-gas emission from air conditioning and refrigeration. Emissions from the waste sector have doubled over the time series, as with energy this is linked to an increasing population. In contrast, emissions from agriculture have remained fairly stable over the time series but fluctuate according to livestock populations.

Figure 14: Total GHG emissions and removals by sector and total emissions with and without the

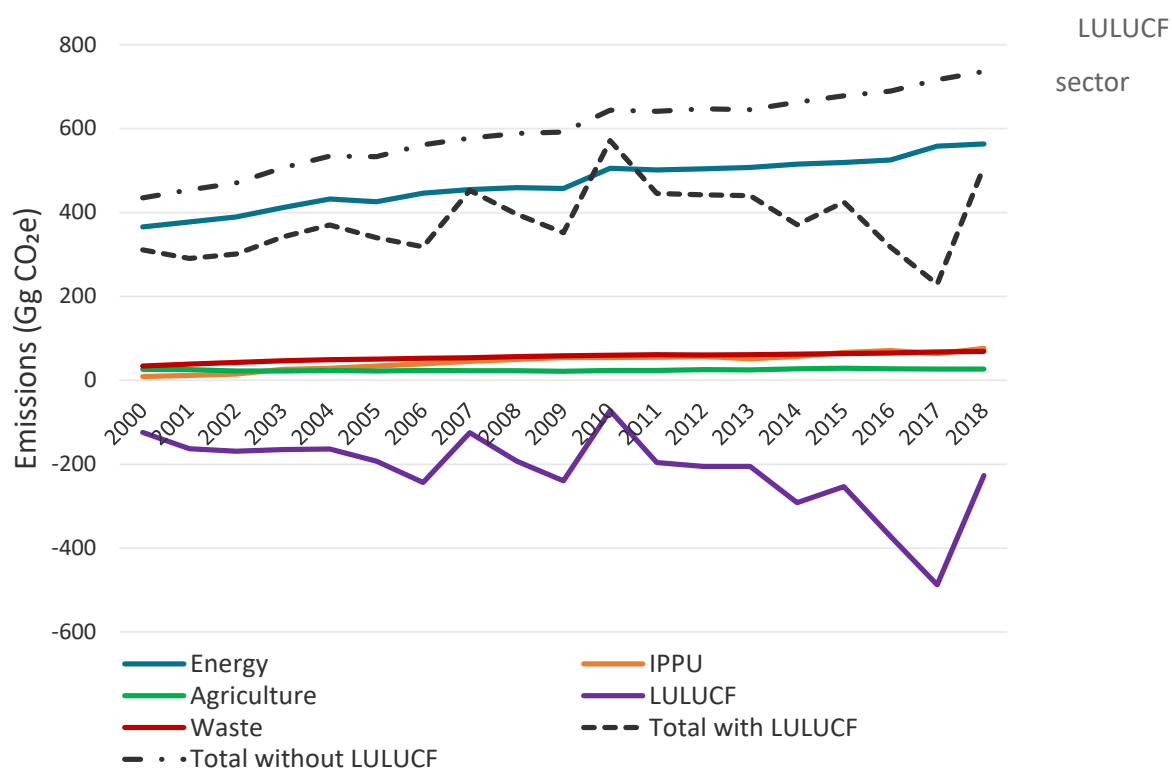


Table 7: Total GHG emissions and removals by sector

Year	Emissions (Gg CO ₂ e)					Total with LULUCF	Total % change from 2000
	Energy	IPPU	Agriculture	LULUCF ¹⁸	Waste		
2000	366	9	26	-124	34	311	-
2005	426	34	22	-193	51	340	9%
2010	505	55	24	-72	60	572	84%
2014	515	57	28	-292	63	371	19%
2015	519	66	29	-253	64	425	37%
2016	525	71	28	-372	65	318	2%
2017	558	64	27	-487	68	229	-26%
2018	564	77	27	-227	69	509	64%

¹⁸ The Forestry Department has updated data which is not reflected in this current GHG Inventory due to it being received after the finalisation of Saint Lucia's 2018 NIR. This data will be incorporated in the Fourth National Communications for Saint Lucia.

3.9.2 Energy

The energy sector GHG emissions are primarily from CO₂ from fossil fuel combustion in the electricity generation and road transportation sectors (**Figure 15**). Emissions from these sectors have been increasing since 2010 and this drives the sector-wide trends across the time series.

Electricity is generated by a single operator in Saint Lucia at a centralised station that has used a consistent fuel mix (diesel combustion with supplementary firewood use) across the time series. The principal driver behind emissions increases from this sector is the increase in use of electricity with the expansion of the electricity network in Saint Lucia: since 2000 there has been an increase of over 45 % in the number of electricity customers¹⁹ and in 2018 the vast majority of the population has access to the electricity grid. Much of this expansion took place between 2000-2010. Since this point, emission increases from the sector have tapered off. This may also be due to other factors such as the uptake of more energy efficient equipment on the island. Renewable projects, such as the installation of a 3 MW solar farm in La Tourney will reduce the carbon intensity of the electricity generated in country.

Increases in road transportation emissions are reflective of the marked increase in the number of vehicles on Saint Lucia's Road network: there were over twice as many vehicles in 2018 as there were in 2000²⁰. It is unclear whether the increase in emissions between 2009 and 2010 in the fuel used in road transportation is due to changes in data collection methodologies or genuine trends reflecting an increase in vehicle use. No formal energy balance data is available to inform trends since 2012.

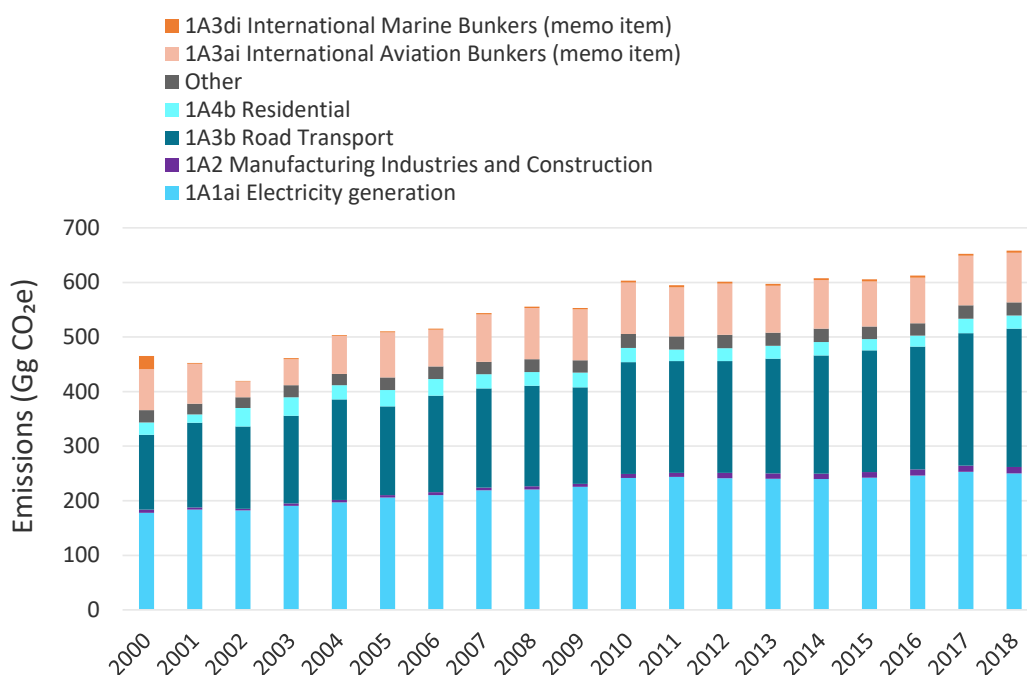
The contribution of other sectors, such as residential combustion, is less important to the overall energy sector emissions context, but are key categories to the overall inventory. Emissions from these other sectors are characterised by the use of various fuels, importantly firewood and charcoal.

Figure 15 also presents the emission from international aviation and navigation which are memo items and therefore not included in the sector or inventory totals. Emissions from these sectors have remained fairly stable over the time series.

¹⁹ St Lucia Electricity Services Ltd - Annual Reports (<https://www.lucelec.com/content/annual-reports>)

²⁰ Data provided by the Ministry of Transport

Figure 15: Total GHG emissions from the energy sector



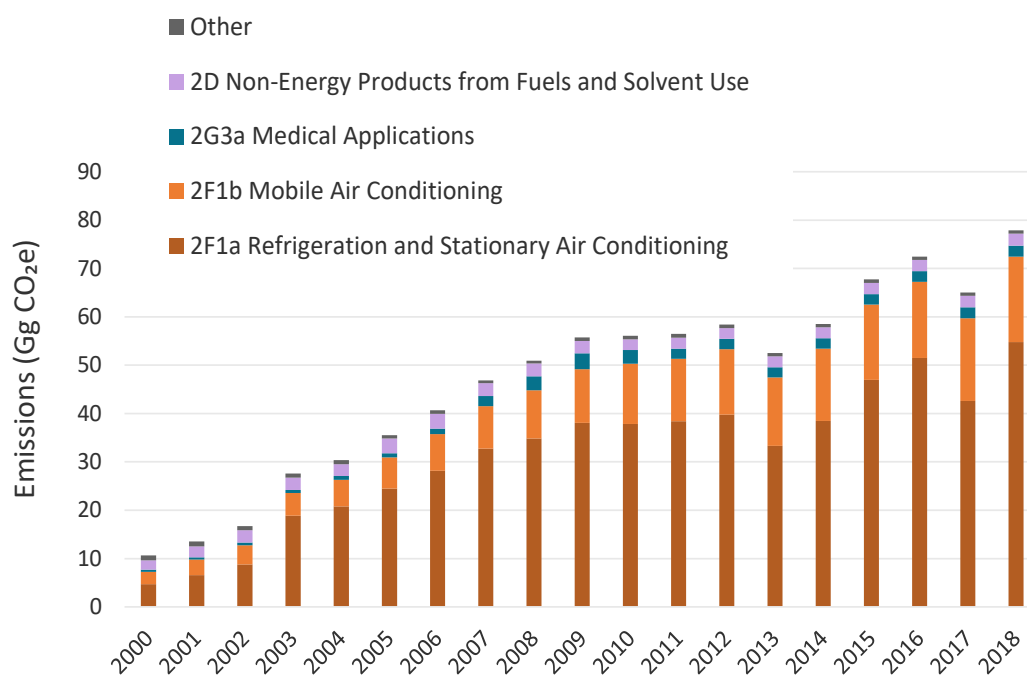
3.9.3 Industrial Processes & Product Use (IPPU)

Emission estimates from IPPU show a significant increase across the time series driven predominantly by an increased use of high global warming potential refrigerants in refrigeration and air conditioning **Figure 16.**

The significant increase in emissions from F-gases can be attributed to the obligatory phase-out of ODS under the Montreal Protocol which Saint Lucia is party to. This phase-out has resulted in an increase in consumption of ODS substitutes (also known as "F-gases") in the refrigeration and air conditioning sector. In line with reduced ODS imports and the subsequent mainstreaming of use substitutes, emissions from refrigeration and stationary air conditioning increased 10-fold. Emissions in the mobile air conditioning sector increased by a factor of 7 over the time series. This is supported by a general increase in vehicle stock throughout the period with an increasing number of vehicles using mobile air-conditioning (90 % of vehicles using mobile air-conditioning in 2018 as opposed to 30 % in 2000).

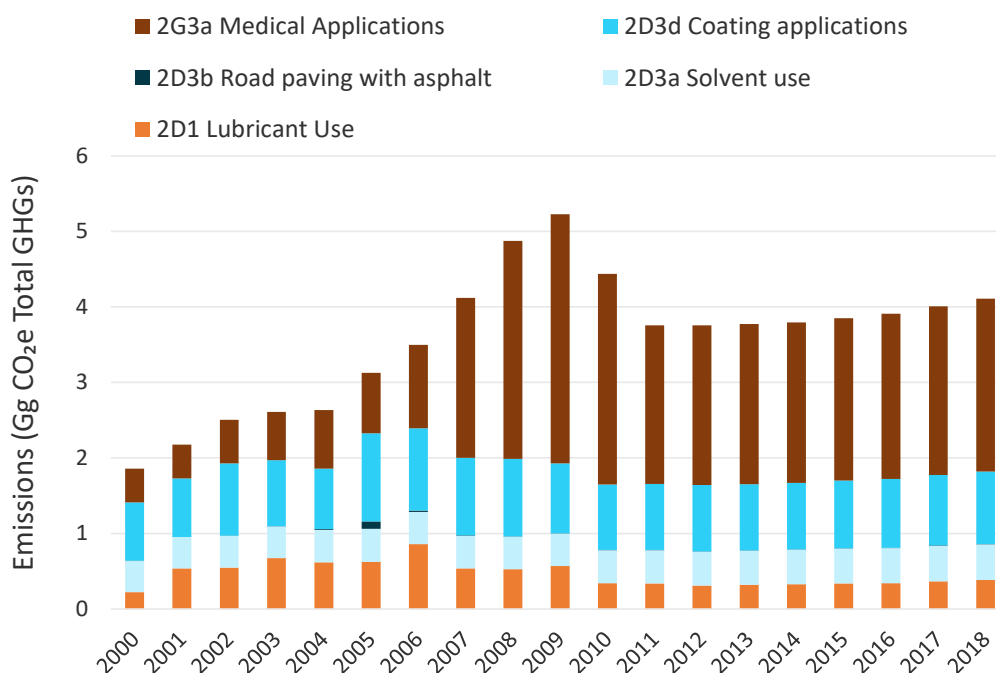
Notable reduction in emissions were observed in 2013 and 2017 for the refrigeration and stationary air conditioning sector and can be attributed to lower imports in those years as a result of stockpiles in the previous year. The assumption is that unused stock from the previous year was sufficient to meet demand, as the data is largely based on imports rather than actual consumption data.

Figure 16: Total GHG emissions from the Industrial Processes and Product Use (IPPU) sector



It is noteworthy to mention four non-F-gas sub-categories of emissions with significant trends (Error! Reference source not found.). Emissions peak in 2009 mainly due to N₂O medical uses. This could be as a result of the preparation for the commissioning of the new hospital namely the OK-EU and the bulk importation of N₂O for use over a number of years rather than a single year. However, this trend may also be a function of imports driven by non-medical domestic demand.

Figure 17: Non f-gas emissions from the Industrial Processes and Product Use (IPPU) sector



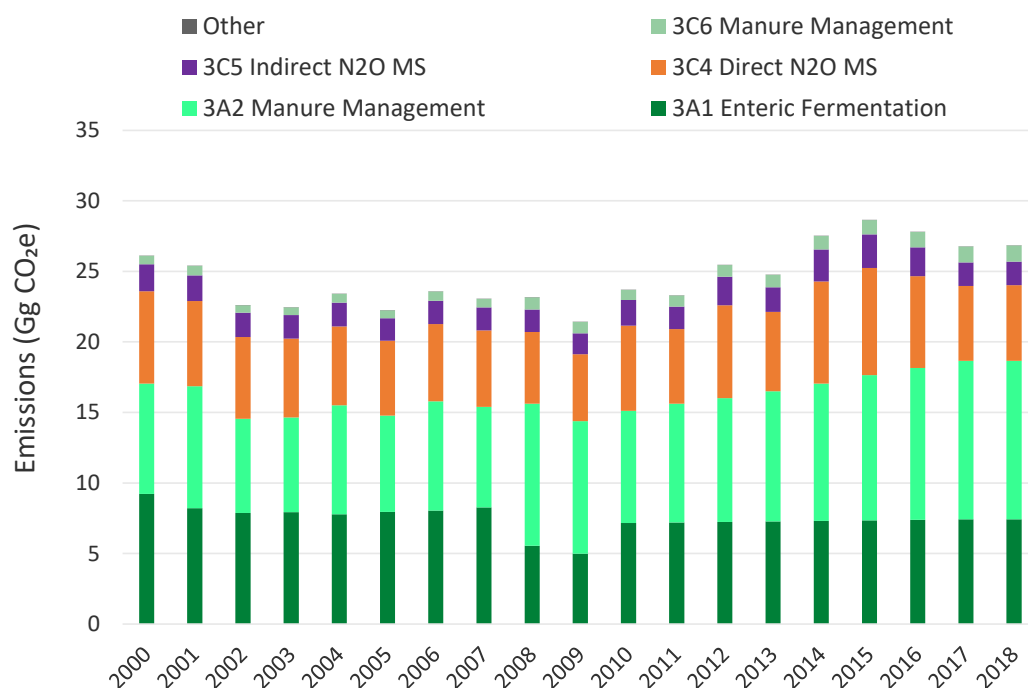
3.9.4 Agriculture

The majority of emissions come from livestock, enteric fermentation and manure management which are both key categories. Cattle is the biggest contributor of CH₄ through enteric fermentation, whilst swine is the greatest contributor in manure management. The third largest category in the agriculture sector is N₂O direct emissions from managed soils, which includes emissions from applying synthetic fertiliser and manure directly to the soils.

As seen in **Figure 18**, there is a fluctuating trend over the time series, which is primarily due to fluctuating livestock populations in Saint Lucia. Emissions from the agricultural sector peaked in 2015. The trend is primarily dominated by changes in livestock emissions from enteric fermentation (which sees a steep dip in 2008 and 2009 due to a dip in cattle numbers), and manure management (which has steadily increased across the time series due to increasing swine numbers). Both of these categories are driven by the total population of livestock in Saint Lucia. Total livestock population numbers are expected to fluctuate throughout the time series due to factors such as demand for livestock goods, success of animal breeding and the average length of time an animal survives. Other parameters such as annual average temperature and weather conditions in Saint Lucia, are likely to be driving some of the fluctuating trends observed. The number of emissions from manure management systems will be heavily influenced by the conditions of the area, with warmer and wetter conditions typically resulting in increased emissions of CH₄.

Other parameters which could contribute to the fluctuating trend observed in Saint Lucia's agricultural emissions include the amount of synthetic fertiliser imported into the country based off of human population and demand by farmers. Import statistics for synthetic fertiliser is some of the activity data used for calculating N₂O emissions from managed soils, meaning the changes across the time series of emissions from direct N₂O from managed soils, could be driven by demand in fertilisers.

Figure 18: Total GHG emissions from the agriculture sector, note MS = managed soils



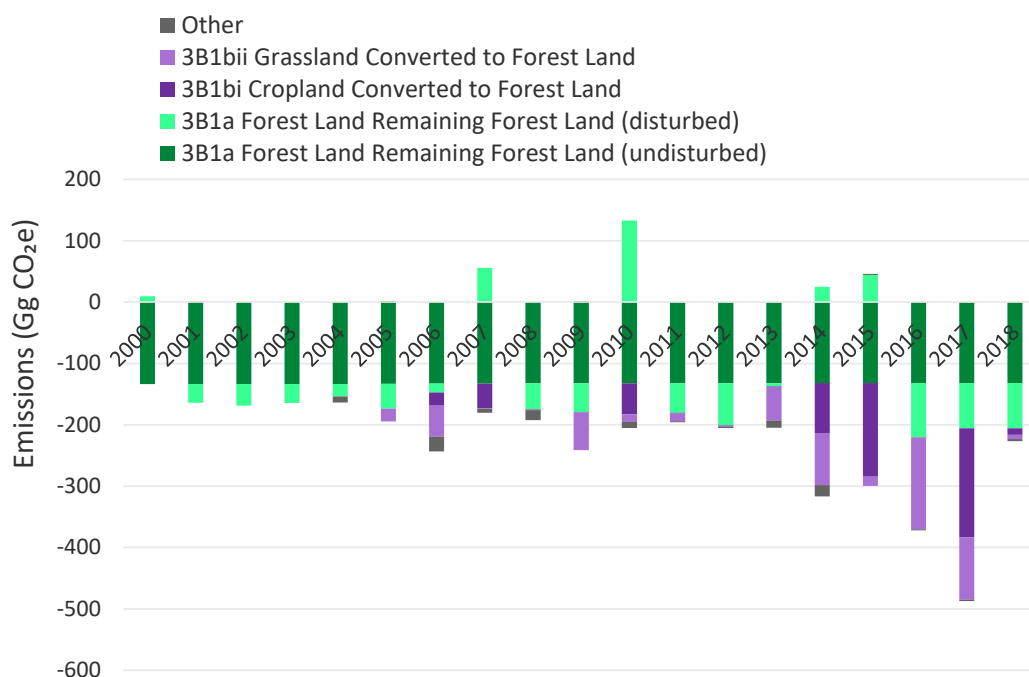
3.9.5 Land Use, Land Use Change and Forestry (LULUCF)

The LULUCF sector shows an increase in removals (sequestration) over the time series. The sector includes six land use classes and biomass burning.

Forestland remaining forestland contributes the most to overall trends removing emissions as forests and vegetation are left to grow. Land converted to forestland also contributes to sequestration as more land area is committed to growing forest and act as additional carbon sinks. A small proportion of the emissions/removals are from croplands, grasslands and land converted to settlements notated by 'Other' in **Figure 19**. The overall tendency is of an increase in removals CO₂ over the time series.

The increase in removals over the time series reflect the increase in forest area. The spike in emissions in 2010 was due to Hurricane Tomas resulting in forest loss and removal/decay of the forest biomass. The following two years 2011 and 2012 show a responding regrowth with an increasing sink for the disturbed forest land remaining forest land category. Saint Lucia had implemented a series of projects which focuses on reforestation of degraded areas in private and public lands. Due to the decrease in banana production (cropland area) in recent years, Saint Lucia has experienced the conversion of farms to forestlands (secondary forest). This resulted in an increase in removals in land converted to forestland category which is mainly attributed to the results from 2014 - 2017. Further explanations of the trends in LULUCF can be found in the NIR (2020).

Figure 19: Total GHG emissions and removals from the Land Use, Land Use Change and Forestry sector



3.9.6 Waste

Emissions from waste are dominated by CH₄ emissions from solid waste disposal on land (**Figure 20**).

Solid Waste Disposal: Emissions from solid waste disposal on land generally are increasing year on year due to the increasing annual quantity of waste disposed in solid waste disposal site. The fluctuations are in line with the fluctuations in annual tonnes of waste disposed. In 1996 the Solid Waste Management Act was brought into force establishing managed Landfills within Saint Lucia and making waste collection for the whole Island the responsibility of one body. Two disposal sites were established: the Vieux Fort and Ciceron disposal sites. In 2003/4 the Ciceron site was closed, and the Deglos Sanitary Landfill site was opened. While all disposal sites, including the now closed Ciceron site, had daily cover, the Deglos Sanitary Landfill also has linings and leachate collection and treatment. Weighbridges were also included in this new site and in the same year the Vieux Fort site was updated to include weighbridges. Prior to 1996 there were no managed waste disposal sites and waste collection was managed by the local council. Waste was disposed of in open dump sites and usually burnt. From 1997, it has been assumed that all solid waste in Saint Lucia is disposed of in solid waste disposal sites: municipal solid waste, sanitised clinical waste, and industrial waste (mostly construction waste). All waste types have been calculated together. Waste burnt or disposed of in unauthorised small dumps is considered negligible.

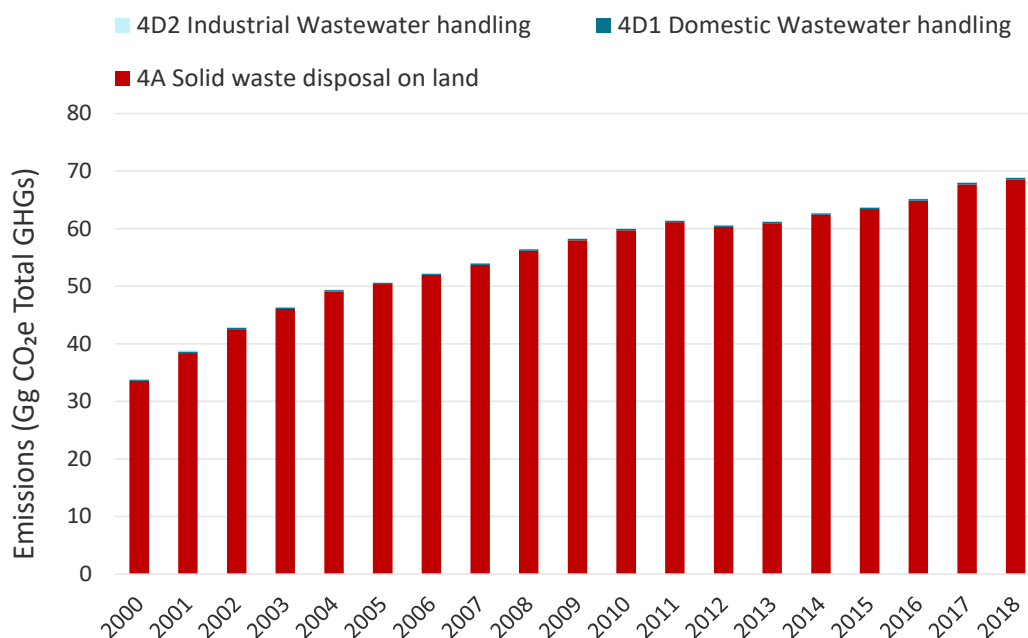
Composting at solid waste disposal sites (biological treatment of solid waste) began in 2004 however prior to 2015 waste was composted on a very small scale and no data is available on the amount of waste composted. Larger scale composting started in 2015 at the Vieux-fort disposal site, with 4

tonnes of green waste composted that year and an estimated 2 tonnes in subsequent years. There is some additional small scale composting taking place at schools, farms and households but there is no data on waste quantities for these activities, so emissions have not been estimated from these activities. Emissions from this sector are too small to be shown in **Figure 20**.

Domestic wastewater: The water and sewerage company Inc. (WASCO) was first started in 1965, under a different name, and has responsibility over water supply and treatment. They manage one wastewater treatment facility: the Beausejour Stabilisation Ponds. This site is made up of two aerated ponds and a fermentation pit. Domestic wastewater is predominantly treated through pit latrines (23 % in 2010) and septic systems (63 % in 2010) with the latter increasing in use and the former decreasing. Approximately 7% of households were connected to the sewer system in 2010, covering wastewater both discharged to the sea and treated at the Beausejour Stabilisation ponds. There are additional aerobic treatment plants which treat wastewater from hotels. Hotel wastewater is also treated at the Beausejour Stabilisation Ponds.

Industrial wastewater is only applicable to alcohol production in Saint Lucia, namely brewing and distilling of rum. Wastewater from brewing is treated in aerobic treatment plants while wastewater from distilling is discharged to the sea.

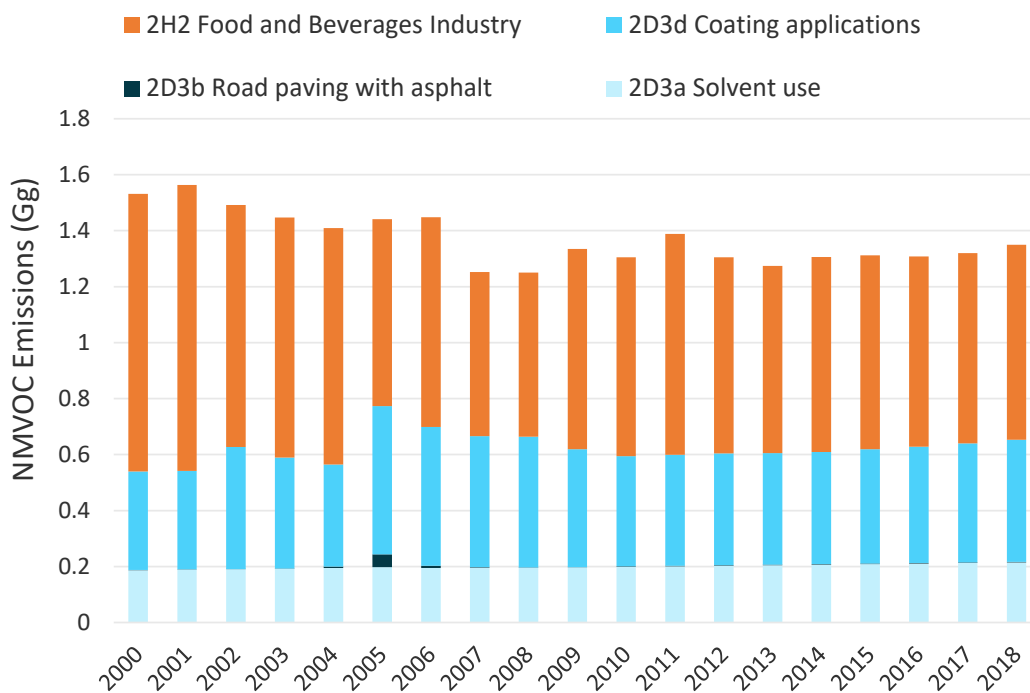
Figure 20: Total GHG emissions from the waste sector



3.9.7 Indirect GHG Emissions

The only indirect GHG emissions that have been estimated in this inventory are NMVOC emissions from the IPPU sector illustrates these emissions of NMVOC which occur in non-F-gas subcategories. Asphalt production, coating application and lubricant use, all show increases between 2005 and 2006. One possible explanation of this trends is increased activity under these sectors due to policy directives to strengthen and increase infrastructure in preparation for the nation's shared hosting with the West Indies of the ICC Cricket World Cup in 2007. This significant increase may also be attributed to preparation for national elections which were constitutional due by 2007 but took place in 2006. Solvent use remains relatively static as emissions levels are assumed by population which was remained stable over the time period.

Figure 21: NMVOC emissions from the Industrial Processes and Product Use (IPPU) sector



CHAPTER 4: MITIGATION ACTIONS AND THEIR EFFECTS

4.1 SAINT LUCIA'S PATH TO REDUCING EMISSIONS

4.1.1. Mitigation Actions and Policies since the Third National Communication TNC

Saint Lucia submitted its TNC in 2017. In the TNC, Saint Lucia communicated its intention to implement several mitigation strategies, mainly focused on the energy sector as the majority of emissions occur from that sector in Saint Lucia.

Since the TNC, Saint Lucia has taken steps to integrate renewables into its electricity generation. Noting that this is an island system with limited resources, a National Energy Transition Strategy (NETS) was developed. The NETS identified the most suitable mix of renewables to ensure a reliable system is maintained and cost containment for consumers is achieved. The NETS also identified energy efficiency as a major strategy to reducing emissions and achieving long-term cost savings for consumers.

The following **Table 8** summarizes the status of mitigation actions undertaken (and in some cases completed) by Saint Lucia in between the submission of the TNC and the preparation of this report.

Table 8: Status of Mitigation Actions

SECTOR	Update on Mitigation Strategies
Energy Demand	Lighting Retrofits of 6 buildings – Greaham Louisy Administrative Building, Gabriel Charles Complex (Forestry Building), the General Post Office and the Ministry of Infrastructure, Ports and Energy building (Ministry of Finance E. G., 2017), Richfond Police Station and Sir Arthur Lewis Community College, T.R.Theobalds Building
	Training of fifty (50) professionals from both the private and public sector in Leadership in Energy and Environment Design (LEED)
Electricity Generation	Cabinet Endorsement (2018) of National Energy Transition Strategy (NETS) with solar resource assessment
	Commission of 3MW Solar Farm in La Tourney, Vieux Fort (Ministry of Finance E. G., Government of Saint Lucia - Economic and Social Review 2018, 2019)
	Completion of Pre-Feasibility study and environmental and social impact assessment for geothermal power development
	Cabinet endorsed Green School NAMA in 2020

SECTOR	Update on Mitigation Strategies
	Installation of approximately 325kW Solar photovoltaic system of Government facilities
Transport	Development of Government Fleet Transition Strategy
	Introduction of three (3) electric vehicles to Government fleet
	Training of fifteen (15) Automotive technicians in the operations of electric and hybrid vehicles
Agriculture, Land Use, Land Use Change and Forestry	Endorsement (2018) of Sectoral Adaptation Strategies and Action Plans (SASAP) for the Agriculture Sector
	Approval of agriculture project by Adaptation Fund in 2019
	Establishment of the Climate adaptation financing facility (CAFF) (Ministry of Finance E. G., Government of Saint Lucia - Economic and Social Review 2017, 2018)
	Submission pending of the Forest Report Emission Levels (FREL) to REDD+ on UNFCCC, 2021
	Approval of Resilient Ecosystems Adaptation Strategy and Action Plan
Waste & Industrial Processes	Endorsement (2018) of Sectoral Adaptation Strategies and Action Plan (SASAP) for water (Ministry of Finance E. G., Government of Saint Lucia - Economic and Social Review 2018, 2019).
SECTOR	Update on Policies
Energy Demand / Electricity Generation	2010 National Energy Policy (under revision)
	National Energy Transition Strategy 2018
	Electricity Bill and regulations (draft)
	National Utility Regulatory Act and revised electricity supply Act
	CARICOM Regional Energy Efficiency Building Code (CREEBC) (awaiting adoption in Saint Lucia)
	Developing draft Geothermal Bill
	Energy Efficiency Bill (Draft)
Agriculture / Fisheries	Sectoral Adaptation Strategies and Action Plans (SASAPs) for Agriculture and Fisheries both endorsed in 2018
Land-Use, Land-Use Change and Forestry	National Land Policy - 2018

SECTOR	Update on Mitigation Strategies
Industrial Processes and Product Use	Code of Practice — Refrigerant and Refrigerant Systems - Installation, Operation, Maintenance, Handling, Transport and Storage adopted/finalized
General	NDC Partnership Plan endorsed 2019*
	National Ocean Policy and Strategic Action Plan endorsed 2020
	National Adaptation Plan endorsed 2018
	Private Sector Engagement Strategy endorsed in 2020
	Climate Financing Strategy endorsed in 2020
	Climate Change Research Policy and Climate Change Research Strategy endorsed in 2020

* Saint Lucia is a member of the NDC Partnership. As part of this collaboration, Saint Lucia developed a NDC partnership plan which is a living document with the objectives to: Increase energy efficiency in buildings, increase the use of energy efficient appliances, improve energy efficiency in water distribution and network efficiency; increase the penetration of renewable energy island wide by 2030, based on a mix of geothermal, wind and solar energy sources as well as improvements to grid distribution and transmission efficiency; introduce energy and fuel-efficient vehicles and improve the public transport system; find synergies with the National Adaptation Plan and associated Sectoral Adaptation Strategies and Action Plans in order to introduce adaptation measures with a view to enhance the NDC; and commit financial contributions from the Government of Saint Lucia to signal the seriousness of our commitments to the international community. The 2019 NDC Partnership plan includes a list of thirty-six (36) projects and activities for Saint Lucia. It is anticipated that this document will be revised annually for Saint Lucia and there are current plans to upload to online platform by mid-year 2021.

4.2 SAINT LUCIA'S MITIGATION STRATEGY: MEASURES TO REDUCE EMISSIONS

4.2.1. Overview

This section describes the mitigation actions included in the mitigation assessment performed by Saint Lucia, actions which have been updated since the TNC. The TNC included ten (10) prioritised mitigation action programmes. In addition, a long list of prioritised actions was developed based on input from stakeholder workshops and presented in the TNC (Government of Saint Lucia, 2017). The updated mitigation assessment that is presented in this report considered all the actions in the TNC as well as further strategies identified from a desk review and stakeholder feedback. As a result, an updated set of mitigation actions, some of which are directly from the TNC or enhanced, others are newly

proposed strategies based on new developments with the Government of Saint Lucia's policies since 2017 (the year of submission of the TNC) and the updated NDCs.

Section 4.2.2 describes each individual action included in the mitigation strategy by sector. The GHG emissions resulting from a selected number of mitigation actions were quantified using the Low Emission Analysis Platform (LEAP) software, which is described in section 4.2.3. The strategies chosen for quantification depended on data availability from Saint Lucia and the limitations of the software used. In addition, Annex II gives a comprehensive overview of each individual mitigation action with indicators and relevant gases.

4.2.2. Description of each Mitigation Measure to Reduce GHG Emissions, by Sector

The mitigation strategies for Saint Lucia cover the following sectors: energy demand, electricity generation, transport, industrial processes and product use, agriculture and land use, land use change and forestry and waste. A total of thirty-four (34) strategies has been identified by Saint Lucia.

Table 9: Distribution of Mitigation Scenarios by Sector

Sector	Number of Mitigation Strategies
Energy Demand	9
Electricity Generation	7
Transport	8
Industrial Processes and Product Use (IPPU)	1
Agriculture, Land Use, Land Use Change and Forestry	4
Waste	5
Total	34

As indicated previously, the energy sector contributes more than 70% of Saint Lucia's total GHG emissions; therefore, it is not coincidental that most of the mitigation strategies are associated with the energy sector, distributed across energy demand, electricity generation and transport.

The thirty-four (34) mitigation strategies were reviewed by stakeholders and confirmed as priority areas for the Government of Saint Lucia.

4.2.2.1. Energy Demand

Energy demand includes the end-use consumption of energy in Saint Lucia. This covers energy demand for residential, commercial, tourism, industry, and street-lighting uses. Mitigation actions for energy demand primarily relate to affected changes in the end-use of electricity and fossil-fuels. This includes changes in fuel and equipment used for cooling, refrigeration, cooking, appliance -use, water heating, and lighting. The GHG impacts of mitigation actions from energy demand are a function of both changes in energy supply (discussed later) and improvements in energy efficiency.

A total of nine **(9) mitigation actions related to energy demand** were identified:

- **Implementation of the CARICOM Regional Energy Efficiency Building Code (REEBC).** This building code is expected to help in design and construction of low carbon buildings. Improved building design can reduce the demand for energy and improve resilience. The implementation of this code will help reduce emissions for commercial and residential buildings. In 2018, fifty (50) professionals were trained in Leadership in Energy and Environment Design (LEED) in both the private and public sector. Training on the REEBC is ongoing by the CARICOM Regional Organisation for Standards and Quality (CROSQ) through the Saint Lucia Bureau of Standards (SLBS).
- **Conduct of energy audits for all Government occupied buildings including schools by 2025.** While an energy audit will not reduce energy demand or reduce emissions, it is an enabling action to help identify specific energy efficiency options for a building. Therefore, this will help create incentives for adoption of energy efficiency building measures which can ultimately contribute to the reduction of emissions.
- **Lighting retrofits of all Government occupied buildings.** Lighting retrofits are proven to be some of the quickest energy efficient measures. Adopting lighting retrofits as an energy efficiency measure will help reduce the energy demand in the government buildings. The Government of Saint Lucia has begun efforts in this area with the retrofits of at least six government buildings.
- **Conduct of public education and awareness raising** on the available concessions and benefits for renewable energy equipment including solar water heaters may help increase the use of these equipment on island. The Government of Saint Lucia has promoted the use of renewable energy equipment since 1999 with the removal of import duties on these items. Public awareness campaigns are conducted during Energy Awareness month in November every year. A more comprehensive awareness campaign is expected to yield further benefits and encourage the switch to more renewable energy systems.
- **Development of incentives that would reduce the cost of energy efficient equipment.** It is expected that these incentives would encourage the adoption of more energy efficient equipment as compared to less efficient equipment. The Government of Saint Lucia currently has some concessions on more efficient lighting equipment and air conditioning. The development of incentives for a more comprehensive list of energy efficient equipment will assist in the promotion of energy efficiency on the island (e.g., reduction in import duties for energy efficient refrigerators and motors).

- **Adoption of Mandatory Energy Efficiency Standards for Appliances by 2025.** Mandatory standards will force the adoption of energy efficient appliances. A shift to more efficient appliances will reduce energy consumption and long-term costs to consumer, also resulting in a reduction in emissions.
- **Retrofit of streetlights of approximately 22,000 HPS to LEDs by 2025.** The initial pilot project of 2013 saw a total reduction of approximately 63% in energy consumption with the replacement of fifty (50), 250W HPS with 120W LEDs. The Government is currently finalising the contract and it is expected to replace the 250W HPS with 75W LEDs and 70W HPS with 21W LEDs which is expected to yield further reductions in energy consumption.
- **Reduction of 20% energy consumption in schools by 2030.** Implementing the green schools NAMA with retrofits of lighting in schools will help reduce energy consumption. The Green Schools NAMA was adopted by Cabinet in 2020 and one intervention recommended is the retrofit of 13,500 lights in primary schools and secondary schools on the island. Work on this action is ongoing by the Ministry of Education.
- **Reduction in system water losses to less than 20% by 2030.** The water system experiences high losses in transmission and distribution. It has been estimated that water system losses in Saint Lucia are as high as 56% (Government of Saint Lucia, 2017). Reduction in these losses will reduce the energy spent to transmit and distribute the water, therefore reducing energy demand in the water sector and reducing GHG emissions. Some measures include the replacement of existing inefficient pumps with high efficiency pumps and reducing leakage through repair and replacement of pipes.

A summary of the mitigation actions for Energy Demand is shown below along with information on the type of action and status of implementation. Complete Information on each mitigation action can be found in Annex II from **Table 44** to **Table 52** .

Table 10: Mitigation Actions for the Energy Demand Sector

Name	Type	Status
Implementation of Regional Energy Efficient Building Codes	Local Plans and Regulations	Ongoing: Regional Energy Efficiency Building Code Adopted. Training ongoing on REEBC
Conduct of Energy Audits for All Government Occupied Buildings	Local Plans and Regulations	Ongoing: Initial energy audits have been undertaken for some buildings; Project to

Name	Type	Status
including schools by 2025		undertake energy audits in schools is currently in progress
Lighting Retrofits for all Government Occupied Buildings	Infrastructure development, technology	Ongoing: Lighting retrofits have been conducted for some government buildings. Terms of reference for lighting retrofits already developed.
Conduct of Public Awareness campaigns on incentives for renewable energy equipment including solar water heaters	Education and Awareness Programs	Ongoing: Energy Awareness Month is planned every November in which the energy unit undertakes energy awareness activities on various initiatives. This strategy requires a more comprehensive plan to be undertaken over the year.
Development of comprehensive incentives for Energy Efficient equipment	Local Plans and Regulations	Planned: There are incentives for lighting and cooling systems already in place. A more comprehensive system is required to have a suite of incentives for energy efficient equipment
Adoption of Mandatory Energy Efficiency Standards for Appliances by 2025	Local Plans and Regulations	Ongoing: National standards have been developed for a range of equipment including air conditioners, incandescent lamps, fluorescent lamps. Several standards are currently under development. Standards are currently voluntary.
Retrofit of Streetlight to LEDs- 22,000 HPS to LEDs by 2025	Infrastructure development, technology	Ongoing: Streetlighting project began since 2015, initial pilot project was undertaken with approximately 50 lights. Further 400 lights were replaced by LUCELEC. The

Name	Type	Status
		Government of Saint Lucia has contracted a firm to undertake this project, terms of the contract are still under negotiation.
Reduction of 20% energy consumption in schools by 2030	Infrastructure development, technology	Ongoing: One project that targets partial implementation of the Green School Nama is ongoing and other projects targeting retrofits in schools have been completed. The Ministry of Education is also undertaking several retrofits of schools as part of their maintenance program
Reduction in system water losses to less than 20% by 2030	Infrastructure development, technology	Ongoing: Efforts are ongoing to reduce system losses, but more focused efforts are required to significantly reduce the water system losses.

4.2.2.2. Electricity Generation

Electricity generation covers the supply of electricity from centralised and distributed generation; off-grid generation is not considered as currently there is no mechanism to monitor the installation of off-grid electricity systems. As noted above in Energy Demand, changes in electricity generation will significantly affect the total GHG reduction potential of mitigation actions under Energy Demand. Thus, both need to be considered together in a mitigation assessment. The effects are not counted twice in the modelling scenarios described later; rather, both the direct and indirect emission reductions achieved from energy demand and energy supply are applied to the energy demand actions.

The Government of Saint Lucia has made several strides in the transformation of the electricity generation sector with the development of the National Energy Transition Strategy, the commission of a 3MW solar farm in La Tourney, Vieux Fort, 1.09MW of distributed generation and plans for a 10MW solar farm with 7MW battery storage farm in the Troumassee, Micoud through concessionary loans from the Abu Dhabi Fund for Development (ADFD). The Government of Saint Lucia has also established a National Utility Regulatory Commission (2016) to independently govern the electricity and water sectors.

A total of seven (7) mitigation actions were identified related to the electricity generation. These include:

- **Reduction of transmission and distribution (T&D) losses to 5% by 2030.** Reducing transmission and distribution losses reduces the amount of electricity generation required to meet demand. LUCELEC in their 2019 annual report indicated T&D losses of 6.54%. A reduction in T&D losses will improve system-wide energy efficiency in the supply of electricity, reducing GHG emissions from generation.
- **Installation of renewable energy generation to achieve 54MW solar and 18MW wind by 2030 and 15MW geothermal by 2035.** Saint Lucia's energy mix is currently dominated by fossil fuels. The NETS identified the best mix of renewables for Saint Lucia. The target mix proposed by this action is based on a scenario in the NETS report. A move to renewables will significantly assist in achieving emission reduction.
- **Achievement of 20MWh of storage installed by 2030.** To help achieve high penetration of variable renewables, it is important to include storage in the mix as identified in the NETS report. Storage capacity is required to reserve excess electricity that can be released when renewable energy output is low.
- **Achievement of at least 13MW of distributed generation of solar (included in the 54MW of solar noted above by 2030) specifically for distributed generation for commercial and residential systems.** Although this action can be considered as a sub-strategy, it was important for the stakeholders to identify what portion of the renewable energy systems are allocated to distributed systems for commercial and residential use.
- **Installation of 400kW PV systems on schools representing about 10kW in 40 schools.** This is a specific solar penetration for distribution generation for schools as part of the Green Schools NAMA. This is included in the 13MW of distributed generation noted above.
- **Enactment of new Electricity Bill by 2022.** The new electricity bill is currently still in draft since 2015 having undergone several reviews. It is anticipated that when fully enacted, the new Electricity Bill will be essential to facilitate the installation of renewable energy on the island.
- **Enactment of Energy Efficiency Bill by 2022.** A draft Energy Efficiency bill was completed in 2015. A review of the bill needs to be undertaken.

A summary of the mitigation actions for Electricity Generation are further described below. Complete Information on each mitigation action can be found in Annex II from **Table 53 to Table 59**

Table 11: Mitigation Actions for Electricity Generation

Name	Type	Status
Reduction of transmission and distribution losses to 5% by 2030	Infrastructure development, technology	Ongoing: In an effort to improve efficiency, the St. Lucia Electricity Services Limited (LUCELEC) has always maintained goals to reduce transmission losses and this is an ongoing initiative
Installation of renewable energy by 2030 to achieve 54MW solar, 18MW wind and 15MW geothermal by 2035	Infrastructure development, technology	Ongoing: A National Energy Transition Strategy (NETS) was developed by the government and the utility. A 3MW solar farm was installed in La Tourney, Vieux Fort. Further 10MW solar PV system project has received loan funding for Troumassee, Micoud. Solar resource assessment was conducted for the island as part of NETS. Wind development project was initiated in 2015 but stopped due to unforeseen circumstances, negotiations are ongoing to reinstate the project.
Installation of 20MWh of storage by 2030	Infrastructure development, technology	Ongoing: The NETS identified the need for storage to be included in the transition to renewables. 1MWh project is planned to accompany the already installed 3MW solar farm, 7MWh battery storage is planned with loan financed 10MW solar farm
Achievement of at least 13MW of distributed generation included in the 54MW of solar	Infrastructure development, technology	Ongoing: As of 2019, 1.09MW of installed distributed PV system are grid connected. The National Utility Regulatory Commission allows for 5kW system for residential and 25kW system for commercial systems. Grid code is currently in development
Installation of 400kW of PV systems on Schools representing about 10kW in 40 schools	Infrastructure development, technology	Ongoing: One project which target partial implementation of the Green School NAMA is ongoing and other projects targeting PV systems in schools have been completed. Approximately 100kW of Solar PV systems already installed

Name	Type	Status
Enactment of new Electricity Bill by 2022	Legislation	Ongoing: Bill was drafted in 2015 and initial reviews began, and public consultations was held. Further reviews are still ongoing and expected to be completed by December 2021
Enactment of Energy Efficiency Bill by 2022	Legislation	Ongoing: Bill was drafted in 2015 and initial reviews began, and public consultations was held. Further reviews are still ongoing

4.2.2.3. Transportation

The transportation sector includes energy use in passenger road, freight road and domestic marine transport and domestic aviation modes. Diesel and gasoline fuels used in road transportation are the main source of emissions. The mitigation actions for transportation cover changes to the public vehicle fleet, improvements/expansion of charging infrastructure, job skills programs, incentives to encourage purchase of private electric vehicles, enhancing and electrification of the public transit to incentivising modal shift (shift from one mode of transportation to another e.g. shift from private to public transport) and reduce emissions, and fuel efficiency standards.

A total of eight (8) mitigation actions were identified for the transport sector:

- **Achievement of 33% of all private vehicles (including government vehicles) sales are of electric vehicles by 2030.** An adoption of electric vehicles, simultaneous with the transition to renewable energy generation will help reduce fossil fuel consumption in the transport sector. This percentage represents sale of electric cars, SUVs, and motorcycles. This measure excludes public and freight vehicles.
- **Replacement of 30% of the Government fleet with electric vehicles by 2030,** which is equivalent to replacing approximately 144 internal combustion engine (ICE) vehicles with electric vehicles based on 2018 Government fleet transition study. The Government of Saint Lucia has developed national fleet transition strategy which identified suitable vehicles for transition to electric vehicles. In addition, three (3) new electric vehicles have been introduced into the government fleet with further projects under development for replacement and introduction of more electric vehicles into the fleet.
- **Expansion of public transit by 30%.** Increasing access to and reliability of public transport would help reduce the use of private vehicles, causing a modal shift and thereby reducing fossil fuel consumption in the transport sector, as well as assisting with traffic management. The current National Energy Policy calls for the increase usage of public transit and a more efficient public transport system but there has been minimal work completed to achieving this

goal. Managing travel demand for different areas, increase planning in the public transport system, public education and awareness are essential to the achievement of this mitigation action.

- **Realisation of 10% of public transport and taxi vehicle fleet sales are of electric vehicles by 2030.** The size of both fleets combined is approximately 2500 vehicles. This mitigation action is linked to the electrification of the transport sector and benefits.
- **Development and adoption of the Transport Policy by 2025.** Development and Adoption of the transport policy will assist in the changes necessary in transport sector to allow for the shift to more efficient technology.
- **Improvement of incentives to increase the purchase of private electric vehicles.** There are currently incentives to promote the use of electric/hybrid vehicles through the reduction of import duties. This strategy will focus on improving the incentives solely for electric vehicles.
- **Conduct of public Awareness on incentives for electric vehicles/hybrid vehicles.** Public education on the concessions for electric and hybrid vehicles will help support the shift of purchases from internal combustion engine (ICE) vehicles to electric vehicles.
- **Adoption of fuel efficiency standards for vehicles and implementation of mandatory age limit on imported vehicles by 2025.** Improved fuel efficiency reduces the demand for fuel in vehicles and therefore reduce consumption of fossil fuels. The mitigation action considers a programme of initiatives to encourage imported new and used vehicles to meet a minimum fuel efficiency standard and in addition meet a minimum age requirement for vehicles.

The mitigation actions for Transportation are shown in **Table 12** below. Complete Information on each mitigation action can be found in Annex II from **Table 60** to **Table 67**.

Table 12: Mitigation Actions for Transportation

Name	Type	Status
Achievement of 33% of private (including government) vehicles sales are electric vehicles by 2030	Local Plans and Regulation	Ongoing: LUCELEC has begun the installation of charging stations around the island. Plans are ongoing for further charging station near the airport. The Ministry of Infrastructure through the Energy Division has also undertaken training for mechanics for electric and hybrid vehicles. Several projects have been developed and waiting approval which would help with overall goal of this action

Name	Type	Status
Replacement 30% of Government fleet with electric vehicles by 2030 and achievement of 50% electric vehicle fleet by 2050	Infrastructure development, technology	Ongoing: The Government of Saint Lucia has introduced 3 electric vehicles into their fleet and installed charging station at the Ministry of Infrastructure. The Government has also undertaken a government fleet transition study which identified suitable vehicles for transition to electric vehicles. Projects are currently being developed and awaiting approval which would help with this transition
Expansion of public transit by 30%	Local Plans and Regulation	Proposed: The NEP calls for promotion and increase use of the public transit.
Development and adoption of the Transport Policy by 2025	Local Plans and Regulation	Planned: The Transport policy has been planned; several attempts to source financial support in the development of the policy have not succeeded. Nonetheless TORs for the policy have been developed and advertised to identify a suitable candidate; efforts are ongoing to source financing. The Transport Division has undergone several transitions with human resources.
Achievement of 10% sales of public transport and taxi vehicle fleet are electric vehicles by 2030.	Infrastructure development, technology	Planned: The public transport drivers have expressed interest in the transition. Negotiations are still ongoing to develop projects for this action
Improvement of incentives for electric vehicles	Local Plans and Regulation	Planned: Incentives for hybrid and sustainable fuel vehicles are already in place, which includes electric vehicles. The additional incentives are expected for only electric vehicles to encourage greater uptake
Conduct of public awareness on incentives	Education and Awareness Programs	Ongoing: Energy Awareness Month is an activity planned every November in which the Energy Division undertakes

Name	Type	Status
for electric vehicles/hybrid vehicles		energy awareness activities on various initiatives. Continued action is required and the development of a more comprehensive programme to be undertaken.
Adoption of fuel efficiency standards for vehicles and implementation of mandatory age limit on imported vehicles by 2025	Legislation	Planned: Develop programme of initiatives to encourage imported new and used vehicles to meet a minimum fuel efficiency standard and in addition meet a minimum age requirement for vehicles

4.2.2.4. Agriculture, Land Use, Land Use Change and Forestry

The Agriculture, Land-Use, Land-Use Change and Forestry sector includes anthropogenic GHG emissions and removals by sinks that occur on managed lands.

A total of four (4) **mitigation actions were identified related to the Agriculture, Land-Use, Land-Use Change and Forestry sector**. These include:

- Conversion of 2,500 ha of additional agricultural lands to agroforestry practices by 2030.** Agroforestry refers to land use practices in which trees and other woody perennials are spatially or temporally integrated with crops and livestock on a given unit of land. Integrating natural biodiversity, species and trees with crops and livestock will enhance sinks from native trees, reduce fertilizer use, increased habitat and build resilience against one-off diseases. This mitigation strategy is part of a funded project under the Global Environment Facility (GEF).
- Reforestation of 2,500 ha of degraded areas by 2030.** Reforestation of degraded areas improves forest carbon sequestration and enhances sinks. Degraded lands refer to lands that were once forests but have been depleted or converted to non-forest land over the last 30 to 50 years. The Government of Saint Lucia is undertaking several reforestation efforts primarily in selected degraded areas or areas of high risk from storms and flooding. The "IYANOLA" natural resource management project for the north-east of the island and the South-East coast project are both funded under the GEF and aims to reforest 1000ha and 2,500ha respectively. The Forestry Division has indicated that the South -east coast project area would need to be revised and the numbers are expected to be closer to 1,500ha. Although the actual rehabilitation area may be smaller, the area impacted will most likely add up to the 2500ha.

- **Protection and rehabilitation 500 ha of seagrass beds, reefs, and mangroves to improve sequestration and enhance sinks.** This mitigation strategy is also funded by GEF through the South-East Coast Project.
- **Improvement of Watershed Management.** Guidelines for developing watershed management plans, were developed through the Disaster Vulnerability Reduction Project (DVRP) as well as one watershed management plan for the Castries Watershed. Also, under the Vieux Fort Water Supply Rehabilitation Project funded by the Caribbean Development Bank (CDB) a Watershed Management Plan was developed for the Vieux Fort Watershed. There are ongoing projects by the Water Resources Management Agency (WRMA) and the Water and Sewage Company (WASCO) and the Forestry Department to manage the watersheds and water supply. The Department of Infrastructure has an ongoing DVRP project titled “Comprehensive Assessment of a Hydrologic and Hydraulic conditions of the Dennery Village and Soufriere including Fond St Jacques” related to flood management. The prevention or reduction in deforestation and forest degradation (loss of carbon density) and sustainable management of forests may significantly contribute to avoided emissions. This is one of the methods used in watershed and flood management improvement which will help conserve water resources and prevent flooding, reduce runoff, control erosion, reduce siltation of rivers, and protect fisheries and at the same time preserve biodiversity (IPCC, 2007).

The mitigation actions for the Agriculture, LULUCF sector are shown in **Table 13** below. Complete Information on each mitigation action can be found in Annex II from **Table 68 to Table 71**.

Table 13: Mitigation Actions for the Agriculture, Land-Use, Land-Use Change and Forestry Sector

Name	Type	Status
Conversion 2,500 ha of additional agricultural lands to agroforestry practices by 2030.	Natural systems protection	Ongoing: Under the “IYANOLA” (GEF-5) project 1,000 ha was marked for agroforestry practices; and this project has been extended. The Gef-6 project South East coast has indicated a need to have 5000 ha converted to agroforestry. The project is still being assessed to identify suitable locations for this conversion
Reforestation 2,500 ha of degraded areas by 2030	Natural systems protection	Ongoing: Under the “IYANOLA “(GEF-5) project 1000 ha was identified for conversion from degraded lands. Only 84 ha of lands so far has been converted, the project has been extended and is expected to be completed. Under the Southeast Coast project,

		the original plan was for 2,500 ha of degraded land converted to forest but the forestry division has indicated that the numbers are more likely to be in the vicinity of 1,500 ha
Protection and rehabilitation 500 ha of seagrass beds, reefs, and mangroves.	Natural systems protection	Ongoing: This is part of the ongoing South-East coast GEF-6 project, currently in the beginning stages of implementation
Improvement of watershed and flood management	Natural systems protection	Ongoing: Several projects are ongoing by the Water Resources Management Agency, the Forestry Department, Department of Infrastructure and the Water and Sewage Company to manage the watersheds.

4.2.2.5 Industrial Processes and Product Use (IPPU)

Emissions from IPPU include the release of HFCs. One mitigation strategy was identified in this sector, which is the phase down of the use of HFCs in refrigerants. Saint Lucia signed onto the Kigali Amendment of the Montreal Protocol to gradually reduce the consumption and production of HFCs. The agreement is expected to be ratified by Saint Lucia in 2022. The mitigation strategy indicates a 10% phase down by 2029, 30% phase down by 2035, 50% phase down by 2040 and 80% phase down by 2045. At present the Kigali Amendment seeks to phase down but not fully phase out HFC's.

The mitigation action for Industrial Processes and Product Use are shown in **Table 14** below. Complete Information on each mitigation action can be found in Annex II in **Table 72**.

Table 14: Mitigation Action for the Industrial Processes and Product Use Sector

Name	Type	Year and Status
Phase down of HFCs-10% by 2029, 30% by 2035, 50% by 2040 and 80% by 2045.	Education and public awareness	Ongoing: A number of webinars and education sessions have been implemented by the National Ozone Unit to educate the public and technicians on alternatives to HFC. Including training Refrigeration and Air Conditioning (RAC) technicians in the safe use of flammable alternatives throughout their life cycle. Ratification of the Kigali amendment is still pending for full phase down implementation

4.2.2.6. Waste

The waste sector includes mitigation strategies for solid waste disposal and assessment of the energy utilized in the waste sector. **A total of five (5) mitigation actions are proposed for the waste sector.** These strategies are all in the initial stages and further development is required in order to ensure that a comprehensive plan is developed for implementation of these actions. These include:

- **Conduct of public awareness campaign for home composting systems.** Aerobic digestion breaks down food and green waste for soil creation. Measures to increase home composting will reduce the amount of organic waste entering the landfill and therefore reduce landfill emissions overall.
- **Introduction of pilot for waste separation by 2023.** This is a new proposed area for development and implementation. It is anticipated that this pilot project will aid in the introduction of recycling systems on island and help reduce waste to the landfills.
- **Development of strategy by 2022 to re-purpose batteries for electric vehicles to other uses upon end of life.** Improvement in the management of solid waste will assist in the three R's of environmental protection, reduce, reuse and recycle. and proper waste disposal. This is a precursor to waste management programs and encourage behavioural change in the waste sector. Batteries from electric vehicles can be reused by integrating into energy storage systems at various scales.
- **Conduct of feasibility study to undertake industrial-scale composting of organics from residents for production of biogas for use in waste collection vehicles.** Anaerobic digestion of organic matter produces biogas. The study will assess the potential amounts of biogas produced based on the volume of organic waste in landfills, taking into consideration the efforts to reduce organic waste through composting needs to be investigated before investments can be made in the system.
- **Assessment of energy utilised for waste management.** This is an energy audit of the complete waste system to identify energy efficiency measures in all aspects of the waste system.

The mitigation actions for the Waste sector are shown in **Table 15** below. Complete Information on each mitigation action can be found in Annex II from

Table 73 to **Table 77**.

Table 15: Mitigation Actions for the Waste Sector

Name	Type*	Year and Status
------	-------	-----------------

Conduct of public awareness campaign for home composting systems	Education and Awareness Programs	Planned: Some work is being done on composting, but public education and awareness is still inadequate
Introduction of pilot for waste separation by 2023	Local Plans and Regulation	Proposed: New area for development and implementation
Development of strategy by 2022 to Re-purpose batteries for electric vehicles to other use upon end of life	Local Plans and Regulation	Planned: Projects planned currently in final approval stages to develop strategies for electric vehicle end-of-life use
Conduct of feasibility study to undertake Industrial-scale composting of organics from residents for production of biogas to use in waste collection vehicles	Local Plans and Regulation	Proposed: New area to undertake research and identify the feasibility of the use of biogas recovered from waste.
Assessment of energy utilized for waste management	Local Plans and Regulation	Proposed: New area to assess the energy used in the waste sector and proposed suitable measures to reduce consumption

4.2.3 LEAP Modelling of GHG Impacts of the Mitigation Strategy

4.2.3.1 Overview of the Methodological Approach

The thirty-four (34) mitigation actions that comprise Saint Lucia's mitigation strategy were assessed for data availability and applicability for mitigation modelling. Ultimately, seventeen (17) mitigation actions were chosen to be included in the modelling to quantify the impacts of the mitigation strategy on Saint Lucia's GHG emissions using the Low Emission Analysis Platform (LEAP), referred to as the Saint Lucia Mitigation Assessment with LEAP. Actions were modelled either as a single strategy or bundled with similar strategies.

The Saint Lucia Mitigation Assessment with LEAP builds upon previous modelling undertaken for Saint Lucia to develop Saint Lucia's updated NDC, which was largely based on the NETS. For this mitigation assessment, the LEAP model developed for the NDC analysis was updated to reflect the most recent

official economic, demographic and energy statistics for Saint Lucia and, to the extent possible, capture the economic impact of COVID-19.

In addition, the Saint Lucia Mitigation Assessment with LEAP model was extended to 2000, so that scenarios can be shown in historical context. Forward-looking scenarios were created out to 2030 and 2050 to project GHG emissions over these timeframes; non-energy sector emissions (historical and projections) were included; and modelled emissions were brought into closer alignment with the most recent GHG inventory. Historical emissions and energy demands obtained from the LEAP model developed for this mitigation assessment closely match official energy statistics and GHG inventories (within 3% of inventory values), indicating the model is well tuned to Saint Lucia's national circumstances.

Three future scenarios were developed to assess impacts: a baseline and two mitigation scenarios were constructed to examine the mitigation effects of Saint Lucia's mitigation strategy, as described further below. Emissions were projected into the future for each of the three scenarios and results compared under the various scenarios. The mitigation effects reported in this chapter are based on comparing the baseline scenario to the mitigation scenarios.

The three (3) scenarios developed for Saint Lucia are:

- **Baseline:** illustrates where Saint Lucia's emissions are headed assuming no changes from current policy implementation and taking account of demographic and macroeconomic trends and associated growth in purchasing power of citizens (e.g. greater ownership of energy-using equipment), as well assuming modest efficiency improvements, which might be expected even in the absence of new government policies.
- **Mitigation:** explores implementation of the mitigation actions comprising Saint Lucia's mitigation strategy in buildings, transportation, street lighting, power, and other sectors. Uses the same macroeconomic and demographic assumptions as the baseline.
- **Mitigation with More Renewables:** the same assumptions are applied up to 2030 as the Mitigation scenario; however, from 2030-2050, the scenario explores further development of renewables (geothermal, solar & wind) compared to the mitigation scenarios addressed above effectively resulting in a more ambitious long-term strategy.

By building the model for Saint Lucia's mitigation assessment analysis within LEAP, the model is readily available for future updated mitigation assessments. In addition, in-country experts were trained on using LEAP to ensure that the government retains the capacity to use the model.

Finally, a stakeholder validation workshop was held to review and validate the assumptions, analysis and conclusions of the Saint Lucia Mitigation Assessment with LEAP. The model was updated to reflect feedback from the stakeholder validation workshop.

4.2.3.2 Description of Assumptions for Modelled Mitigation Actions by Sector

Energy Demand

The historical information on total consumption of energy was mainly taken from the energy balance prepared for the 2018 GHG Inventory. This energy balance used extrapolated data, as energy balances for Saint Lucia were officially last prepared in 2015 for the energy balance year 2010-2012. In general, there was limited data available on energy end uses from the energy balance. The main source of data was the 2010 census because, due to covid-19, the planned 2020 census was not conducted. Data from other countries, from the TNC, from LUCELEC Annual Reports and country expert opinion were also used to develop the energy balance.

Energy Efficient Equipment

The following four (4) mitigation strategies were grouped together to model the effects of Energy Efficient Equipment:

Table 16: Showing Energy Efficiency Mitigation Actions grouping

Modelled Action	Mitigation Actions Included in the Modelled Action
Energy efficient equipment	Implementation of Regional Energy Efficient Building Codes for all new buildings and renovations
	Lighting Retrofits for all Government Occupied Buildings
	Development of comprehensive incentives for Energy Efficient equipment
	Adoption of Mandatory Energy Efficiency Standards for Appliances by 2025

It was assumed that these mitigation actions would result in a higher uptake of energy efficient equipment (air conditioning, lighting, refrigerators, and other electric appliances) in the residential and commercial sectors. To estimate the impact of these actions on GHG emissions, assumptions were made about the technical characteristic and rates of uptake of more energy efficient equipment in the future. The detailed assumptions for residential and commercial sectors are given in **Table 17** and **Table 18** below.

Table 17: Detailed assumption for energy efficient equipment in the residential sector

Equipment	Ownership rate (%)	Current Intensity (kWh/household)	Energy Best Practice Efficiency improvement	Penetration of efficient equipment	
				Baseline	Mitigation
AC	5% in 2010 10% in 2018,	1200	15%	10% in 2030	20% in 2030

	16% in 2030 and 34% in 2050			30% in 2050	60% in 2050
Lighting	100%	360	50%	100% in 2040	100% in 2030

Table 18: Detailed assumption for energy efficient equipment in the commercial sector

Equipment	Current Intensity (kWh/MM EC\$)	Energy Best Practice Efficiency improvement	Penetration of efficient equipment)	
			Baseline	Mitigation
AC	21028	15%	10% in 2030, 30% in 2050	30% in 2030, 90% in 2050
Lighting	10278	50%	100% in 2040	100% in 2030

For other electric appliances in both the residential and commercial sectors, it was assumed that there was a general increase in energy efficiency of appliances of 0.5% annually in the baseline and 1.5% in the mitigation scenarios.

Solar water heaters: Public awareness campaigns on incentives for renewable energy equipment, including solar water heaters.

This mitigation action was modeled as an increase in uptake of solar water heaters in the residential and commercial sectors, as a function of home ownership and technology penetration rates in the future.

Table 19 below shows the detailed assumptions made for the increase in solar water heaters.

Table 19: Assumption for increase uptake of solar water heaters

Equipment	Water heaters	
Water heater Ownership rate in households (%)		12% in 2001, 19% in 2010, 40% in 2030, 50% in 2050
Penetration of solar water heaters	Baseline	Residential: 60% in 2018, 70% in 2030, 80% in 2050 Commercial: 0% in 2018, 10% in 2030, 20% in 2050
	Mitigation	Residential: 60% in 2018, 80% in 2030, 95% in 2050 Commercial: 0% in 2018, 30% in 2030, 50% in 2050

Streetlighting retrofits

This mitigation action assumes all streetlighting will be replaced by 2025 and only LED lights will be installed from 2025 onward.

Table 20 below shows the detailed assumptions for the model.

Table 20: Detailed assumption for streetlighting retrofits

Equipment		Streetlights
Activity level		22,000 in 2020, grows with GDP
Current technology		250 W & 70 W HPS bulbs
Efficient technology		75 W & 21 W LED bulbs (70% improvement)
% Replacement	Baseline	0% in 2018, 5% in 2020, 100% in 2040
	Mitigation	0% in 2018, 5% in 2020, 100% in 2025

Electricity Generation

The electricity generation assumptions determine the underlying GHG emissions from the supply of electricity. In Saint Lucia, almost all grid connected electricity production is from diesel generation. In 2019, there was 88.4 MW of installed diesel generation with an additional 3MW of utility solar and 1.09MW of distributed grid connected solar. Off grid renewables are not considered. LUCELEC produces annual reports that disaggregate the electricity sales in the different sectors – residential, commercial, industrial and streetlighting. These sales data were used to assign emissions from electricity generation to end users and thereby relate the mitigation actions, which typically target end use, to the source of GHGs emissions in the modelling.

Below are key assumptions for the renewable energy supply under different scenarios, which is a key driver of energy-related emissions in the modelling.

Table 21: Power Generation Capacity Energy Generations Assumptions for the Modelled Scenarios

Scenario	Year	Distributed Solar/MW	Solar/MW	Wind/MW	Geothermal/MW	Diesel/MW	Total/MW
Baseline	2019	1.1	3	0	0	88.4	92.5
Mitigation Scenario	2025	7.6	25.0	8.0	0	70.0	111.0
	2030	13.0	41.0	18	0	52.1	124.1
	2035	13.0	41.0	18	15	42.4	129.4
	2050	13.0	41.0	18	15	65.0	152.0
Mitigation more Renewables	2025	7.6	25.0	8.0	0	70.0	111.0
	2030	15.0	47.0	22.0	0	50.1	134.1
	2035	18.0	59.0	30.0	15	32.4	154.4
	2050	22.0	68.0	36.0	30	32.0	188.0

In addition, the following assumptions are made in the model:

- In the mitigation scenario, installed capacity of renewables reaches targets, and additional capacity requirements are met by diesel driven power plants.
- In the mitigation scenario, in 2035, 67% of the capacity and 76% of the power generation in Saint Lucia will be from renewable energy sources.

Reduction of transmission and distribution losses

In the baseline, it is assumed that the transmission and distribution losses are maintained at 6.3% until 2030 and in the mitigation scenario, they are assumed to reach 5% in 2030%.

Transportation

The historical information on total consumption of energy for transportation was taken from the energy balance prepared for 2018 GHG Inventory which was calculated based on extrapolated data. The total stock of vehicles was assumed to decline from fifty-seven thousand (57,000) in 2018 to forty-seven thousand (47,000) in 2030 taking into account the impact of COVID-19. It was assumed that personal vehicles represent 89% of the stock in 2018 and the share of SUVs decline from 17% in 2018 to 12% in 2030. After the validation workshop, model was updated to reflect impacts of COVID-19 on the transport sector, which affected stock projections. The stock of vehicles decreases for a few years, and then ramps up again.

Electrification of private and government vehicles

Two mitigation actions are included to model the mitigation scenario as follows:

Table 22: Mitigation Actions for electrification of private and Government vehicles.

Modelled Action	Mitigation Actions Included in the Modelled Action
Electrification of private and government vehicles	33% sales of vehicles are electric by 2030
	Replace 30% Government fleet with electric vehicles by 2030 and 50% by 2050*

*equal to the replacement of approximately 144 ICE vehicles to electric vehicles based on 2018 Government fleet transition study

Electrification of vehicles was modelled using assumptions about the share percentage of sales of electric vehicles. In the baseline, electric vehicles account for 5% of sales of cars and 3% of SUVs in 2030. This results in 2% of electric vehicles in the total stock by 2030. In the mitigation scenario, electric cars, SUVs and motorcycles represent 33% of sales in 2030. This results in 6.8% of electric vehicles in the total stock of private transportation vehicles (excludes freight and public vehicles). The assumptions made in this scenario are shown in **Table 23**.

Table 23: Assumptions made in the electrification of private and government vehicles

Indicator	Baseline 2030	Mitigation scenario 2030
% sales of electric cars and motorcycles	5%	33%
% sales of electric SUVs	3%	33%
% of electrification in private & Government vehicle stock	2%	6.8%

Electrification of public transport

The following mitigation action was modelled to assess mitigation from the electrification of public transport vehicles and taxi's:

- 10% sales of vehicles in public transport and taxi vehicle fleet are electric vehicles by 2030.

In the scenarios modelled, for the baseline, electric vehicles account for 5% of sales of public mini-buses and 5% of commercial vehicles (commercial taxis-buses) in 2030. This results in 1.2% and 1.3% of electric vehicles in the total stock of public and commercial vehicles, respectively. In the mitigation scenario, electric vehicles represent 10% of sales of public vehicles, and 10% of commercial vehicles in 2030. This results in 3.1% and 2.6% of electric vehicles in the total stock of public and commercial vehicles respectively. The assumptions are shown below:

Table 24: Assumptions in the electrification of public transport

Indicator	Baseline 2030	Mitigation scenario 2030
% sales electric – public	5%	10%
% of electrification – public vehicle stock	1.2%	3.1%
% sales electric – commercial	5%	10%
% of electrification – commercial vehicle stock	1.3%	2.6%

Improvement of Fuel economy

The mitigation action modelled is: Fuel efficiency standards for vehicles and implementation of mandatory age limit on imported vehicles by 2025.

The following assumptions are made in the model:

- Fuel economy improvements were considered for all gasoline and diesel vehicles (ICEs)
- In the baseline, new vehicles in 2025 have a fuel economy improvement of 5% compared to older vehicles.
- In the mitigation scenario, the fuel efficiency improvement is 15% in passenger vehicles, and 10% in freight vehicles (Light Duty Vehicles (LDV) and Medium Duty Vehicles (MDV))

Increased public transport

The mitigation action modelled is: 30% expansion of public transit, to increase access to public transport and reduce the use of private vehicles.

For the modelling, the following assumptions are made:

- Shift of demand from private vehicles to public transport is represented by a decrease in private vehicles and an increase in public transportation of 65 million pass-km travelled by 2030.
- This requires an increase in 271 minibuses and a decrease in 4250 private vehicles by 2030.
- To reach the above, the model considers a change in total annual sales as follows: 24 more minibuses sold per year; 420 fewer private vehicles sold per year.

Non-Energy Measures

Agroforestry practices

The mitigation action modelled is that 2,500 ha of additional agricultural land is converted to agroforestry practices by 2030. It was assumed that land converted to agroforestry sequesters carbon at an average rate 15.9 tCO₂e per hectare per year as reported in the TNC. Each year from 2019-2030, an additional 208.3 ha of land is assumed to be converted to agroforestry, until a cumulative total of 2,500 ha is converted by 2030. From 2030 on, no further area is assumed converted to agroforestry and the total annual sequestration rate is based on the 2,500 ha of land under agroforestry each year from then on.

Reduction in Degradation and Reforestation

The mitigation action modelled is that 2,500 ha of degraded land is repaired and reforested by 2030. It was assumed that targeted land sequesters carbon at an average rate of 4.9 tCO₂e per hectare per year as reported in the TNC. Each year from 2019-2030, an additional 208.3 ha of land is assumed repaired and reforested, until a cumulative total of 2,500 ha is reached in 2030. Then the annual sequestration rate remains steady each year from there on, based on the 2,500 ha of reforested land.

Industrial Processes and Product Use (IPPU): HFC Phase-down

The mitigation action modelled is: 10% phase down of HFC by 2029, 30% phase down by 2035, 50% phase down by 2040 and 80% phase down by 2045. The mitigation action assumes that each year, a fraction of the imported HFCs will be replaced by alternative refrigerants which have at least 90% lower global warming potential than the refrigerants used in the baseline.

Waste

Due to lack of baseline data on waste management (e.g., waste characterization and waste disposal practices), none of the five mitigation scenarios were modelled.

4.2.3.3. Results

4.2.3.3.1 Baseline Scenario

Mitigation assessment requires that there be a projection of expected baseline sometimes referred to as “business as usual” scenario that accounts for existing government policies.

The baseline scenario explicitly does not consider the targets, goals and projects of the mitigation strategy; rather, the scenario reflects a continuation of existing policy implementation and moderate energy efficiency improvements and shifts in technology that are expected to happen even in the absence of new policies. In the baseline projections, drivers of emissions are population growth, household growth and GDP/economic growth, energy supply, impact of existing government policies and historical emissions from the 2018 National GHG Inventory and the 2018 Energy Balance report. The same trends for population growth, household growth and GDP/economic growth (also referred to as macroeconomic and demographic trends) are used for the baseline and mitigation scenarios. The impacts of COVID-19 on GDP and GDP per capita were estimated using the GDP projections from the International Monetary Fund (IMF) World Economic Outlook which projects to 2025. It assumes constant growth after recovery. Key macroeconomic and demographic projects used in the model are illustrated in the following figures.

Figure 22: Population Trend to 2050

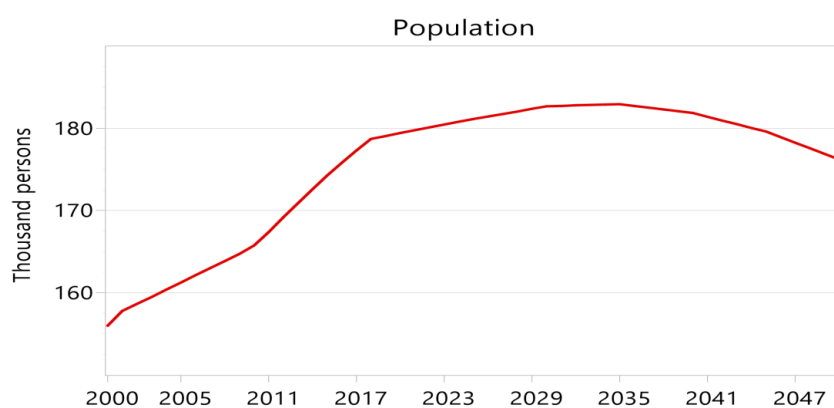


Figure 23: GDP Trend to 2050

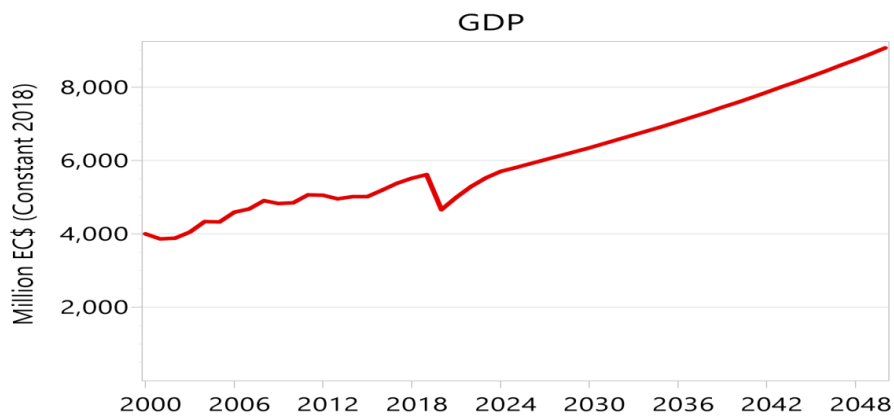


Figure 24: Household Trend to 2050

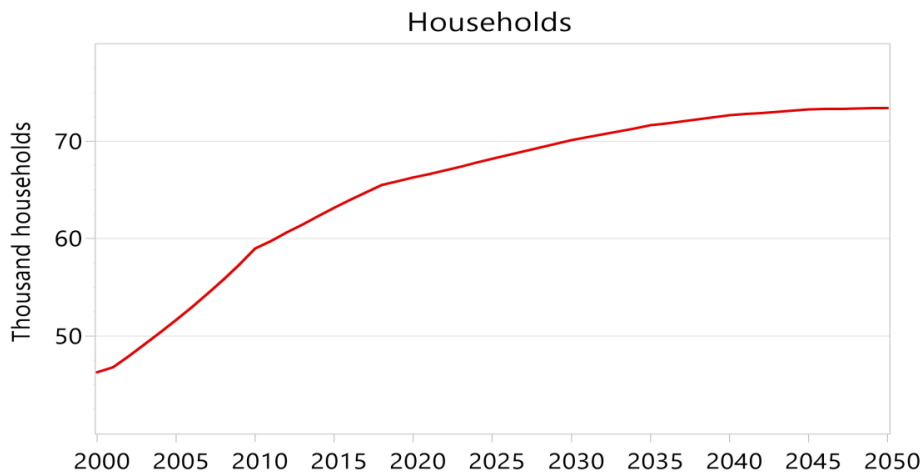
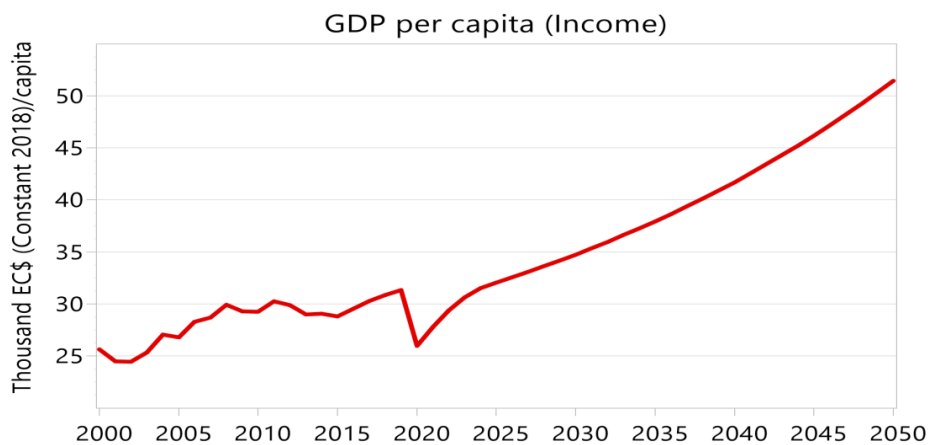


Figure 25: GDP per capita Trend to 2050



Historical (back to 2000) and future (to 2050) baseline emissions were estimated for all sectors and are shown in Figure 26 and

Figure 27. The baseline presented is the best available realistic projection of future emissions based on current trends and market influences. Mitigation scenarios were then considered against this baseline to understand how mitigation would impact the reduction of GHG emissions.

Figure 26: Projected GHG emissions by sector in the baseline

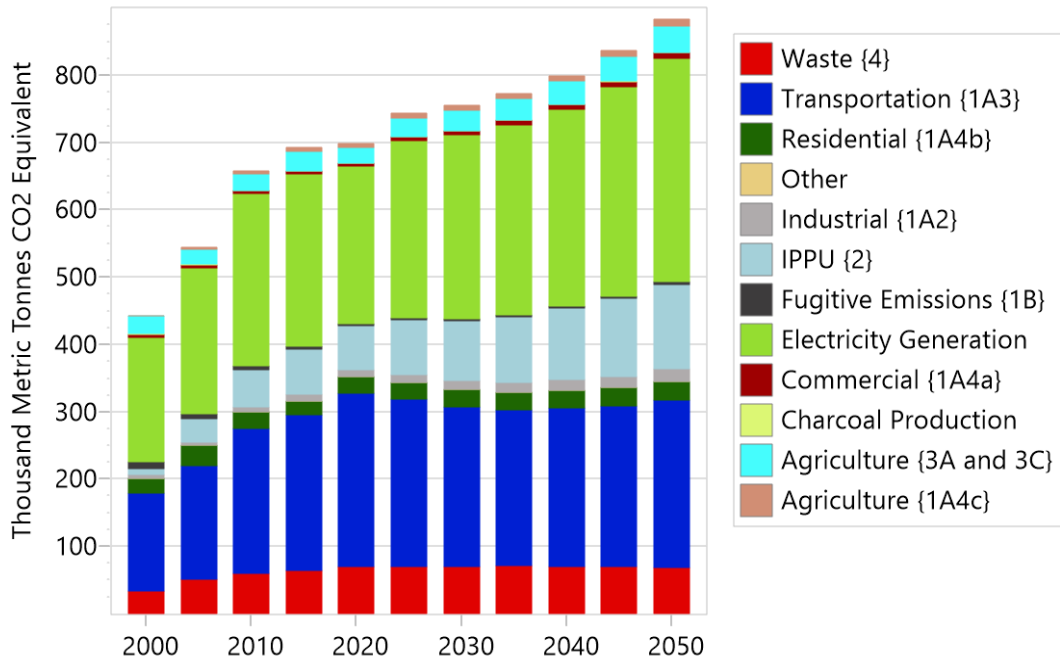
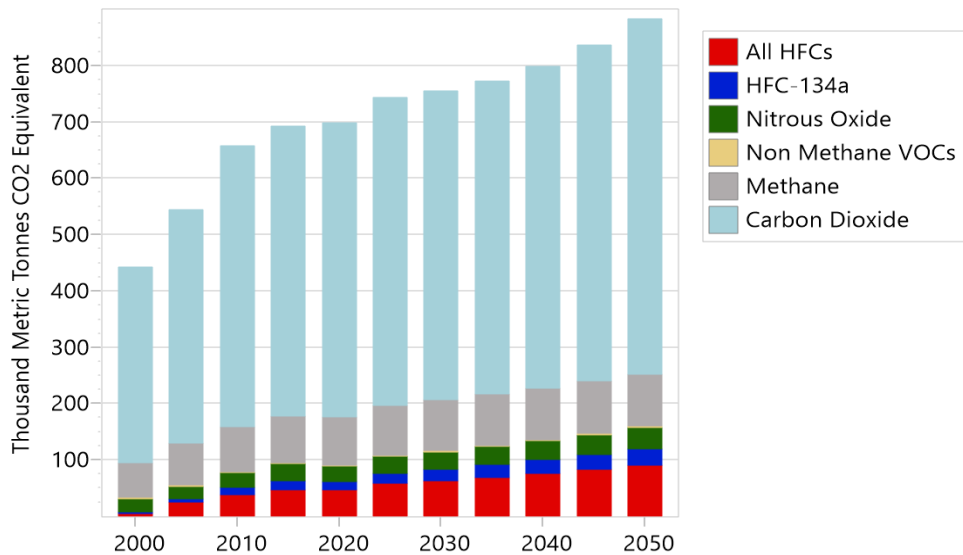


Figure 27 : Projected GHG emissions by gas in the baseline

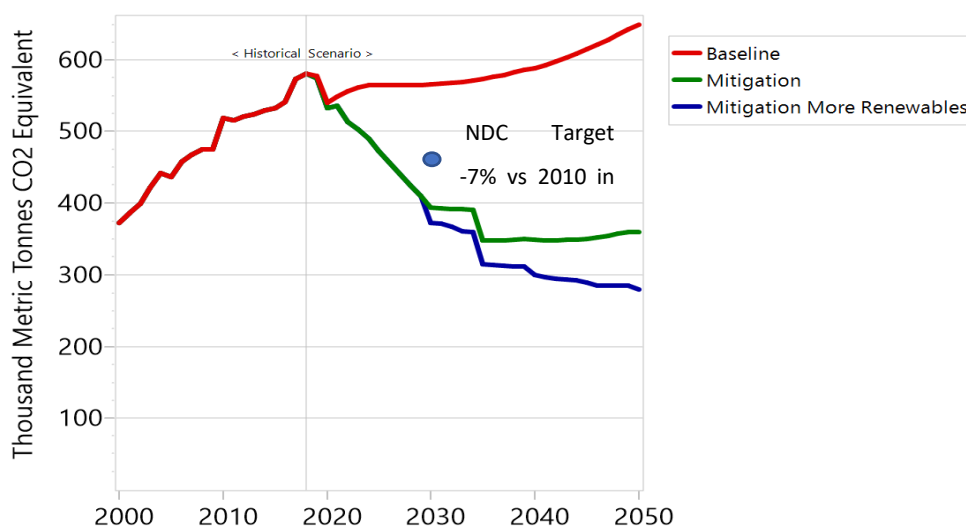


4.2.3.3.2. Mitigation scenarios: future emissions considering Saint Lucia's mitigation strategy

As discussed above, two mitigation scenarios were modelled, having the same assumptions to 2030 and differing in power sector generation and other sectors from 2030-2050.

Figure 28 shows the results of the three modelled scenarios for the energy sector, encompassing power generation, energy demand, and energy use in transportation and buildings. Also shown for comparison is the NDC target for 2030.

Figure 28: Projected emissions for the energy sector only, under three scenarios

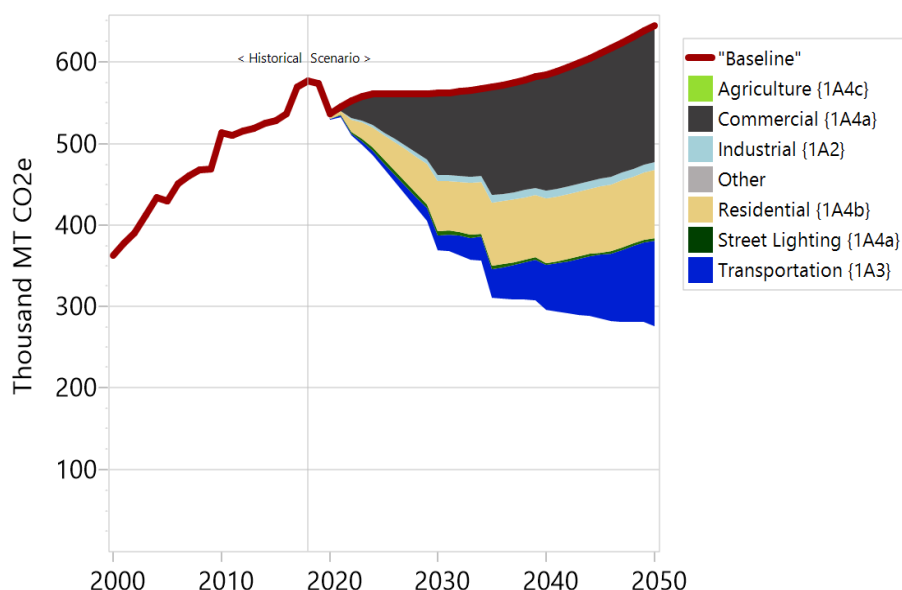


The mitigation assessment indicates that the NDC target is achievable and emission reductions beyond the NDC target are possible if the assumptions of the mitigation assessment are achieved in the future.

The potential emission reductions (or avoided emissions) of the mitigation strategy are the same out to 2030 for both mitigation scenarios. After 2030, the Mitigation with More Renewables scenario reduces emissions further due entirely to more electricity generation from renewable sources.

Error! Reference source not found. shows the relative contribution of various strategies to the emission reductions achieved by the Mitigation with More Renewables scenario, relative to the baseline. This figure does not show the potential reductions achieved by the non-energy mitigations actions specifically for IPPU, agriculture, and reforestation. However, the estimated impact of those actions is reported in **Table 25**.

Figure 29: Projected reductions by end-use strategy (energy only), including emissions from power generation allocated to end-uses; comparing the baseline and the Mitigation with More Renewables scenarios



Mitigation actions that increase electricity generation from renewable sources underly all the trends in the Error! Reference source not found. and the resulting emissions are shown by end-use categories. Therefore, the trends shown consider both renewable generation and improvements in energy/fuel efficiency. The commercial and residential sectors dominate the emission reduction trends shown in Error! Reference source not found.. The transition to electric vehicles and improvements in vehicle fuel efficiency, which are inherent to the trends in Error! Reference source not found. for transportation, are also substantial contributors to the reduction trends occurring under the mitigation scenario.

4.2.3.3.3. Summary of emission reductions achieved by sector and action within sector

Electricity Generation

The table below relates the trends to the emission reduction potential of mitigation actions in the mitigation strategy. The table shows the modelled direct emissions reductions (or avoided emissions) achieved in the year shown by comparing the Baseline to the Mitigation scenario in that year.

Table 25: Summary of direct emissions reductions achieved in each year by Sector comparing baseline to mitigation scenarios. (Thousand MT CO₂e Avoided per year)

Mitigation vs. Baseline				
Direct	Thousand MT CO ₂ e Avoided			
Sector	2025	2030	2050	2050 w/ More RE
Agriculture {3A and 3C}	23.2	39.8	39.8	39.8

Mitigation vs. Baseline				
Commercial {1A4a}	0.2	0.3	0.7	0.7
Electricity Generation	84.5	152.2	183.2	263.4
IPPU {2}	0.5	1.1	9.5	9.5
LULUCF {3B}	7.1	12.3	12.3	12.3
Transportation {1A3}	7.3	19.2	104.7	104.7
Total	122.8	224.8	350.1	430.2

Emission Reductions by Sector/End Use

Table 26 provides further explanation of the trends in Error! Reference source not found. and enables relating the trends to the emission reduction potential of mitigation actions in the mitigation strategy. The table shows the modelled emissions reductions (or avoided emissions) achieved in the year shown by comparing the Baseline to the Mitigation scenario in that year. Just as in Error! Reference source not found., the table shows the total direct and indirect emissions allocated to the end use sectors. Recall the Mitigation and Mitigation with More Renewables scenarios are the same until 2030, after which they deviate due to more aggressive renewable energy adoption. Therefore, the table also shows emission reductions that could be achieved in 2050 under the Mitigation and the Mitigation with More Renewables scenario separately, for comparison.

The table is sorted in descending order from largest to smallest avoided emissions in 2050 under the Mitigation with More Renewable scenario, to further illustrate the relative contribution of each sector/end use to the trends. For example, the highest reductions come from commercial cooling, which is largely due to more renewable energy supply but also is due to the uptake of more efficient air conditioning. The potential renewable energy impacts can be inferred by comparing the Mitigation in 2050 to Mitigation with More Renewables in 2050 results (for non-energy sectors, the avoided emissions are the same in 2050 for the two scenarios).

Mitigation actions related to the uptake of privately owned electric vehicles and improvements in fuel efficiency of private vehicles (Transport, private transportation) also show a relatively high emission reduction potential, with renewable energy generation playing an important role in achieving those reductions

The mitigation assessment indicates potential emission reductions of 122.8 thousand MT CO₂e in 2025, 224.8 thousand MT CO₂e in 2030, and 350.1 thousand MT CO₂e in 2050 when comparing the baseline to the mitigation scenario. Under the Mitigation with More Renewables scenario, the potential emission reductions in 2050 increase to 430.2 thousand MT CO₂e. In comparison, baseline

emissions are projected to grow by 28 percent by 2050 relative to 2010 without the mitigation strategy.

Table 26: Summary of emissions reductions achieved in each year by Sector/End use comparing baseline to mitigation scenarios. (Thousand MT CO₂e Avoided per year)

Sector/End-Use	2025	2030	2050	2050 w/ More RE
Transport, Private Transportation	9.4	20.3	74.7	84.1
Commercial, Cooling	17.7	35.9	55.8	77.3
Commercial, Other	15.1	28.6	43.9	55.8
Non Energy, Agriculture	23.2	39.8	39.8	39.8
Residential, Other	12.8	22.9	25.6	32.9
Residential, Refrigerators	7.8	14.7	17.0	22.7
Commercial, Lighting	10.0	16.4	13.2	19.3
Residential, Cooling	2.1	4.9	11.8	16.7
Non Energy, LULUCF	7.1	12.3	12.3	12.3
Transport, Freight	0.2	1.1	10.9	11.9
Commercial, Water Heating	2.9	5.3	8.0	9.6
Non Energy, IPPU	0.5	1.1	9.5	9.5
Other Sectors, GHGs Avoided from RE Generation	3.2	6.0	6.5	9.4
Transport, Commercial Transportation	0.1	0.7	7.1	8.2
Residential, Lighting	5.7	8.8	5.2	7.6
Commercial, Cooking	1.2	2.5	3.8	5.5
Residential, Water Heating	1.7	3.0	3.5	3.7
Street Lighting, LEDs	5.1	4.7	2.2	3.3
Transport, Public Transportation	-3.0	-4.2	-0.7	0.6
Total GHGs Avoided	122.8	224.8	350.1	430.2

4.2.4. Wider Benefits and Links to Sustainable Development Goals (SDG)

Below is an assessment of the benefits associated with the mitigation strategy, by sector, linking to the Sustainable Development Goals. SDG 17: Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development, is important in every aspect of the mitigation action and strategies. The mitigation actions can only be achieved through partnership national, regional, and international and it is important that developing countries receive support to implement these actions. This section shows the direct link with policy changes towards sustainable development, science and technology, promotions for our energy transition and emissions reduction for each sector to achieve the SDGs.

Energy Demand

- **Energy Security and Independence:** Reduction in energy consumption enables the transition to a clean renewable energy system by helping to manage demand, with the overall result of a reduction in fossil fuel demand and a boost to economy as foreign exchange is reduced.
- **SDG 3: Good Health and Well Being** - Improved Health and Environment; a reduction in electricity demand is correlated directly with a reduction in air pollutants including nitrogen oxides (NOX), sulphur dioxide (SO₂), particulate (PM and PM_{2.5}) and carbon monoxide (CO). These pollutants have been closely related to a large number of health risks, including increased mortality and morbidity associated with corresponding changes in ambient air quality.
- **SDG 8: Decent Work and Economic Growth** – Installation of new, more energy efficient equipment, and whole building retrofits to improve energy efficiency will drive economic growth and employment opportunities. Acknowledging that employment opportunities may require some skills refocus and retooling of the workforce.
- **SDG 9: Industry, Innovation and Infrastructure** – Retrofit of Government buildings and schools with energy efficient equipment, and greater adoption of clean and environmentally sound technologies.
- **SDG 11: Sustainable Cities and Communities** – Reducing Energy demand will reduce environmental impacts of cities in particular reducing local air pollution associated with fossil-fuel power generation.
- **SDG 12: Responsible Consumption** – Although consumers may pay a small premium for commercial and residential buildings to meet the REEBC, all of these measures have reasonably short pay-back periods, and the consumers will benefit from energy savings in the long-term. Residential and Commercial customers may pay increased prices for energy efficient appliances, but these appliances have short pay-back periods and consumers will

benefit from energy savings in the long-term. Building owners that lease their buildings to the Government will have lower operating costs that will positively impact their bottom line.

- **SDG 13: Climate Action**-Integration of climate change measures into national policies, strategies, and planning remains critical.

Electricity Generation

- **Energy Security and Independence:** Reduction in use of fossil fuel and reduced losses in transmission and distribution will result in reduction in the fossil fuel demand and a boost to economy as foreign exchange is reduced. The overall result is that Saint Lucia will rely less on imported sources of fuel, as more local renewable options come on-line and can meet energy demand of Saint Lucia.

The LEAP model was used to project energy independence for all scenarios modelled and found that in the Mitigation scenario, by 2035 Saint Lucia can meet approximately 32% of primary fuel needs with domestic energy supply, compared to only 10% in the baseline. In the Mitigation with More Renewables scenarios, this increased to approximately 36% in 2035 and 46% in 2050 of primary fuel needs with domestic supplies. In any case, moving toward more renewable energy generation will give Saint Lucia more energy independence.

- **SDG 3: Good Health and Well Being** - Improved Health and Environment; a reduction in diesel generation is correlated directly with a reduction in air pollutants, including nitrogen oxides (NOX), sulphur dioxide (SO₂), particulate (PM and PM_{2.5}) and carbon monoxide (CO). These pollutants have been closely related to many health risks including increased mortality and morbidity associated with corresponding changes in ambient air quality.
- **SDG 7: Affordable and Clean Energy**- The introduction of renewables to the grid can improve the affordability and renewables are cleaner than diesel generation.
- **SDG 8: Decent work and Economic Growth** – Expanding capacity for solar, wind, and geothermal energy sources and upgrading the grid to reduce transmission and distribution losses will create numerous employment opportunities.
- **SDG 9: Industry, Innovation and Infrastructure** – Introduction of renewables result in a greater adoption of clean and environmentally sound technologies.
- **SDG 11: Sustainable Cities and Communities** – Introduction of renewables will reduce environmental impacts of cities in particular reducing local air pollution associated with fossil-fuel power generation and also produce a long-term link to SDG 14 as sustainable cities reduces the impact on surrounding ecosystems.

- **SDG 12: Responsible Consumption** – Introducing renewables will aid in the efficient use of natural resources.
- **SDG 13: Climate Action** – Integration of climate change measures into national policies, strategies, and planning remains critical.

Transport

- **SDG 3: Good Health and Well Being** – Improved Health and Environment; a reduction in diesel use is correlated directly with a reduction in air pollutants including nitrogen oxides (NOX), sulphur dioxide (SO₂), particulate (PM and PM_{2.5}) and carbon monoxide (CO). These pollutants have been closely related to many health risks including increased mortality and morbidity associated with corresponding changes in ambient air quality.
- **SDG 7: Affordable and Clean Energy** – It is anticipated that the introduction of electric vehicles and fuel efficiency improvement will result in reduced diesel use and gasoline use in the transport industry and reduce cost for travel.
- **SDG 8: Decent work and Economic Growth** – Job training for electric vehicle maintenance creates new employment opportunities; more demand for installation of EV charging infrastructure creates economic opportunity.
- **SDG 11: Sustainable Cities and Communities** – The electrification of the transport sector and the expansion of the public transport network will result in the improved access to modern, safe, accessible and sustainable transport systems.
- **SDG 12: Responsible Consumption** – Reduced consumption of diesel and gasoline will promote sustainable practices and promote efficient use of natural resources.
- **SDG 13: Climate Action** – Integration of climate change measures into national policies, strategies, and planning remains critical.
- **Energy Security and Independence** – Increase electrification of the transport industry and improvement in fuel efficiency will result in reduction in the fossil fuel demand and a boost to economy as foreign exchange is reduced.

Agriculture, Land Use, Land Use Change and Forestry

- **SDG 2: Zero Hunger** – Agroforestry practices will contribute to sustainable food production systems and resilient agriculture practices.
- **SDG 8: Decent work and Economic Growth** – Sustainable agroforestry systems produce food and fiber contribute to jobs and raw materials for economic growth, in addition these mitigation strategies would help encourage more environmentally friendly careers.

- **SDG 12: Responsible Consumption** – Agroforestry and reforestation will help promote sustainable practices and promote efficient use of natural resources.
- **SDG 13: Climate Action** – Integration of climate change measures into national policies, strategies, and planning remains critical.
- **SDG 14: Life Below Water** – Protection of sea grass beds, reefs and mangroves will help to sustainably manage coastal ecosystems to avoid significant adverse impacts.
- **SDG 15: Life on Land** – Agroforestry and Reforestation have several important environmental benefits including enhanced biodiversity, increased soil nutrient, water retention, reduced soil erosion, increase soil fertility and crop yields.

Industrial Processes and Product Uses

- **SDG 11: Sustainable Cities and Communities** – The measures in this sector will reduce the adverse environmental impact of cities by reducing local pollution from industrial emissions.
- **SDG 13: Climate Action** – Integration of climate change measures into national policies, strategies, and planning remains critical.

Waste

- **SDG 11: Sustainable Cities and Communities** – The measures in this sector will reduce the adverse environmental impact on cities by reducing waste going into landfills and turning organic waste into compost that can be applied to urban ecosystems to enhance soil health.
- **SDG 12: Responsible Consumption** – Increased home composting and other measures will reduce waste generation through prevention, reduction, recycling and reuse.
- **SDG 13: Climate Action** – Integration of climate change measures into national policies, strategies, and planning remains critical.
- **SDG 14: Life Below Water** – Reduction in waste and the landfill and promotion of composting has several environmental benefits and will reduce impact to surrounding environment.
- **SDG 15: Life on Land** – Reduction in waste and the landfill and promotion of composting has several environmental benefits including increased soil nutrients, increase soil fertility and crop yield.

4.2.5 Methods to Improve Modelling, Challenges and Barriers to Implementation

Methods to Improve Modelling

- Improvement in data collection and further disaggregation of sectors/end-uses such as hotels, offices, and other important commercial building types.
- More detailed power sector analysis using optimization-based modeling (e.g., better modeling of variable renewable potential, better modeling of transmission needs, and storage,).

- Improvement in the baseline projections for the Land Use, Land Use Change and Forestry Sector
- Further examination of the adaptation of the model for monitoring the implementation of projects (MRV).

Challenges and Barriers to Implementation of Mitigation Strategies

A summary of the main barriers towards the implementation of the mitigation strategies is highlighted below. These barriers were verified during the stakeholder workshop as part of the Mitigation Assessment:

- **Political Will** – This barrier was common across several of the sectors and the main proposed intervention to help alleviate this barrier was through the sensitisation of high-level decision makers.
- **High Capital Costs** – This barrier was evident in several of the sectors and varying proposed interventions by each sector. The common intervention proposed was access to climate finance grants and low interest loans to help reduce the cost.
- **Weak Governance** – This barrier was identified as the sectors have cross-cutting nature across Ministries and coordination may prove to be difficult. A proposed intervention was to have coordinated programs across ministries and address the overlapping jurisdictions.
- **Technology Suitability /Availability**– This barrier was identified as not all technology proposed is suitable for a SIDS like Saint Lucia. It was proposed that studies and testing be done for the technology proposed for each sector to identify the most suitable for the island. Increased capacity building and training in the different technologies were also identified as method to overcome some of these barriers.

4.3 INTERNATIONAL MARKET MECHANISMS

Saint Lucia is a non-Annex 1 Party and therefore is eligible to participate in the Clean Development Mechanism (CDM). The CDM under the Kyoto Protocol allows a developed/industrialised country with an emission-reduction or emission -limitation commitment to implement an emission reduction project in a developing country. Saint Lucia currently has no projects registered with the CDM or any other international market.

National level market-based instruments, such as cap-and- trade emission trading schemes and offsetting, are crucial to price carbon emissions and keep the costs of mitigation in Saint Lucia low. These will be pursued to encourage implementation of the proposed mitigation measures drawing on any applicable international arrangements. Saint Lucia is in the process of developing a national REDD+

program. It is also important to recognise that negotiations on Article 6 of the Paris Agreement are not well advanced and will influence Saint Lucia's participation in this area.

4.4 DOMESTIC MEASUREMENT, REPORTING AND VERIFICATION FOR MITIGATION ACTIONS

4.4.1 Institutional Arrangements

The Ministry of Education, Innovation, Gender Relations & Sustainable Development, Department of Sustainable Development (DSD) is responsible for submitting/compiling the National Communication (NC) and the BUR. This process is coordinated through the Climate Change Team of the Sustainable Development and Environment Division (SDED). DSD is Saint Lucia's Climate Change Focal Point for the UNFCCC in Saint Lucia.

The DSD is responsible for gathering information from government agencies and other stakeholders to develop, maintain, update, and oversee Saint Lucia's mitigation strategy. To facilitate this, the DSD has developed an MRV system for the mitigation strategy that works in conjunction with, enhances and supplements the National MRV system. The DSD MRV system for mitigation has three components: a formal agreement for data sharing; reporting tool for agencies; and implementation report for DSD. Considering the various efforts to date regarding MRV for adaptation and mitigation, DSD will make every effort to minimise duplication, facilitate coordination, and reduce as much as possible stakeholder fatigue. Each MRV system for mitigation is described below:

4.4.2. Information Sharing Memorandum of Understanding (MOU)

An inter-agency MOU has been drafted by DSD with the intention to have agencies formally commit to regular information and data exchange in support of the mitigation strategy. The MOU formalises institutional arrangements for data sharing and specifies, for example: there will be routine dialogue and meetings between DSD and agencies; there is an expectation for timely responses to requests; and how information will be requested. The MOU is still in its developmental stage and has not been executed.

4.4.3. Reporting Instrument for Agencies Linked with the National MRV System

A Mitigation Action Reporting Tool for Agencies (MARTA) has been developed and is a spreadsheet tool for agencies to report to DSD on a quarterly basis or other suitable time frame on the mitigation actions they are responsible for implementing. The MARTA contains fields that will be important for Agencies to report on to DSD such as on progress, barriers and challenges, funding sources, and data collected on indicators. Some fields are identical to those required by the National MRV system and there are additional fields that provide DSD with useful information for overseeing and monitoring

progress and impacts at the project or programme level. DSD will administer this tool to agencies and save the reported information in DSD's electronic filing system. Where feasible, fields that are in the MARTA and National MRV system can be linked to ensure consistency across platforms and transparency.

4.4.4 Implementation Reports by DSD

DSD has also developed a template for internal reporting on the mitigation strategy. Presently, the template is an excel worksheet with a proposed tabular format for aggregating information reported by Agencies in the MARTA reports. The primary purpose of the internal implementation reports is to facilitate DSD's ability to rapidly assess progress and identify issues, and to generally manage and oversee the mitigation strategy. The aim of the implementation report is to: (1) monitor and improve on implementation of mitigation actions, (2) identify needed support (financial and capacity), and (3) identify new mitigation actions or updates to existing ones to include in future mitigation assessments.

CHAPTER 5: FINANCE, TECHNOLOGY AND CAPACITY BUILDING NEEDS AND SUPPORT RECEIVED

5.1 OVERVIEW OF FINANCIAL AND TECHNOLOGICAL NEEDS

Saint Lucia has and continues to work with several international donors and funding agencies on projects that directly address climate change adaptation and mitigation. Saint Lucia does not currently have a central system for recording the contributions received from these donors in a systematic manner, therefore tracking the progress of these activities is not straightforward. Nevertheless, recordings are thorough, and most of the information ultimately resides within the Ministry of Finance. The Ministry of Finance also tracks national budgets allocated either as co-financing for donor-funded projects or as stand-alone nationally prioritised activities. Furthermore, the agreements between donors and the GOSL include information on national contributions, thus providing a comprehensive picture of the island's public sector financing for climate change related purposes. Currently, climate finance data is available within various entities, and there is no systematic collection and archiving of this data, thus it is difficult to easily access and report such information. Corroborating the information with the most relevant line ministries however brings a significant level of detail to this information. Nevertheless, to enhance this process, under the MRV Component of the BUR, efforts are being made to address this gap. In this regard the MRV Portal has been developed and is capable of housing/tracking information on support received for climate change initiatives. Importantly as well under the NDC revision being undertaken through the Climate Action Enhancement project (CAEP), the GOSL is seeking to incorporate tracking of climate change-related spending into the current budgeting process so that spending and investments related to the NDC, and climate action can be accurately tracked and measured. It is expected that this activity will support the creation of a more detailed tracking initiative in the future.

In spite of this challenge and based on the guidance provided by UNFCCC for the preparation of BURs, this chapter gives an overview of the gaps and constraints as well as financial commitments, both nationally and internationally, for funds received and used between 2017 and 2019 to address climate change. It also presents information on technical and financial assistance needed to further address these gaps.

In undertaking this assessment, the gaps and constraints identified in the Initial National Communication (INC) 2002, Second National Communication SNC (2011), and the Third National Communication TNC (2017) were noted, and an assessment was undertaken to determine what gaps still existed in terms of technical and financial assistance needed, as well as what actions were and

should be taken to address those challenges. In this regard, a specific review was made of the GOSL budget for 2017-2018 through to 2019-2020.

Also, a range of climate-related strategies and action plans and reports relevant to the key priority sectors for Adaptation and Mitigation were reviewed, especially with regard to actions taken to address gaps that may have been identified both at the sector and project levels. The result of this assessment is presented in the following sections:

5.1.1 Gaps in the Mitigation Thematic Area

Table 27 - Summary of Gaps and Needs in the Mitigation Thematic Area

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>Technical barriers concerning the identification and availability of appropriate technology.</p>	<p>Gaps persist, but efforts to address continue.</p>	<p>Saint Lucia has developed a National Climate Change Research Policy and Strategy 2020 to 2030, with the aim of reducing this gap.</p> <p>Saint Lucia developed a National Energy Transition Strategy (NETS). The strategy identified in the NETS process, relying heavily on renewable energy and energy efficiency, seeks to move the electricity generation to 40% reduction in carbon emissions versus business as usual in 2025, and a 46% reduction in carbon emissions by 2030. The barriers in its implementation will be addressed by ongoing capacity development both at the level of the Governmental agencies as well as the LUCELEC, the lone power supply company.</p> <p>Training in sustainable agricultural practices under various projects, but these are on a limited scale.</p> <p>The Saint Lucia Electricity Services Limited (LUCELEC) commissioned the first three megawatt (3MW) solar farms in La Tourney, Vieux Fort in 2018. The site has contributed a total energy of 9086 MWh into the electricity grid as of December 2019. This corresponds to avoided use of approximately two thousand tons (2,000t) of fuel and greenhouse gas emission reduction of approximately 6000 tCO₂eq. This site was commissioned with the assistance of the Government of Saint Lucia, Rocky Mountain Institute (RMI) and Carbon War Room (CWR). In addition, the Government of Saint Lucia has installed over 420kW of solar PV at various public buildings and total of 1.09MW of installed distributed grid-connected solar PV is available on island.</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>The World Bank administered Geothermal Resource Development Project (GRDP), consisting primarily of key upstream activities such as the completion of a prefeasibility study and environmental and social impact assessment (ESIA) and the engagement of a transaction advisor was completed in January 2019.</p>
<p>Economic and financial barriers - the lack of adequate resources to implement the required measures makes many identified challenges difficult to address with existing government or private sector resources.</p>	<p>Gap persists but efforts to reduce it continue</p>	<p>Saint Lucia has developed a Climate Change Financing Strategy as part of its Climate Response strategy. This was developed in 2019 and approved by cabinet in 2020.</p> <p>A Private sector Engagement Strategy has been developed under its NAP in 2019, which is also expected to impact mitigation efforts.</p> <p>Cabinet-approved NDC, which is largely mitigation-focused, as well as the NDC Partnership Plan. In addition, a Climate Finance Strategy under the NDC was developed as well as a Budget Tracking tool to monitor climate related budget financing. This is being done with the support of the Global Green Growth Initiative.</p>
<p>Institutional barriers - the effectiveness of the recommendations for mitigation is dependent on strong institutional support. The capacity required includes technical, financial, and managerial capabilities. Any institutional weakness in these areas would undermine the attempt to implement mitigation measures effectively.</p>	<p>Gaps persist, but efforts to address continue.</p>	<p>Institutional capacity in the area of climate change mitigation continues in a range of agencies. The GOSL worked closely with The Global Green Growth Institute (GGGI), the Organisation of Eastern Caribbean States (OECS), Climate Analytics, and the World Resources Institute (WRI), through the CAEP, funded by the NDC Partnership. This collaboration aimed at helping Saint Lucia revise and fast-track implementation of its Nationally Determined Contributions climate change goals under the Paris Agreement. Through this partnership, an updated NDC was developed for Saint Lucia. Some key supplements to this updated NDC include:</p> <ul style="list-style-type: none"> ▪ Fossil Fuel Subsidy and Taxation Reform Scenarios Modelling Report – It is thought that changes in the subsidies and taxation schemes for fossil fuels in the country could help reduce their consumption, lowering the country's carbon emissions. ▪ Climate Finance Strategy –has been developed to find ways to finance relevant projects and programs. ▪ Climate Change Budget Tracking to track spending on projects related to its climate action goals.

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<ul style="list-style-type: none"> ▪ NDC Implementation Strategy - to guide the implementation of measures to achieve the transitions envisions within the document

5.1.2 Gaps in the Agricultural Sector

Table 28 - Summary of Gaps and Needs in the Agricultural Sector

Gaps as per TNC, SNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Developing and strengthening of institutional capacity for research and systematic observation (RSO), including data collection, management, analysis and processing into outputs to guide decision-making.	The gap persists. However, efforts to address this are ongoing.	<p>A roadmap entitled "Strengthening Operational Weather, Water, and Climate Services" was developed in collaboration with the World Bank in May 2017.</p> <p>The Government of Morocco provided the island with technical support to undertake a Soil Fertility Mapping project. Through this project, Saint Lucia will seek to build capacity to manage soil fertility, establish databases and develop a sound soil information system to speedily and effectively respond to the farmers' needs and personal demand for fertilizers.</p> <p>Under the GEF Cross-cutting Capacity Development (CCCD) project, a National Environmental Information System (NEIS) was established, and this provides a platform for data capture and sharing. The capacity of key agencies was also enhanced in data collection and management.</p> <p>The Agricultural Transformation Project (ATP) which seeks to modernize the agricultural sector and mitigate the impact of losses caused by the preferential arrangements for bananas in the European Union was implemented. It explicitly addresses climate-resistant agriculture and technology, among other resilience-building measures, such as agribusiness promotion and development, disaster risk reduction, and an updated system for pests and diseases management.</p> <p>Saint Lucia developed a Climate Change Research Policy and Climate Change Research Strategy 2020-2030 which has been approved by cabinet. The documents outline key research questions on a number of sectors and thematic</p>

Gaps as per TNC, SNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>areas. The goal of the National Climate Change Research Strategy is to enhance the availability and use of climate change-relevant information in national decision making. This will be achieved by informing the design and execution of climate change-related scientific research initiatives in Saint Lucia thereby helping address critical data and knowledge gaps to help the country execute its climate change agenda.</p>
<p>Enhanced capacity to evaluate suitable adaptation and mitigation technologies.</p>	<p>The gap still exists. However, some level of effort was made to address this, although current impacts are still limited. One of the most significant efforts in this regard is the Caribbean Aqua Terrestrial Solutions (CATS) and PPCR projects.</p>	<p>Though not addressed on a broad scale, the CATS project, implemented in Canaries and Soufriere in 2019, is an initiative which will contribute to narrowing this gap. The project activities included:</p> <ul style="list-style-type: none"> ▪ Recycling farm waste through composting and shredding ▪ Training and enhanced capacity in mushroom and cocoa cultivation ▪ Introduced natural pest control agents and low chemical fertilizers ▪ Assistance in compiling the first few drafts of the Organic Standards for Saint Lucia ▪ Biogas digester installation ▪ Support for eradicating invasive alien plant species on Gros Piton, capacity building, procurements and ▪ Technical support to create the agro-processing group, Jacq-Co Valley Products. <p>In 2018, Saint Lucia developed a National Adaptation Plan (NAP) to combat Climate Change. This is a ten-year strategy (2018-28). This NAP is also supported by a SASAP for a number of sectors including the Agricultural Sector which is also a 10-year plan.</p>
<p>Enhanced capacity to participate in relevant international negotiations.</p>	<p>Gap persists but efforts to address continues</p>	<p>According to the Agricultural Sector SASAP the GOSL has undertaken a number of measures to enhance the Agricultural Sector's resilience and in so doing they have increased the capacity of Agricultural Officers to participate in relevant international negotiations. These measures include:</p> <ul style="list-style-type: none"> • Improved research, data collection and management; • Development of tools for improved decision making;

Gaps as per TNC, SNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<ul style="list-style-type: none"> • Capacity building in public agencies and specific target groups; • Improved collaboration between agencies.
<p>Increased sensitivity to and awareness of the need to promote and finance no-regrets options that support climate change response efforts.</p>	<p>Efforts are ongoing</p>	<p>Efforts to address gaps are ongoing. Saint Lucia has developed a Climate Finance Strategy which will assist in identifying potential revenue sources.</p> <p>Saint Lucia has also received funding from the Adaptation Fund for a project entitled “Building Resilience for Adaptation to Climate Change and Climate Vulnerabilities in Agriculture in Saint Lucia”. The project components are</p> <ul style="list-style-type: none"> • Building resilience and sustainability of farming systems through interventions for water security, soil conservation and management • Establishing green agro-parks, including the use of solar energy, for increased efficiency in resilience farming systems • Knowledge management and transfer for capacity building to institutional and local level adaptive capacities.
<p>Promotion of a model of integrated development planning that incorporates environmental, economic and social considerations in a holistic, and coordinated manner.</p>	<p>Efforts are ongoing</p>	<p>The Government of Saint Lucia in 2018 formalised IDP through the creation of the National Integrated Planning and Programme Unit (NIPP) within the Department of Finance. The Medium Term Development Strategy 2020-2023 and the Castries Vision 2030 plans are built on the pillars of sustainable development. Both plans are critical to the island’s development and incorporates economic, social and environmental issues as important considerations.</p>
<p>Increasing public awareness of the role that individuals and communities can play in responding to climate change.</p>	<p>Gap persists but efforts to address this continues.</p>	<p>An extensive Public Awareness Program was implemented under the DVRP project between 2014 and 2019. As at November, 2019, 6,692 individuals—representing 155 agencies/groups—benefitted from face-to-face interactions on climate change issues and the Government’s efforts to strengthen the country’s resilience to climate-related disasters in the form of the DVRP.</p> <ul style="list-style-type: none"> • 21 quarterly newsletters (Resilience) were produced spanning the official launch of the DVRP in December, 2014. The newsletters averaging six (6) articles per edition, totals approximately one hundred and twenty-six (126) stories accompanied by photos highlighting climate change and DVRP related happenings. Over the years, each edition of

Gaps as per TNC, SNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>the newsletter was distributed to approximately 3195 individuals, including Government employees, World Bank counterparts, the Saint Lucia Chamber of Commerce and the Saint Lucia Industrial and Small Business Association.</p> <ul style="list-style-type: none"> • From 2014-2019, every media house in Saint Lucia, including those established in Soufriere and Vieux-Fort were utilised to consistently disseminate information on the DVRP and climate change related matters. • Press releases to mainstream media as well as the DVRP's Facebook page was also used in the Public Awareness effort.
<p>Proper documentation of lessons learnt, best practices and historical/traditional knowledge.</p>	<p>Gaps persists</p>	<p>The Ministry of Agriculture utilises its website and the national television to document and air interviews, PSAs and documentaries on agriculture and including traditional knowledge.</p> <p>In addition, a key aspect of the NAP 2018-28 is an annual monitoring and evaluation report. This will assist in better documentation of gaps, lessons and traditional and historical knowledge as appropriate.</p> <p>The GOSL, through the Sustainable Development and Environment Division (SDED) has established a climate change website which captures and airs climate change information, some of these initiatives highlighted through this medium included: The National Adaptation Plan 2018-2028, Agriculture SASAP, portfolio of Project Concepts, Climate Change Research Policy and Strategy.</p>

5.1.3 Gaps in the Coastal Zone Sector

Table 29 - Summary of Gaps and Needs in the Coastal Zone Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>Department of Fisheries Inadequate capacity to address Enforcement of Coastal Resources Protection</p>	<p>Gap persists, but efforts continue to address them</p>	<p>Saint Lucia has taken steps to address constraints and challenges in the Fisheries Sector.</p> <p>Saint Lucia, between 2018-2020, participated in the Climate Change Adaptation of the Eastern Caribbean Fisheries Sector Project (CC4FISH). The project objective was to increase</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>resilience and reduce vulnerability to climate change impacts in the Eastern Caribbean fisheries sector, through introduction of adaptation measures such as capacity building of fisherfolk and aqua culturists and mainstreaming of climate change into fisheries governance. To this end the island undertook the following:</p> <ul style="list-style-type: none"> ▪ Vulnerability capacity assessment was improved by conducting studies in 3 communities for 386 people. ▪ Awareness was raised with ad hoc communication materials. ▪ Activities were conducted to reinforce resilience of the Fisheries sector including safety-at-sea training carried out and 200 fishers received Very High Frequency (VHF) radios and associated training. ▪ Business skill training was conducted in Saint Lucia for fisherfolk. ▪ 12 Saint Lucian fisherfolk went on an exchange to Antigua (conch fishers) in February 2019 and to Grenada on MPAs and fishing cooperatives. ▪ Fish farmers were trained in aquaponics by farmers in Antigua and Barbuda. ▪ To further increase aquaculture resilience, technical assistance was provided to the country's existing aquaculture facilities; ▪ A work plan was proposed for improvement of existing sites or construction of new sites and the procurement process initiated. ▪ Review of the vessel registry information system was conducted with proposals for improvements. ▪ Different activities supporting the reinforcement of the legal framework were undertaken including: A draft FAD Fisheries Management Plan for Saint Lucia and a draft Aquaculture Management Strategy have been prepared, incorporating the principles of Ecosystem Approach to Fisheries (EAF), Climate Change Adaptation (CCA) and Disaster Risk Management. <p>CC4FISH has also supported the development of the new Fisheries Policy</p> <ul style="list-style-type: none"> • Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector (Fisheries SASAP) 2018-2028 was developed in 2019 and approved by

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>Cabinet in 2020. The Fisheries SASAP has been designed as a 10-year framework for action for strengthening the sustainability of Saint Lucia's fisheries and fishery-dependent businesses and the security of fisheries-dependent livelihoods. The plan details adaptation objectives and priority measures, proposes activities and timing for the execution of the measures, and offers project concept notes to help secure funding for implementation.</p> <ul style="list-style-type: none"> • A Climate Finance Strategy developed and approved by Cabinet in 2020 helps identify possible funding sources to address climate related risks. • Development of National Fisheries Policy (2020) to help guide the development of the Fisheries Sector including addressing climate change related issues
<p>Department of Forestry- Inadequate capacity to address Enforcement of Coastal Resources Protection</p>	<p>Gaps persist, but the effort to address them is ongoing</p>	<p>Several projects have been and are currently being implemented to address gaps, including: The Integrated Ecosystem Management and Restoration of the Forest on the Southeast Coast of St. Lucia Project. (GEF funded). Some notable activities under the project related to strengthening the capacity of the Department of Forestry include:</p> <ul style="list-style-type: none"> ▪ A Forest management systems and practices plan drafted ▪ Special management regimes for marine buffer areas drafted and discussed with stakeholders ▪ Collaboration agreements with key partners adopted for marine buffer areas ▪ Draft manuals/guidelines for anti-erosion land use practices within agricultural landscapes developed. ▪ Carbon benefits measurement tool applied to assess restoration impact. ▪ National Forest Management Strategy developed.
<p>Saint Lucia National Trust - Inadequate capacity to address Enforcement of Coastal Resources Protection</p>	<p>Gap persists but measures continue to address them</p>	<p>SLNT has faced increased resistance and challenges to implement its mandate, which has underscored the need for more significant effort in this regard. However, some of the progress made are as follows:</p> <ul style="list-style-type: none"> ▪ Efforts to better engage CSOs and strengthen their mandate are ongoing as they seek to advocate for the required enhancements. The GCF Country

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>Strategy developed in 2020 as well as efforts to provide the Coalition of Civil Society with a legislative mandate, will allow the SLNT to execute its mandate and support climate-related actions.</p> <ul style="list-style-type: none"> ▪ The SLNT is currently implementing a project aimed at increasing the climate change resilience and public awareness of the Pointe Sable Environmental Protection Area and Pigeon Island National Landmark ecosystems. The project will contribute to climate risk reduction by enhancing the climate resilience of targeted coastal ecosystems through improved health and management and strengthening of the coastlines of the Pigeon Island National Landmark and the Point Sable Environmental Protection Area.
<p>Inadequate prioritisation of coastal land use. There is a need for adequate management of these resources, including the need for human and financial resources.</p>	<p>Efforts are ongoing</p>	<p>The Government of Saint Lucia, with the support of the Organisation of Eastern Caribbean States (OECS), drafted a Coastal Master Plan and Marine Spatial Plan (CMSP) for the Blue Economy, an important component of the Eastern Caribbean Regional Ocean Policy (ECROP) dedicated to the promotion of the “blue economy” in the Caribbean.</p> <p>The National Ocean Policy calls for Saint Lucia to develop and implement a Coastal Master Plan and a Marine Spatial Plan. The Marine Spatial Plan presented in Part B of this document and the Coastal Master Plan presented in Part C are intended to be used as tools to enable Saint Lucia to achieve sustained and equitable growth by pursuing a Blue Economy strategy that respects and protects the shared ocean space.</p> <p>The geographic scope of these plans extends from the highest peaks of coastal watersheds to the seaward extent of the exclusive economic zone (EEZ). The plans contain marine zoning, wide-ranging blue economy priority investments and integrated coastal zone management policy guidance. The policy guidelines contained in the plan are designed to work in tandem, enabling an integrated approach to managing the relationship between land and water.</p>
<p>Inadequate availability of data to allow cost analyses associated with adaptation</p>	<p>Gap persists but efforts to address them continues.</p>	<p>Increasingly, funding agencies are requiring that climate change impacts are considered when infrastructure enhancement projects are contemplated. These agencies</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>measures. In some cases, where data are available, it is not adequately shared and utilised in a manner that would enable the Government to make informed management decisions.</p>		<p>include the World Bank and the Caribbean Development Bank who have made it conditionalities for loan approval.</p> <p>The OECS is working alongside the Division of Forest and Land Resources under the Climate Change Adaptation Sustainable Land Management in the Eastern Caribbean project. This included the Development of Land Issues Paper for the island.</p>
<p>Inadequate financial resources to facilitate the implementation of adaptation measures.</p>	<p>Efforts are ongoing</p>	<p>Saint Lucia has taken several steps to address this gap. These include:</p> <ul style="list-style-type: none"> ▪ Climate Finance Strategy developed and approved by the Cabinet of Ministers in 2020 ▪ Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector (Fisheries SASAP) 2018-2028 ▪ Resilient Ecosystems Adaptation Strategy and Action Plan 2018-2028 ▪ Saint Lucia's Portfolio of Project Concept Notes for the Fisheries Sector 2018-2028 developed ▪ Saint Lucia's Portfolio of Project Concept Notes for Resilient Ecosystems 2020-2028. <p>The initiatives contained therein can provide significant financial and technical resources, contributing to the increased resilience of the coastal resources.</p> <p>Saint Lucia has identified its Designated National Authority (DNA) to the Adaptation Fund and secured 9.7M USD in 2019. The GOSL has also strengthened its capacity to access funding by securing the service of a technical expert in GCF projects.</p> <p>Saint Lucia has also developed a GCF Country Strategy, which was launched in December 2020.</p>

5.1.3 Gaps in the Critical Infrastructure Sector

Table 30 - Summary of Gaps and Needs in the Critical Infrastructure Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Lack of involvement and collaboration of critical public sector agencies.	Gaps still exist	<p>There is an increased focus on climate change, especially in planning and construction/rehabilitation of critical infrastructure. Many of these projects, which are funded by regional and international agencies, now require consideration of climate change impacts.</p> <p>A number of agencies engaged in Infrastructure development and improvements including the Department of Infrastructure, participate in the meetings of the NCCC, this helps to contribute to the decision-making process as well as helps to inform the actions of the respective agencies and strengthen collaboration to address climate change. In addition, the Department of Infrastructure worked closely with Forestry, and the Department of Sustainable Development (DSD), under the Global Climate Change Alliance (GCCA) project on stabilisation of the Corinth/ Grande Rivière River. These actions reflect efforts at increased collaboration among state agencies.</p> <p>The Japan Caribbean Climate Change Partnership supports the incubation of climate technology into targeted public sectors, private industries, and community groups and enterprises. This initiative is aimed at helping green, low-emission climate-resilient technologies be tested, refined, adopted, and sustained as a practical measure to enhance national, sub-national and community level resilience. These technologies will help reduce the dependence on fossil fuel imports, setting the region on a low emission development path. The project will also focus on strengthening collaboration among agencies to implement sustainable solutions which could be up scaled.</p>
Low level of awareness and sensitisation, even among key stakeholders.	Gap persists especially among CSO and the larger community	<p>Efforts to increase Public Education are ongoing. In this regard, several initiatives have been instituted both at the national and regional level. In addition to the DVRP mentioned previously, efforts at engaging schools and the youth have been given more focus. Some of these include:</p> <ul style="list-style-type: none"> ▪ Saint Lucia has developed a Climate Change Communications Strategy which is expected to be beneficial to all sectors.

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<ul style="list-style-type: none"> ▪ State agencies and the private sector have collaborated to raise awareness through an annual Energy Awareness week ▪ Annual fair by the GCF small Grants Project to raise awareness on progress made with respect to environmental and sustainable livelihoods including building resilience to climate change. ▪ Public Education programs were undertaken as part of NEIS program especially as it related to its use and the collaborative initiative among 17 agencies to share environmental information.
<p>Inadequate management capacity and access to information. There is a need for national site-specific modelling and hazard risk assessment in vulnerable areas, including assessments relating to flooding, landslide, sea-level rise, and flooding combined with sea-level rise in certain low-lying coastal areas.</p>	<p>Gaps persist. However, significant efforts have been made to close this gap</p>	<ul style="list-style-type: none"> ▪ The Department of Physical Planning has implemented the Light Detection and Ranging (LiDAR) project. The data presented by the LIDAR exercise will be useful for several other climate-related initiatives, including the development of a Flash Flood Guidance System, sea-level rise modelling, flood modelling, and other measures geared towards mitigating the impact of climate change in Saint Lucia. ▪ A National policy on spatial data management and a road map for implementing the policy through National Spatial Data Infrastructure (NSDI) has been achieved.
<p>Policy on public access to information, and regional agreements on the collection and sharing of data is needed.</p>	<p>Efforts to address this gap continues.</p>	<p>The cabinet of Saint Lucia agreed to the Escazú agreement and ratified this agreement in December 2020. Under this agreement, Saint Lucia agrees to provide access to information and facilitate public participation and access to justice in environmental matters.</p> <p>Saint Lucia's Open Data Policy document was adopted in November 2017. The policy articulates the framework within which Saint Lucia implements an effective open data programme. This involves a cross-government policy on sharing of data in the public domain and the promotion of Open data throughout all sectors. In implementation of this policy, the GOSL currently operates an open data portal on which climate related data is shared. The Open Data Website was officially launched in June 2018.</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>Inadequate collaboration and planning: Cross-sectoral collaboration is essential. This must be improved at all levels from data generation and analysis through to national and sectoral planning that facilitate climate change resilience.</p>	<p>Efforts to address this gap continues.</p>	<p>There is increasing awareness of the need to work together as exemplified under the GEF CCCD project "Increasing St. Lucia Capacity to Monitor Multilateral Environmental Agreements". Under this project, 17 agencies have signed a Memorandum of Understanding to share data on the NEIS. National Climate Change Committee, an interagency national committee to oversee climate related matters and advise the government meets periodically. This has helped in facilitating collaboration across agencies on various climate change related matters.</p>
<p>Need to improve the capacity of institutions to undertake research, data collection, management and analysis. This can be achieved through capacity building initiatives, procurement of equipment and adequate training and budgeting. This should also extend to civil society and resource users.</p>	<p>The gap persists; however, significant progress was made in this regard</p>	<p>A data node has already been established in Saint Lucia, giving the country access to the Regional Clearinghouse Mechanism, which provides a searchable database of Caribbean climate change information (CCCCC, 2019).</p> <p>Under the GEF CCCD project, Enhancing Saint Lucia's capacity to Monitor the Implementation of MEA's, persons engaged in data collection and management were trained in a wide range of data management areas. Some agencies were also provided with tools and equipment to enhance their ability to store and generate data.</p> <p>The implementation of the NEIS has helped and will continue to assist in narrowing this gap</p> <p>Saint Lucia has developed a Climate Change Research Policy and Strategy as part of its NAP. This policy will guide research actions over the period 2020-2030</p>
<p>Need to improve training to facilitate research, data analysis, risk assessment, and application of findings to design engineering and non-engineering adaptation measures.</p>	<p>Efforts to address this gap continues.</p>	<p>Saint Lucia's Climate Change Research Strategy 2020-2030 has been developed. One of the areas of focus will be to address this gap.</p>
<p>Need to improve capacity in the use of GIS as well as analysing information. A National GIS is required to</p>	<p>Gap persists but efforts to address continues</p>	<p>Several agencies currently utilise GIS, among them being the Department of Physical Development. During 2019, the Ministry of Infrastructure undertook a project to Develop a GIS-based Road Maintenance Management System (RMMS). An effort to build on this initiative is required.</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
facilitate the development, maintenance and management of data sets.		Under the GEF CCCD funded project entitled Increase Saint Lucia's Capacity to Monitor Multilateral Environmental Agreements (MEAs) Implementation and Sustainable Development Project, key agencies engaged in data capture and management including the Department of Infrastructure were trained in GIS.

5.1.4 Gaps in the Disaster Management Sector

Table 31 - Summary of Gaps and Needs in the Disaster Management Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Inadequate collaboration by key agencies. This is critical to ensuring a coordinated approach to disaster management and more importantly, disaster risk reduction. In this regard, the mandate of the agency should reflect areas of inter-agency collaboration.	Gap persists but efforts to address continues	<ul style="list-style-type: none"> • Efforts have been made to address this gap, namely: • Disaster Risk Reduction Forum for Permanent Secretaries convened to sensitise Permanent Secretaries on the need for continuity of Government and their roles and responsibilities within an activated National Emergency Management Advisory Committee. (NEMAC) • Forum for Government Liaison Officers convened to raise awareness of interagency collaboration to address disaster risk reduction within Ministries and Departments. • Institutional review of the Operations of National Emergency Management Organisation (NEMO) commenced to develop recommendations to strengthen interagency collaboration and cooperation. • The creation of a National Disaster Fund to provide the funding to prepare, mitigate and respond to disaster events has offered an avenue to access financing to undertake disaster risk reduction activities. • An initiative to establish a disaster preparedness liaison officer within all government agencies was instituted. These Liaison officers also form part of a database of trained personnel in the Disaster and Risk Management field. • Saint Lucia is a beneficiary under the Enabling Gender-Responsive Disaster Recovery, Climate and

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>Environmental Resilience in the Caribbean (EnGenDER) funded by the United Nations Development Programme (UNDP). The EnGenDER project will support Climate Change, Disaster Risk Reduction (DRR) and environmental management interventions in nine (9) Caribbean countries by leveraging sector-level entry points (e.g., NAPs and NAMAs), specifically supporting implementation and/or upscaling of countries' priority actions. The project is also intended to analyse and prioritise the needs of the most vulnerable with respect to climate change adaptation and mitigation in priority sectors, including increasing their resilience in key livelihood sectors. It will also improve institutional capacities for delivering services effectively for the most vulnerable to accelerate post-disaster recovery and mitigate risk.</p> <ul style="list-style-type: none"> • NEMO is a member of the NCCC and as such that membership has facilitated better collaboration with and forge partnerships with other national agencies.
<p>Inadequate resources to implement critical measures. There is a greater need for the requisite human, material and financial resources to achieve required goals and objectives.</p>		<ul style="list-style-type: none"> ▪ The Caribbean Disaster Emergency Management Agency (CDEMA) has developed a community-based disaster management tool, which has strengthened national capacity in this area. ▪ In 2015, Community Disaster Plans for six climate-vulnerable communities were developed. These plans will inform climate change adaptation investments to be implemented under the DVRP and other relevant projects. Previous and ongoing projects, for example, under the OECS Disaster Management Program, have contributed to building resilience at the community level using this CDEMA model. ▪ NEMO continues its efforts at strengthening capacity for comprehensive disaster management. In this regard, several initiatives have been implemented, namely: <ul style="list-style-type: none"> ✓ Creating a National Disaster Fund to finance disaster risk reduction interventions. ✓ Updating of the legislation regarding emergency shelters, relief distribution and other legislations guiding disaster risk reduction.

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<ul style="list-style-type: none"> ✓ Enhancing the National Emergency Operation Center (NEOC.) ✓ Reviewing the operational readiness of NEMO.
<p>Inadequate Information and Communications Technology Management, including an absence of the requisite trained staff and associated resources.</p>	<p>Gap persists but efforts in this regard continues.</p>	<p>Efforts made to address this gap include:</p> <ul style="list-style-type: none"> • Developing a Disaster Information Management System (with support of the DVRP) to make information on disaster management more centralised and accessible for decision-making. • Revising of the National Emergency Telecommunications Plan • Strengthening of the emergency telecommunications system to broaden connectivity between first responding agencies. • Using telecommunications to develop Early warning systems, Broadcast interrupts and Mobile apps for early warnings. • Procuring emergency telecommunications equipment to strengthen the capacity of first responder agencies • Securing the services of an in-house staff at NEMO to ensure ongoing communication with stakeholders and awareness building activities.
<p>Inadequate Public Sensitisation & Education.</p>	<p>Efforts to address this gap continues.</p>	<p>The Saint Lucia Climate Change Communications Strategy and the Monitoring and Evaluation Plan of Saint Lucia's NAP process were launched in 2018. Additionally, all climate change related projects at both the national and regional level have some aspect of awareness-building initiatives to support the implementation of projects.</p> <p>NEMO has taken several measures to address this gap. These are as follows:</p> <ul style="list-style-type: none"> • Media training conducted for media workers on disaster reporting and public education strategies. • Development of a number of Public Service Announcements (PSA) on a number of hazards • Training for Persons with Disabilities in disaster preparedness conducted. • Training for First responders and Met Officers in Sign Language to broaden their ability to communicate with all sectors of the public.

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<ul style="list-style-type: none"> • Working with BSO to raise awareness of disaster risk reduction for the private sector. • Development of Early Warnings systems policy to incorporate Persons with Disabilities and other vulnerable persons. • Installation of Early Warning systems in communities and conducting community drills to educate persons on evacuation routes, shelters and hazard prone areas.

5.1.5 Gaps in the Financial Services Sector

Table 32 - Summary of Gaps and Needs in the Financial Services Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>Inadequate insurance coverage for the agricultural and fisheries sector.</p>	<p>Efforts to address this gap continues.</p>	<p>Some effort has been made to close this gap as identified in the SASAP for the Agriculture sector.</p> <p>The Climate Risk Adaptation and Insurance in the Caribbean (CRAIC) project addresses climate change adaptation and vulnerability by promoting climate risk insurance as an instrument to manage and transfer risk. The project, which currently operates in three countries (Jamaica, Saint Lucia, and Grenada), has successfully designed and launched two index-based insurance products.</p> <p>The Livelihood Protection Policy (LPP) supports low-income people who are particularly vulnerable to extreme weather events. It covers damage from heavy rains and strong winds to offset the worst storm-related damage.</p> <p>The Loan Portfolio Cover (LPC) helps financial institutions better manage their loan portfolio risk in the face of damaging weather events. Transferring a financial institution's weather-related loan risks means that their financial position remains stable after an extreme event. The LPC seeks to help overcome the reluctance to invest, improve access to lending, and contribute to cost reductions for financial services</p> <p>A parametric insurance product was also developed specifically for the fisherfolk in the Caribbean by the</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>Caribbean Oceans and Aquaculture Sustainability Facility (COAST). COAST was launched in 2019 in two countries, Grenada and Saint Lucia. With financial support from the US Department of State, the World Bank, the Caribbean Catastrophe Risk Insurance Facility (CCRIF SPC), and the Caribbean Regional Fisheries Mechanism (CRFM). The insurance product is designed to enhance resilience against the impacts of climate-related disasters.</p>
<p>Inadequate financing for agricultural research.</p>	<p>Efforts are ongoing</p>	<p>Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Agricultural Sector (Agriculture SASAP) 2018-2028 was approved in 2020 by Cabinet.</p> <p>Efforts are being made to close this gap, through project initiatives under the CATS project and the Morocco soil fertility project.</p> <p>Saint Lucia constructed a National Agricultural Diagnostic Facility. The European Union funds the Facility under the Agricultural Transformation Programme (ATP) Banana Accompanying Measures (BAM) programme.</p> <p>Saint Lucia has developed a Climate Change Research Policy and Strategy which was approved by Cabinet in 2020. This includes initiatives relevant to the agricultural sector.</p>
<p>Inadequate development, implementation and enforcement of climate change sensitive building guidelines.</p>	<p>Efforts are ongoing</p>	<p>In 2017 The OECS Commission embarked on establishing a significantly improved and harmonised building code for the OECS sub-region. The building code initiative was part of iLand Resilience initiative under "The Commission's Climate Change Adaptation and Sustainable Land Management" project funded by the European Union. Saint Lucia was a beneficiary under this project, as such the island has developed a new draft building code.</p>
<p>Lack of consideration of climate risk-based pricing.</p>	<p>Efforts are ongoing</p>	<p>The National Insurance Council is a member of the NCCC. It is hoped that this matter will be given increased focus in the future</p>
<p>Inadequate education and sensitisation of the citizenry on all aspects of climate change</p>	<p>Efforts are ongoing</p>	<p>Some level of awareness building is being undertaken under the CAFF.</p> <p>Saint Lucia's National Adaptation Plan Roadmap and Capacity Development Plan 2018-2028 has been developed.</p> <p>Saint Lucia's Climate Change Communications Strategy has been developed and approved in 2018. Its implementation is</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>ongoing via Climate Change related programmes and projects such as videos, PSAs, talk shows/interviews, school lectures, competitions, articles, website, FB and other social media presence, etc., in both English and Kweyol.</p> <p>Saint Lucia Private Sector Engagement Strategy under its National Adaptation Planning process was developed in 2019 and approved in 2020 by Cabinet.</p> <p>Efforts to better sensitise the citizenry on all aspects of climate change continues. The GCF Readiness Project entitled Enhancing "Caribbean Civil Society's Access and Readiness for Climate Finance" led by CANARI will serve to better engage CSOs and raise awareness at the community level.</p>
<p>Inadequate adoption of climate change friendly technologies and measures. This includes solar photovoltaic systems, solar hot water systems and solar cooling systems, for example, wind technologies.</p>	<p>Gaps exist, but efforts to address them continue</p>	<p>The SLDB Climate Adaptation Financing Facility (CAFF) is operational. Through this facility, funding to engage in climate change friendly initiatives and technology is made available.</p> <p>Saint Lucia's Private Sector Engagement Strategy under its National Adaptation Planning Process (2019) was approved by Cabinet in 2020. In May 2019, Saint Lucia's Cabinet approved Saint Lucia's NDC Partnership Plan, becoming the first country to have a plan validated at such a high level. Furthermore, it enshrined a commitment made in 2015 to mobilize US\$23 million in domestic funding for NDC execution through 2035.</p> <p>Saint Lucia's Climate Financing Strategies and implementation Plan will assist the island in sourcing finance for relevant climate change projects and programs. These strategies will help the relevant agencies devise innovative financing mechanisms such as national financing vehicles, debt-for-climate swaps, green bonds or public-private partnerships, to catalyse investment from domestic, international, and private sector sources and make these goals achievable.</p>
<p>Inadequate financial coverage to deal with increased health issues</p>	<p>Efforts are ongoing</p>	<p>Some finance has gone into climate resilience health infrastructure. Ongoing and planned GCF/PAHO projects.</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
like to arise from climate change impacts		

5.1.6 Gaps in the Forest Biodiversity Sector

Table 33 - Summary of Gaps and Needs in the Forest Biodiversity Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Inadequate technical resources to implement adaptation measures.	Efforts are ongoing.	<p>Department of Forestry has established a strategic relationship with several agencies including the Coalition of Rain Forest Nations, UNEP, GEF among others which serves as a mechanism to identify and take advantage of opportunities for training and capacity development programs.</p> <p>Saint Lucia SASAP for the water sector is also expected to benefit the forest sector.</p> <p>The portfolio of projects and concept notes for Resilient Ecosystems was developed. It also seeks to address this sector as several projects and concept notes have been developed with the view to seeking financing to address these gaps.</p>
Inadequate human resources to implement adaptation measures.	Gaps persist, but efforts to address continues	<p>In 2020 staff of the Forestry Department, The Caribbean Public Health Agency (CARPHA), DSD, Department of Fisheries and Protected Areas received training in ecosystem restoration through a regional training workshop conducted by the Forest Ecosystem Restoration Initiative (FERI).</p> <p>Forestry Division has been working with the Coalition of Rainforest Nations to build capacity in GHG inventories in the department. At least 6 of its existing staff members have benefitted from this process.</p> <p>A training manual has been produced and once a week online "classes" in the LULUCF sector have taken place.</p> <p>Although the complement of staff of the Department has not changed at Forestry, the Department has indicated that temporary workers are employed under projects to undertake rehabilitation works. This has helped improve the situation.</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Inadequate institutional co-ordination to implement adaptation measures.	Gaps persist, but efforts to address continue.	<p>There have been increased efforts at addressing this gap. The NCCC has been effectively utilized, to help address this gap.</p> <p>The NAPs and related sector plans developed as an outcome of the NAP process for 2018-2028 and approved by cabinet in 2020 provides an opportunity for increased cross-agency collaboration.</p>
Absence of an integrated development planning approach which adequately deals with land management.	Gaps persist, but efforts to address continue.	<p>The Government of Saint Lucia in 2018 formalised IDP through the establishment of the National Integrated Planning and Programme Unit (NIPP) within the Department of Finance.</p> <p>Efforts in this regard continue so that whilst a National Integrated Development Plan has not been developed, sector and agency plans are integrating climate change related initiatives in their plans. The Saint Lucia's medium-term development strategy addresses climate change as a cross cutting issue of national significance.</p> <p>Efforts in this regard continue. Saint Lucia has a National Climate Change Committee and the Department of Forestry is a member; this has assisted in increasing cross agency collaboration.</p> <p>Under the Iyanola project, launched in 2019, a pilot land use plan for the North East Coast, in the absence of a national land use plan, was developed with particular emphasis to integrate considerations of biodiversity and sustainable land use for the North East Coast.</p> <p>Under the GEF Funded Integrated Ecosystem Management and Restoration of Forests on the South East Coast of St Lucia the Government of Saint Lucia, municipal governments and communities will undertake projects and implement programs to increasingly restore and rehabilitate productive landscapes. Two of the expected outcomes in this regard are:</p> <ul style="list-style-type: none"> ▪ 2500 ha reforested in degraded areas, agricultural areas and Headwaters. This is with the view mitigating (682,850 tons of CO₂-eq over 20 years, or 34,143 tons of CO₂-eq per year from reforestation of 2,500 ha of degraded land.

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<ul style="list-style-type: none"> ▪ 500 ha of Sea grass beds, reefs, mangroves and productive coastal systems will also be protected and rehabilitated.

5.1.7 Gaps in the Health Sector

Table 34 - Summary of Gaps and Needs in the Health Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>Insufficient numbers of health care professionals and allied health care workers with the requisite mix of skills to deliver health care services.</p>	<p>Gaps persist but efforts to address continues</p>	<p>The Ministry has constraints as it relates to the structure and numbers in any given post. The Ministry of the Public Service is responsible for hiring staff. The Department of Health has augmented staff through hiring of staff on sessions (mainly nursing) and has relied on consultancies to undertake key work activities. The Ministry also used project staff to implement activities through projects funded by donors such as World Bank and European Union. The Ministry also has continuous training to update and enhance skills mix, however funding remains a challenge and more recently, the COVID-19 pandemic has further exacerbated the problem. Currently there is an ongoing consultancy to assess the human capacity in terms of numbers and skill mix to support the roll out of the National Health Insurance (NHI).</p>
<p>Poorly sustained national public health programmes.</p>	<p>Gaps persist but efforts to address continues</p>	<p>The Ministry has made some progress with public health programmes through projects and donor funding. However, the issue of sustainability after the projects have ended still remains. Greater attention is being made in the design of projects to foster more integration and enhancement of existing programmes to improve sustainability.</p>
<p>Weak public health responses to disease outbreaks and emergency events.</p>	<p>Gaps persist but efforts to address continues</p>	<p>Saint Lucia's National Climate Change Research strategy addresses health and specifically seeks to:</p> <ul style="list-style-type: none"> ▪ Improve health data collection and processing protocols and systems, including incorporating vector-borne, water-borne, food-borne and other potential climate change-related diseases (allergies, respiratory disease, heatstroke, etc.). ▪ Evaluation and strengthening of health monitoring, surveillance and reporting systems, including if necessary, establishing surveillance systems for climate change-related disease outbreaks.

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<ul style="list-style-type: none"> ▪ Analyses of the psychological impacts of climate change and extreme climate events. ▪ Modelling and mapping the risk of disease using updated (downscaled) climate change projections, updated socioeconomic, environmental, and ▪ Analysis of epidemiological data and climate change data to create health climate rational. ▪ Assessment of priority health impacts of climate change in occupational setting
Inadequate capacity of National Health Services Lab to conduct rapid testing.	Gaps persist but efforts to address continues	Since COVID-19, there has been some lab strengthening. The work on this is ongoing as part of the rollout/establishment of the National Quality system. Funding has been secured through the World Bank loan funding – Health Systems Strengthening Project and the OECS Regional Health Project to strengthen lab infrastructure and capacities to support public health emergencies.
Lack of funds for awareness campaigns specifically on climate health.	Gap persist but efforts to address continues	Efforts include use of project and donor funds and integrating climate change in health messages such as vector control. Collaborating with agencies such as Department of Agriculture and Sustainable Development has also assisted. It is anticipated that this will improve significantly upon completion of the Health SASAP.
Low links with other government ministries to develop national programmes that incur co-incident health benefits.	Gap persist but efforts to address continues	Inclusion of Health in the NAP has assisted. Improved collaborations with key sectors such as tourism, agriculture and sustainable development should be strengthened
Lack of quality assurance systems within the health sector.	Gap persist but efforts to address continues	A national quality in Health policy and framework has been approved by Cabinet. The Department of Health has secured funding through the World Bank loan funding – Health Systems Strengthening Project and the OECS Regional Health Project for the implementation of the National Quality System for the sector
Ineffective system for the management and analysis of data and dissemination of information	Gap persist, although efforts are ongoing to have those gaps at NHIS addressed.	While the NHIS exists, gaps still remain with data sharing between public and private sector as well as hospitals and Primary Care facilities. There is also limited capacity with data analysis to inform policy and strategic interventions

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
An ineffective national emergency medical system that will ensure appropriate and timely dispatch, effective stabilisation and transfer of patients and hospital emergency rooms is integrated during a disaster.	Gap persist but efforts to address continues	This remains a major issue as the Emergency Medical Service (EMS) currently lies with the Fire department. Not much has been done in this area at this time.

5.1.8 Gaps in the Human Settlement Sector

Table 35 - Summary of Gaps and Needs in the Human Settlement Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Availability of adequate financial resources.	Gaps persist, but efforts to address continue.	CAFF project is ongoing, but uptake is not as widespread as anticipated. SLDB is seeking to be declared an Accredited Entity to GCF. This alongside efforts to implement the recently launched GCF Country Strategy will strengthen efforts in accessing financing.
Inadequate availability of human resources, especially skilled technical personnel.	Gaps persist, but efforts to address continue.	GCF Readiness support is being sought to support the advancement of the SLDB Green Resilient Housing Concept Note. The readiness support aims to also provide capacity building support to SLDB and other private sector stakeholders (Commercial Bankers Association) on environmental social governance aspects of project development, as well as an assessment to determine the feasibility of enlisting a sovereign Green Bond for Saint Lucia to fund the implementation of the Green Resilient Housing Project and developing a clear framework for public-private partnerships to crowd in additional private financiers. The Green Resilient Housing Concept Note itself aims to provide support to a number of areas including the actual development of green resilient housing that will combine technical training to strengthen national capacities of architects, property developers and skilled workers in the

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		development of climate resilient housing designs, with the engagement of commercial lenders and application of green building codes. The project would support the relocation of vulnerable communities to less flood prone/climate impacted areas (away from the coastlines). Should it be approved, the concept will present a good example of integrated planning, with a PPP model, bringing together public and private sector actors to address critical climate change impacts affecting Saint Lucia's housing stock.
Inadequate institutional co-ordination to facilitate the diversity of issues which impact on the sector.	Gaps persist, but efforts to address continue.	Saint Lucia National Adaptation Plan 2018-2028 seeks to develop/update national emergency plans based on a comprehensive assessment of human settlements and related infrastructure at risk of climate change. It also seeks to develop a psycho-social support network for dealing with post-disaster stress.
Lack of an integrated approach to development.	Gaps persist, but efforts to address continue.	The presence of the NCCC has served to strengthen coordination among agencies in relation to climate change matters.

5.1.9 Gaps in the Marine Biodiversity Sector

Table 36 - Summary of Gaps and Needs in the Marine Biodiversity Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Inadequate capacity for enforcement of legislation related to the conservation of marine biodiversity. Relevant agencies include:	Gaps persist, but efforts to address continue.	Saint Lucia is seeking to ratify the Nagoya Protocol in 2021
i. Department of Fisheries		Soufriere Marine Management Association Inc has the ability to form its own by laws regulating activities within the area under its jurisdiction. The Department of Fisheries continue to advocate and engage with stakeholders.
iii. Saint Lucia National Trust		In 2017 the Government of St. Lucia and the SLNT began working to execute legal, regulatory, financial, policy and communications strategies and actions to formally adopt and implement Saint Lucia's Systems Plan for Protected Areas. A Protected Areas Working Group/Planning Committee has been established to coordinate the various governmental and

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
		<p>non-governmental agencies to maximise resources and minimise duplication of work. Initially, each agency will review current work plans to determine what is already being implemented and what can be incorporated into a new work plan, and there will be ongoing review and assessment over a proposed seven-year period.</p>
<p>Royal Saint Lucia Police Force Soufriere Marine Management Association Inc.</p>		<p>The Department of Fisheries (DOF) is the only government agency with the structure to support field monitoring. Their responsibilities are split between monitoring and managing fishing activities, as well as focusing on ecosystem management issues. Efforts to close this gap continue. A relationship has been forged with the Royal Saint Lucia Police Force, The Marine Police and the SMMA to provide assistance in monitoring illegal fishing activities when required.</p>
<p>Inadequate monitoring of biodiversity loss as a result of the impacts of climate change. There is a need to restore the biodiversity and ecosystems that underpin the sector's resilience and ability to mitigate and adapt to climate change.</p>	<p>Gaps persist, but efforts to address continue.</p>	<p>Through a collaboration with NOAA, the Caribbean Community Climate Change Centre is working to establish an integrated regional network of climate and biological monitoring stations to strengthen the region's early warning mechanism.</p> <p>The Government of Saint Lucia, through the Disaster Vulnerability Reduction Project (DVRP), in 2018 developed the Reef Enhancement Plan for the coral reef systems within the Point Sable Environmental Protection Area (PSEPA). Under this same project staff of the Department of Fisheries, and other coral reef stakeholders, were trained in underwater research specific to coral reef biology/ecology, health, nursery establishment, monitoring, other laboratory techniques and implementation of the guidelines developed under the PSEPA Reef Enhancement Plan. The information gathered and the skills gained has resulted in ongoing efforts and monitoring of the Coral reefs in the area as part of continued action to build the PSEPA's resilience to the impacts of climate change.</p>
<p>An inadequate policy framework that recognises the interdependence of climate change,</p>	<p>Gaps persist, but efforts to address continue.</p>	<p>There is, now in place, several initiatives that are intended to address these gaps. These include the NAP, SASAP the NBSAP among other measures. While these strategy documents have just been developed, the intention is that over the next few years, and with adequate financial support, these initiatives will be incorporated into relevant sector plans. Saint Lucia's Resilient Ecosystems Adaptation Strategy and</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>biodiversity and ecosystem services.</p> <p>This framework must facilitate cross-sectoral interaction, incorporating agriculture, forestry and business, and including research areas.</p>		<p>Action Plan (REASAP) 2020–2028 was developed in 2019 and approved in 2020.</p> <p>Revised Second National Biodiversity Strategy and Action Plan for Saint Lucia (2nd NBSAP, 2018-2025) was developed in 2019.</p> <p>The draft Saint Lucia Forests and Lands Resources Department Strategy for the period 2015–2025.</p> <p>The National Land Policy of 2018 was approved in 2019.</p>
<p>Inadequate Coastal Infrastructure including ecosystem-based actions such as soft coastal defenses and the maintenance and restoration of vegetation and green infrastructure.</p>	<p>The gap persists, but efforts in this regard continue.</p>	<p>Increased emphasis is being placed on coastal ecosystems. In this regard several initiatives are ongoing which seek to ensure ecosystem-based adaptations forms a part of the action in building resilience to climate change. Some of these initiatives are as follows:</p> <p>Development of a draft National Ocean Policy-and Strategic Action Plan- NOP- SAP, (2020) containing several activities that emphasises the application of ecosystem-based adaptation.</p> <p>The Caribbean Biodiversity Fund (CBF) project, co-financed by the International Climate Initiative (IKI) of the German Federal Ministry for Environment, Nature Conservation, and Nuclear Safety through KfW.</p> <p>The Pointe Sable Environmental Protection Area and the Pigeon Island National Landmark Ecosystems” project, “Increasing the climate change resilience and public awareness” are set to run for three years from 2020. These programmes focus on supporting effective climate change adaptation measures in the marine and coastal zone.</p>

5.1.10 Gaps in the Tourism Sector

Table 37 - Summary of Gaps and Needs in the Tourism Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>Inadequate human resources: There is a need for climate change</p>	<p>Gaps persist but efforts to address</p>	<p>The Saint Lucia National Tourism Strategy and Action Plan to address climate change was prepared in 2015. However, it</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>exposure or expertise in the sector to handle potential impacts.</p>	<p>them are ongoing</p>	<p>does not contain finance-ready concept notes. The project is currently being reviewed to rectify this.</p> <p>In 2017, under the Waste and Resources Action Programme (WRAP), an assessment was undertaken of areas of the tourism sector in Saint Lucia which may be classed as hotspots for GHG emissions. The goal of this initiative is to support policy makers, businesses and international organisations in finding feasible solutions to reduce GHG emissions and improve resource efficiency (RE) in tourism value chains.</p> <p>Under the 2019 project undertaken by Travel Foundation: International Climate Initiative – Transforming Tourism Value Chains Reducing Carbon Emissions in the accommodation Sector a “Low Carbon and Resource Efficient Action Plan for Accommodation Sector” was developed. However, the next stage, which is implementation was delayed because funding to execute this phase was not yet finalized.</p>
<p>Inadequate institutional co-ordination - there is a need for an effective coordinating mechanism among agencies or across ministries to ensure adequate monitoring and enforcement of tourism projects to facilitate compliance with regulations and other environmental issues.</p>	<p>Gaps persist, but efforts to address continue.</p>	<p>The NCCC provides an effective platform to address shortcomings in this area.</p>
<p>Inadequate financial resources - a lack of adequate funding, coupled with difficulty accessing funds, is an issue that affects the sector's ability to address climate change effectively.</p>	<p>Gaps persist, but efforts to address continue.</p>	<p>A National Climate Change Adaptation Strategy and Action Plan for the Tourism Sector was developed in 2015. However, the plan needs to be updated to better define the actions which can be undertaken by the Ministry of Tourism to address gaps. As such, the Ministry of Tourism (MOT) made a request to have this plan reviewed to identify the possible activities which can take place under the 3 outcomes outlined in the plan. This is slated to take place between 2021 and 2022.</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Inadequate policy and legal instruments - the absence of supportive policies, standards and regulations to effect adaptation are of significant concern.	Gaps persist, but efforts to address continue.	National Climate Change Adaptation Strategy and Action Plan for the Tourism Sector developed in 2015 is being revised to identify actions required to further address this gap.
Inadequate technological solution - the absence of cost-effective technology solutions makes adaptation less attractive to major players in the sector.	Gaps persist, but efforts to address continue.	<ul style="list-style-type: none"> ▪ The Tourism Stimulus and Investment Act makes provision for developers to obtain duty free concessions and some have taken up this opportunity to utilise technology which reduces their carbon and other environmental footprints including water harvesting and solar energy.
Inadequate data and information - this includes sector data; for example, on hotel consumption patterns for energy, water and solid waste disposal practices as well as other tourism impacting information such as land use maps, GIS information and climate data relevant to the tourism sector.	Gaps persist, but efforts to address continue.	<ul style="list-style-type: none"> ▪ Saint Lucia National Climate Change Research Strategy 2020-2030 includes tourism as a key sector. ▪ The Plastic Waste-Free Islands (PWFI) project which is currently being implemented will introduce initiatives to demonstrate effective, quantifiable solutions for addressing plastic leakage from small island developing states, ensuring that participating islands, like Saint Lucia, will make a significant, quantified reduction in plastic waste generation and leakage within the planned project timeframe of three years. The project is currently supporting a flow analysis of plastics, looking at waste from household and commercial outlets, as well as the tourism and fisheries industries. Work is ongoing to collect the required data, on waste management and production details from hotels, resorts and restaurants on the island.

5.1.11 Gaps in the Water Sector

Table 38 - Summary of Gaps and Needs in the Water Sector

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Lack of data. It is necessary to have well established records of Current and Historical	Gaps persist, but efforts to address continue.	Data capture on water has continued to improve. The WRMA received training under the GEF CCCD project, which has enhanced their capacity in data management. They are also implementing the Early Warning System and Hydrological

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
<p>Rainfall, Stream Flow, Runoff, Water Demand & Supply. The data available is insufficient to facilitate proper planning, and as such, establishing a system of continuous collection of data is essential.</p>		<p>Monitoring for Water Management and Disaster Risk Reduction Project, Saint Lucia 2018-2028. A SASAP has been developed for this sector.</p>
<p>Inadequate Water Supply Infrastructure – the infrastructure is over 50 years old and needs replacement.</p>	<p>Gaps persist, but there is an ongoing effort in this regard.</p>	<p>Saint Lucia's SASAP for the project including the Portfolio of Project Concept Notes for the Water Sector 2018-2028 has identified initiatives to strengthen Saint Lucia's water supply infrastructure.</p> <p>The John Compton Dam rehabilitation began in 2019 and is still underway. The components of the project include:</p> <ul style="list-style-type: none"> ▪ The upper catchment areas of the reservoir are to be stabilised and rehabilitated. ▪ Supplementary water sources are to be developed to augment the supply from the reservoir. ▪ The spillway wing-wall is to be reinstated and the outlets in the Dam are to be restored. ▪ Monitoring equipment are to be installed. ▪ An environmental and social plan is included for implementation. <p>A climate vulnerability assessment for purposes of ensuring resilience is incorporated in the recommendations. Dennery Water Supply Rehabilitation, completed in 2020, was a collaboration between the United Nations Office for Project Services (UNOPS), the Government of Saint Lucia, and the Water and Sewerage Company (WASCO).</p> <p>The project is intended to bring clean and reliable pipe-borne water to approximately 8000 Dennery residents who, in the past, have suffered chronic water shortages and poor water quality. The major infrastructural components include the design, procurement and construction of a raw water intake, transmission pipelines, a water treatment plant, pumping stations and distribution systems.</p>

Gaps as per SNC, TNC and INC	Status	Initiatives / Progress made including capacity building and technical support received
Absence of a water & land use policies related to water resource management and inadequate natural and water resource management. (Legal Responsibility of the Water Resource Management Agency (WRMA)).	Gaps persist, but efforts to address continue.	<p>Saint Lucia Resilient Ecosystem Adaptation Strategy and Action Plan has as a goal to be achieved between 2023-2026:</p> <p>Saint Lucia is seeking to develop, approve and promulgate legislation to establish a network of protected areas island-wide under a clear and agreed governance system to secure the provision of essential ecosystem services under a changing climate.</p> <p>A draft Water Policy has been developed by the WRMA and a Land Policy has been adopted which will serve to strengthen the powers of the WRMA to protect and develop the island's water supply.</p>

5.2 BARRIERS TO INCREASING DATA MANAGEMENT CAPACITY AND SENSITIZATION

The benefits of data sharing have been widely recognised. These include transparency and cooperation, reproducibility of research, cost-efficiency and prevention of redundancies, evidence-based decision-making, and saving of lives through more efficient and effective response systems. Given the importance of data in building climate resilience, Saint Lucia has undertaken several initiatives to increase data management capacity and sensitization: These include:

- The establishment of the NEIS which is an online platform that facilitates the sharing of data on a common platform. To date, seventeen agencies have signed an MOU to share data on the NEIS. Whilst the establishment of the NEIS is a commendable effort to address and strengthen the island's capacity in this area. However, there is the recognition that despite a growing global commitment to the use and sharing of environmental data, this can be challenging in SIDS like Saint Lucia. The main barriers to addressing data management and capacity and sensitization have been identified in the following sections.
- The development of a MRV portal developed as part of Saint Lucia's MRV System. It provides a centralised platform to house all climate change information and data on projects/initiatives, plans and opportunities for finance, investment and support.
- The establishment of Saint Lucia open data portal in 2017, which is a government operated system to facilitate access to data including climate related information.

5.2.1 Technical Challenges

For the most part, the technical barriers are well understood as part of resilient environmental information system capacity challenges. These challenges continue to form a major obstacle to the availability and use of environmental data. While the need for financial resources and ongoing capacity development and enhancement are recognised, sustainable implementation as well as political and financial commitment are limited. As such, the island continues to face challenges such as:

- Data not being collected. This results in significant gaps in public data systems, making it difficult to understand the impact of climate change and limiting the country's ability to report on MEAs and implement evidence-based decision-making.
- Data not preserved or cannot be found. In many cases, data is collected but not safely stored and made readily available for decision making. In some cases, even if data has been preserved, data retrieval systems may be lacking. This challenge is amplified by the relocation of offices, staff turnover, physical damage to paper or electronic files, and computer viruses.
- Restrictive data format. Despite major advances in computational resources in the public sector, a large volume of data continues to be collected and preserved in hardcopy paper format or in an electronic format that may be antiquated or incompatible with modern software systems, or in a form which does not allow for easy universal use.
- Lack of resources. The process of data sharing requires human and technical resources for data preparation, annotation, communication with recipients, computer equipment, internet connectivity, etc. These resources are frequently lacking in public sector agencies. Technical capacity including software to collect, harmonise (transformation and recoding to enhance inter-operability), integrate (combining harmonised datasets), and share complex and heterogeneous data has not become widely available to critical public agencies.
- Lack of metadata and standards. Metadata that describes data content, origin, methods, etc. are lacking, and standards for data format, variables, and metadata are insufficiently used, limiting secondary data use and inter-operability.
- Inadequate awareness of data requirements for managing climate change among agencies.

5.2.2 Institutional Challenges

In addition to the barriers identified above, there are several other barriers. The most significant barriers are as follows:

- **Lack of incentives.** Data sharing requires time and resources that are chronically lacking in public agencies. As such, personal and institutional incentives are often required to prioritize data sharing over other pressing duties, particularly if the benefit of data sharing to these agencies is delayed and uncertain.

- **Reluctance to share data** since data providers may differ with the data's intended secondary use or may consider their data inappropriate for a specific use. As such, they may be reluctant to share that data.
- **Possible economic damage.** Data sharing on environmental issues can be challenged by the financial/reputational damage that this data may cause to data providers and national interest. The possibility of such significant economic implications due to (over) reactive market forces or inefficient use of the information causes great reluctance among agencies to release data.
- **Lack of reciprocity.** Data sharing practices have not always been fair, and data producers have often felt exploited in transactions where they receive little credit or benefit from their work. In contrast, data users that can rapidly analyse data and publish results benefit from academic credit and career advancement, as has happened in the past.
- **Lack of awareness and research-driven culture** is an important issue in acquiring IT and data collection capacity. There is a need for a more significant shift to a data-driven decision-making culture so that persons will be more inclined to prioritize data collection.

5.2.3 Legal and Policy Barriers

- The absence of appropriate policies, legal environments, transparency, clarity, fairness, and consistency negatively affects data collection and management. There is a lack of ongoing efforts at identifying and addressing data information gaps in a number of agencies.
- **Lack of trust** between a data provider and user significantly inhibits data sharing. In the absence of trust, providers could anticipate potential misinterpretation, misuse or intentional abuse of the data. Public agencies must develop confidence in each other and any data-sharing arrangement. Due to a lack of trust in such data's potential use, legal agreements are often required, which may cause difficulty and be time-consuming to institute.
- **Lack of guidelines.** Frequently, official policies on data sharing do not exist, are unclear or inconsistent. The balance between making data accessible, safeguarding privacy, and protecting intellectual, time and financial investments by a public agency is not well regulated or standardized, resulting in protective policies on sharing data in general.
- **Protection of privacy and national development.** Public agencies have the mandate and authority to collect private data from the population with significant implications. This leads to restrictive policies on all types of data due to privacy and national development concerns.

5.3 MECHANISM TO STRENGTHEN CAPACITY IN DATA COLLECTION AND DATA SENSITIZATION

5.3.1 Quality and Usefulness of data

The data needs to meet the requirements concerning timeliness, reliability and quality. This will require that the NEIS manager and the SDED have the internal capacity to monitor these requirements continually and take corrective measures to address gaps in this area. The gaps in the data which is needed must be continually assessed and strategies instituted to close them.

To determine how data collection, sensitization, and capacity needs in this area can be addressed, an evaluation of the critical data gaps identified in the TNC was undertaken. Also, specific recommendations on actions that should be taken to address the data gaps were identified. These were further evaluated so that specific solutions to address these challenges would be determined.

Table 39 - Key Inventory Activity Data Gaps and Recommendations

IPCC Sector	Key Activity Data Gap Identified	Recommendation for Addressing Data Gap in TNC	Action taken to date	Recommended action to address gaps in BUR
Energy	National energy balances, including imports, exports, consumption and international bunker data for major economic sectors (e.g., residential, commercial, transportation etc.) are not consistently available.	While the Latin American Energy Organization (OLADE) compiled in 2014, an energy balance for Saint Lucia for 2010, 2011 and 2012, the overall process would benefit if the governmental agency with responsibility for Energy prepared energy balances annually using sales data from fuel distributors as well as import data. This would allow the ministry to prepare consistent and comparable energy balances annually that could also be used for planning and policy development.	Undertaken in 2014	Actions to strengthen national capacity in this area through training and technical assistance should continue. There also needs to be increased human resources

IPCC Sector	Key Activity Data Gap Identified	Recommendation for Addressing Data Gap in TNC	Action taken to date	Recommended action to address gaps in BUR
	<p>Estimates of wood fuel and charcoal consumption are difficult to estimate with a high degree of accuracy. Recent consumer and producer surveys are different by several orders of magnitude.</p>	<p>A comprehensive nation-wide bottom-up survey of producers and a top-down survey of consumers should be conducted to reduce the level of uncertainty associated with the production and demand for wood fuel and charcoal.</p>	<p>No action to date</p>	<p>Resource requirements and other mechanisms determined, and a baseline survey undertaken to ensure information becomes available.</p>
Industrial Processes	<p>Information on the HFCs imported annually in bulk and products is not complete and has a high degree of uncertainty. Bulk imports of HFCs are tracked by DSD based on surveys of importers. However, the reliability of data on imports of products containing HFCs (e.g., refrigerators, air conditioners) is low. There is no information gathered that identifies whether a product contains HFC, the type and amount of HFC.</p>	<p>Additional training and support should be provided to customs agents to have a reliable tracking system for HFCs. The primary route of entry for HFCs is through products and surveys to reliably estimate the number of HFC containing products imported and the charge and type of HFCs in associated air conditioning, refrigeration and aerosol products.</p>	<p>A Product registration system has been established under the C-COOL project to track equipment including ACs and refrigerators. Customs has also received training on the product registration system. Currently, data are collected on the imports of bulk HFC refrigerant. However, when it comes to equipment that use HFCs, the current HS Code does not allow for differentiation based on the refrigerant.</p>	<p>Training should be instituted for customs officials and a mechanism instituted in collaboration with the Customs Department and the Saint Lucia National Statistics Department to collect this data</p>

IPCC Sector	Key Activity Data Gap Identified	Recommendation for Addressing Data Gap in TNC	Action taken to date	Recommended action to address gaps in BUR
Solvent and Product Use	<p>Information on solvents and paints imported was obtained from customs and excise. However, there is limited knowledge regarding the solvent content of these products. Also, information on other products containing solvents, including household products (not including paints) is limited.</p>	<p>A national survey to characterise solvent and product use in Saint Lucia would be very useful to improve the data's overall quality. However, it is recognized that this is likely a low priority for the GHG inventory.</p>	<p>No action to date</p>	<p>No action recommended as it is deemed a low priority item.</p>
Agriculture	<p>Data on the fraction of different livestock that are managed under different animal waste management systems are lacking, and default data was used.</p>	<p>The Department of Agriculture should undertake an assessment to determine the fraction of different livestock that are managed under different animal waste management systems.</p>	<p>Some base data is available as it is part of the approval system for animal farms as well as part of the monitoring systems of these agencies</p>	<p>This should be considered as an area of focus for the respective agencies. It is also recommended that these gaps be tabled at a special meeting of the NCCC and a plan of action developed to address same, including the resources, if deemed necessary.</p>
	<p>The amount of nitrogen applied through fertilizers was estimated on available data from distributors. The data is of low quality and provides only an average estimate between 2000 and 2009. Also, the estimated nitrogen does not include some products such as bio-stimulants, foliar</p>	<p>The Ministry of Agriculture should conduct a detailed survey to develop an inventory for the different fertilizers sold to farmers in Saint Lucia and prepare estimates of the overall nitrogen contents.</p>	<p>No action to date</p>	<p>It should be included as part of a comprehensive plan to upgrade data management in the Department of Agriculture.</p>

IPCC Sector	Key Activity Data Gap Identified	Recommendation for Addressing Data Gap in TNC	Action taken to date	Recommended action to address gaps in BUR
	fertilizers and some pesticides.			
LULUCF	Changes in land-use were estimated using land-use classifications for the year 2000 and 2009. These classifications are not perfectly aligned as at least one category is not included for both years. Imperfect alignment of the land-use classifications results in greater uncertainty in emission estimates.	The Forestry Department should implement measures to improve the quality of the LULUCF inventory.	<p>Saint Lucia developed its Final Country Report of the Land Degradation Neutrality Target Setting Programme (LDN TSP) in 2018.</p> <p>Collect Earth was engaged by the Forestry Department to assess 20 years of imagery and classified changes in land use based on IPCC land use categories, this information was further broken down to meet Saint Lucia's Forest Definition criteria. Saint Lucia is also strengthening the capacity of its forest officers to undertake this assessment and will continue to train them in this regard.</p>	Effort in this regard must continue.

IPCC Sector	Key Activity Data Gap Identified	Recommendation for Addressing Data Gap in TNC	Action taken to date	Recommended action to address gaps in BUR
		Continued research and effort are required to link the land-use changes indicated in this report to biomass stocks and changes in carbon pools.	The capacity of DOF is being strengthened to enhance their capacity to undertake this action. They have received training from the Coalition of Rain Forest Nations and will continue to build on this growth.	Their efforts to address this gap should continue.
	Biomass stocks in forest reserves were estimated from a recent forest inventory. However, IPCC defaults are used for other land-use classifications.	The Forestry Department should work to improve estimates of the biomass stocks related to different land-use classifications to improve the quality of the LULUCF inventory.	The Forestry Department has initiated training for its staff to improve capacity to estimate biomass stocks as well as undertaking LULUCF Inventory.	Efforts in this regard should continue. The Department of Forestry has prioritised this action as part of its improvement plan for GHG inventories. Efforts to address same should continue.
	Estimates of wood removal from forests for wood fuel and charcoal have high uncertainty (see Energy Sector above).	Work on estimates of wood fuel removal and charcoal production identified for the energy sector would greatly enhance the robustness of the removal and emission estimates of the LULUCF sector.	The capacity of Department of Forestry is being strengthened to enhance their capacity to undertake this action. They have received training from the Coalition of Rain Forest Nations and will continue to build capacity.	The Department of Forestry should continue efforts to addressing this gap
Waste	The total degradable organic content of domestic wastewater is	The Water Resources Management Authority could potentially	No action to date	The NCCC should convene a special meeting to assess gaps

IPCC Sector	Key Activity Data Gap Identified	Recommendation for Addressing Data Gap in TNC	Action taken to date	Recommended action to address gaps in BUR
	based on an IPCC default coefficient that has a high degree of uncertainty.	conduct tests to determine the average degradable organic content of wastewater related to different wastewater treatment systems.		and to determine what is required to close this gap. Thereafter a plan of action should be developed and implemented by the respective agencies and updates provided to the NCCC.

5.3.2 Building Capacity Among Data Providers and Users

To ensure that the data required to monitor and report on Climate Change is available, it is recommended that the DSD engage with all the primary stakeholders to outline the data needs and agree on measures which can be implemented to address these gaps. The nature of the public service is such that persons can be reassigned or leave the service at any time. The NEIS manager must, therefore, remain in constant contact with these persons/agencies and create the mechanism to train replacements as data providers or data curators to ensure knowledge preservation within each agency.

5.4 PROVISION OF TOOLS AND EQUIPMENT AND CAPACITY DEVELOPMENT

5.4.1 Availability of Tools and Equipment

The availability of tools and equipment can also be an impediment. The DSD should constantly be assessing this situation to ascertain where interventions are needed. The buy-in and support of key decision-makers are also critical to this process. It is also important that the Minister with responsibility for Sustainable Development in collaboration with key agencies create a mechanism to sensitize the decision-makers at senior levels within the various agencies on the importance of having job functions aimed at providing quality data well resourced

5.4.2 Developing Strategic Relationships

Strategic relationships are very important. Maintaining and forging even greater alliances with the Department of Statistics and the Government Open Data System and other stakeholders to capture and report on required data is also important. Considering the importance of this data, there is a need to obtain a Cabinet mandate to have agencies charged with collecting this data to make it available for national decision making through the NEIS, Department of Statistics, and other national data

platforms. This means that it will become an important need that they must meet as part of their deliverables. This will also help to strengthen data collection and sharing as part of their work programs

5.4.3 Strengthening the Policy and Legislative Environment for Data Collection and Management

Research and data management requires significant resources, including human and financial. As such, policy instruments and guidelines for research should be strengthened. All efforts at implementing the Climate Change Research Strategy should be pursued, as this will require strong collaboration with relevant agencies in addressing crucial environment-related knowledge gaps for climate reporting and decision-making.

The establishment of a research council that has a clear mandate to work alongside national, regional and international stakeholders to promote and facilitate research and the use of the same in decision-making is important. Saint Lucia had a National Council for Science and Technology for Development (NCSTD) which is now defunct. The DSD (DSD) (under which the Science and Technology Mandate now falls) has not re-established the NCSTD in the absence of a National Science and Technology Policy. To this end, the DSD has been working collaboratively with the National Competitiveness and Productivity Council (NCPC) and the Innovation Division of the Ministry of Education towards the development of a National Competitiveness Agenda for Saint Lucia. One of the outputs from this Agenda is a National Science, Technology and Innovation Policy. In 2019, the Minister, under whom the DSD falls, launched the Decade of Research and Innovation and in that same year, the Vaughn Arthur Lewis Institute for Research and Innovation was established. Additionally, in 2020, several stakeholders from different sectors received valuable training by the University of Cambridge.

5.4.4 Strengthening the National Statistical System

The National Statistical System is central to the production of reliable, timely, robust and heterogeneous data, which is important in planning, monitoring and reviewing development progress. There is a need to strengthen the island's legislation as it relates to national statistics and mainstreaming environmental data collection, management and reporting. Also, there is a need to strengthen the national statistical database, to ensure it has the necessary capacity to collect, analyse and disseminate data.

5.5 FINANCIAL AND TECHNICAL SUPPORT RECEIVED FROM NATIONAL AND OTHER SOURCES

Saint Lucia's Climate Financing Strategy has primarily focused on two funding sources: international funding and domestic public sources. The GOSL has signalled that efforts will be made to better engage

the private sector in climate financing. To this end, the GOSL has developed a Private Sector Engagement Strategy which seeks to ensure that Saint Lucia is positioned to receive climate finance support from multiple sources for a variety of programmes including disaster prevention and preparedness and general environmental protection (Atteridge, Canales & Savvidou, 2017). A summary of the information, including the source and the amount allocated to these projects is presented in the section that follows.

5.5.1 Financial and Technical Support Received

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
1.	Agricultural Transformation Project	EU	Department of Agriculture	13,250,395.67
Project Objectives	Agricultural Transformation Programme aims to modernise the agricultural sector and mitigate the impact of losses caused by the preferential arrangements for bananas in the European Union. The components of this project include: <ul style="list-style-type: none"> ▪ Training for young people to create new agro-entrepreneurs. ▪ Facilitation of physical capital- Agricultural equipment to promote mechanised production. It is intended that the new agro-entrepreneurs apply the latest technologies to boost production. It will also increase agro-processing through more efficient production and marketing. ▪ Disaster Risk Reduction (updating the management system for pests and diseases). ▪ Strengthen the legal framework to facilitate better control of pests. ▪ Reduce vulnerability by constructing and rehabilitating agricultural roads and riverbanks. 			
2.	Morocco Soil Fertility Mapping Project 2015-2019	Morocco Government	Department of Agriculture	601,136.22
Project Objectives	Under this project, the island will seek to build capacity to manage its soil fertility, establish a database and develop a sound soil information system to respond speedily and effectively to soil resource preservation. This is an essential intervention aimed at combating and adapting to climate change; protecting water resources and enhancing the ability to produce a safe and secure food supply for today and the future.			
3	Ridge to Reef Ecosystem Rehabilitation	FAO	5Cs, Department of Fisheries and Department of Agriculture	811,811.62
Project Objectives	This project seeks to: <ol style="list-style-type: none"> 1) Promote sustainable agricultural practices and strengthen the resilience of the agricultural sector to climate change. Some of the initiatives of this project include: <ul style="list-style-type: none"> • Recycling farm waste through composting, shredding • Mushroom cultivation training 			

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
	<ul style="list-style-type: none"> • Cocoa cultivation training • Drainage improvement in L'Etang • Natural pest control agents and low chemical fertilizers in agriculture • Contribution to the compilation of the first draft of Organic Standard for Saint Lucia • Biogas digester Installation • Support for the eradication of invasive alien plant species on Gros Piton • Capacity building, procurements, technical support for the creation of the agro-processing group, The Jacq-Co Valley agro-processors. <p>2) Protect the marine environment. Initiatives include:</p> <ul style="list-style-type: none"> • Capacity building for staff of SMMA • Procurement of equipment and materials for operational functions • Scoping for wastewater management • Organizational Review and strategic action plan for enhancing the National Legal and Organizational Framework for Sustainable Marine Managed Areas (SMMAs) in Saint Lucia • Revision and amendment of Management and Operations Plan • Development of Communication Strategy and supply of communication equipment 			
4.	Dennery Water Supply Redevelopment	Government of Mexico Republic of Germany Caribbean Development Bank	WASCO	17,704,957.85
Project Objectives	The project will bring clean and reliable pipe-borne water to approximately 8000 Dennery residents who, in the past, have suffered chronic water shortages and poor water quality. The major infrastructural components include the design, procurement and construction of a raw water intake, transmission pipelines, a water treatment plant, pumping stations and distribution systems			
5.	Early warning system and hydrological monitoring for water management and disaster risk reduction project, Saint Lucia	Government of Australia	WRMA	98,909.05

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
	2018-2020			
Project Objectives	This project provides assistance towards a flood early warning system and hydrological monitoring for water management and disaster risk reduction. The overall purpose of the project is to enhance WRMA's ability to monitor and manage Saint Lucia's water resources through hydrometric monitoring of the water balance and to install and operate flood early warning systems in the communities of Anse La Raye, Canaries and Castries.			
6.	Revision of Saint Lucia NBSAP and Preparation of Saint Lucia 5th National Report on Biodiversity NBSAP	GEF	DSD	220,000.00 9000.00
Project Objectives	To meet Saint Lucia's Reporting Requirements under the CBD as well as to update the NBSAP			
Project Objectives	To increase awareness of the GEF and its role in capacity development in environmental management			
7.	Increasing Saint Lucia's capacity to Monitor MEA's	GEF	DSD	1,050,000.00
Project Objectives	To strengthen institutional capacity for the implementation and monitoring of international conventions as a follow-up to the National Capacity Self-Assessment (NCSA) of St. Lucia and better integrate environmental concerns and the value of ecosystems into its broader development frameworks.			
8.	Integrated Ecosystem Management and Restoration of the Forest on the Southeast Coast of St. Lucia.	GEF	DSD	7,063,242.00
Project Objectives	To enable sustainable economic development of the Southeast Coast by maintaining healthy ecosystems, sustainable livelihoods, and securing global environmental benefits.			
9.	Biennial Update Report under the UNFCCC	GEF	DSD	352,000

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
Project Objectives	The Biennial Update report provides updates on actions undertaken by a Party to implement the Convention, including the status of its GHG emissions and removals by sinks and the steps to reduce emissions or enhance sinks.			
10.	Third National Biosafety Report to the Cartagena Protocol on Biosafety	GEF	DSD	24,728.55
Project Objectives	Preparation of The Biosafety Report on the Cartagena Convention protocol on Biosafety			
11.	Sustainable Development and Solar PV Demonstration and Scale-up Project 2016-2019	WB/ IDA	MSDEST	593,661,894.07
Project Objectives	The project's Grant Development Objectives are to demonstrate the use of commercial-scale PV systems in the Caribbean through pilot projects and disseminate the region's results.			
12.	Pilot Programme for Climate Resilience- Disaster Vulnerability Reduction Project – PPCR-DVRP Global Project Period: 2014-2021	Donor/ Funding Agency WB	WB/ PCU/MOF/ MSDEST. MIPSAT	68,000,000 Loan thirty-two million dollars (US\$41M) (DVRP) (PPCR) Loan (US\$15M) and Grant (US\$12M)
Project Objectives	DVRP focuses on vulnerability reduction and post-disaster reconstruction activities in the health, education, and infrastructure sectors throughout the island. Simultaneously, the PPCR resources are used to effect transformational change to establish long term climate resilience. Innovative approaches are piloted to realize such change and draw lessons learned for future replicability within Saint Lucia and internationally. The project consists of five components: (1) Risk Reduction and Adaptation Measures; (2) Technical Assistance for Improved Assessment and Application of Disaster and Climate Risk Information in			

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
	Decision-Making; (3) Climate Adaptation Financing Facility (CAFF) ¹ ; (4) Contingent Emergency Response Component (CERC) ² ; and (5) Project Management and Implementation Support.			
13.	The Caribbean Aqua-Terrestrial Solutions (CATS) Programme	Donor/ Funding Agency WB/CIF	PCU/MOF/ MSDEST. MIPSAT	11,390,000.00 (shared between 8 CARICOM countries)
Project Objectives	<p>This project seeks to strengthen regional capacity building in the management of marine resources. In 2018 training was provided to volunteers at the Marine Protected Area (MPA) Programme Unit and staff of the Fisheries and Forestry Divisions to enhance monitoring and management within Marine Protected Areas and watersheds.</p> <p>The CATS programme provided WASCO with more than 400 days of expert input over 13 months, from November 2018 to November 2019. Through this intervention, key experts worked alongside WASCO's staff in four defined thematical areas – Institutional Strengthening, Network Management, Hydraulic Modelling, GIS, and Asset Management. Through hands-on activities and on-the-job training, the experts shared insights and jointly developed numerous tools and deliverables to assist WASCO.</p> <p>Staff from 8 Caribbean water utilities participated in the Regional Training on Measures and Activities for NRW-Reduction in Saint Lucia which took place from September 24th to 27th, 2019. The training was conducted as part of the consultancy project "Institutional and Organizational Strengthening of WASCO Saint Lucia and Regional Water Utilities."</p> <p>In early 2019, the CATS Programme collaborated with the Centre for Livelihoods, Ecosystems, Energy, Adaptation and Resilience (CLEAR) Caribbean on a coral restoration project in Soufriere, Saint Lucia. The project aimed at propagating Staghorn Coral and Elkhorn Coral along the coastline in the Soufriere area, reaching from Anse Chastanent Bay to the Pitons.</p>			
14.	Water Supply Redevelopment Projects (Castries, Gros Islet, Anse La Raye and Vieux Fort)	John Compton Dam 14.8 million USD in funding from the CDB, the IADB, EIB Vieux Fort Water Supply Redevelopment	WASCO PCU/MOF/ MSDEST. MIPSAT	John Compton Dam 14.8 million USD in funding from the CDB, the IADB, EIB Vieux Fort Water Supply Redevelopment

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
		Project, \$19.675 M CDB		Project, 19.675 M CDB
Project Objectives	This project aims to ensure sustainable access to safe drinking water. The John Compton Dam Rehabilitation and the Vieux Fort Water Supply Redevelopment projects are intended to provide an efficient, reliable, climate-resilient, and sustainable supply of potable water to all the residents and businesses of Vieux Fort, Castries, Gros Islet and Anse La Raye. The projects could help improve access for more than 100,000 people on the island.			
15.	Optimization of meteorological and hydrological monitoring network through procurement of hydrological and meteorological equipment. National Project Period	WB	WRMA	1,077,689.00
Project Objective	Strengthen the capacity of the WRMA to monitor the island's water resources through capacity development as well as the procurement of necessary equipment			
16.	Strengthening Operational Weather, Water, and Climate Services Road Map for Saint Lucia	Water Partnership Program (WPP)	WRMA	Total Project Budget N/A
Project Objectives	This report seeks to provide GOSL with options and estimated benefits versus costs to strengthen hydro-met services in the country. This includes repairing the existing early warning system hardware outages and restoring a necessary warning capability for heavy rainfall and flooding threatening critically flood-vulnerable communities in the river basins. Also, it would allow for existing data to be collected and utilised by users for both disaster risk reduction and water resources management			
17.	Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWEco Project)	GEF and UNEP	UNEP/ UNDP	89,039,262.00

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
Project Objectives	IWEco's objective is to contribute to the preservation of Caribbean ecosystems of global significance and the sustainability of livelihoods. This is being done by applying existing, proven technologies and approaches best suited for small island developing states. The project will improve the management of fresh and coastal water resources, land resources and forests.			
18.	Building Regional Climate Capacity in the Caribbean (BRCCC)	Caribbean Institute for Meteorology and Hydrology (CIMH)	DSD	5,085,000.00
Project Objectives	<p>The Programme was established to facilitate the development of the World Meteorological Organization's Regional Climate Centre (RCC) for the Caribbean to be housed at the Caribbean Institute for Meteorology and Hydrology (CIMH) through (i) infrastructure development, (ii) increasing the range of products and services delivered to stakeholders, (iii) enhancement of human and technical capacities at CIMH and in National Meteorological and Hydrological Services in the Caribbean, and (iv) improvement of service delivery mechanisms to national, regional and international stakeholders.</p> <p>It is expected that the programme will improve the range of climate-related products and services that will be available at the appropriate spatial-temporal scales, to decision-makers, for effective decision-making in the Caribbean. This will ultimately result in support of sustainable development of the Caribbean region.</p>			
19.	Solar Car Port and Charging Stations	Donor Government of Italy	Executing Agency MIPE	481,534.00
Project Objective	The facility will include the purchase of three (3) electric vehicles and installation of (2) double EV charging stations, and installation of a solar carport with a total generation capacity of 54KWp. The solar carport is part of the government's plan to reduce energy consumption in the public sector by 20 per cent by 2020 and incorporate sustainable energy solutions into the public sector.			
20.	Iyanola – Natural Resources Management of the Northeast Coast 2014-2021	GEF	Executing Agency DSD	2,494,545.00

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
Project Objective	Increased management effectiveness and sustainable use of the Northeast Coast's natural resource base to generate multiple global environmental benefits.			
21.	Coastal Protection for Climate Change Adaptation in the Small Island States in the Caribbean. 2014-2019	German Ministry for Economic Cooperation and Development (BMZ)	Executing Agency 5Cs	15,229,499.06
Project Objectives	The Project concerns implementing local adaptation measures for the sustainable improvement of coastal ecosystems relevant for climate change adaptation in Saint Lucia, Grenada, St. Vincent and the Grenadines and Jamaica. It seeks to reduce climate change-induced risks for the population of the Small Island States of the Caribbean by improving ecosystem services that reduce the impact of climate change on coastal areas.			
22.	Building Resilience for Adaptation to Climate Change Variability in Agriculture in Saint Lucia	Donor/Funding Agency Adaptation Fund, in collaboration with CDB and CARICOM	Executing Agency 5Cs in collaboration with the Ministry with responsibility for Agriculture.	9,797,246.50
Project Objectives	Three integrated project components are proposed to capture the interventions of the project as follows: <ul style="list-style-type: none"> • Building resilience and sustainability of farming systems through interventions for water security, soil conservation and management. • Establishing green agro-parks, including the use of solar energy, for increased efficiency/ resilience in farming systems. • Knowledge management and transfer for capacity building to institutional and local level adaptive capacities. 			
23.	GCF Readiness and Preparatory Support in Saint Lucia (LCA-RS-001)	Donor/Funding Agency GCF	Executing Agency 5Cs	375,100.00
Project Objectives	Institutional strengthening for NDA, NCCC and other key stakeholders Development of a national Strategic Framework, including a Country Programme and Pipeline of prioritised concept notes for the GCF; No-Objection Procedure and NDA Operational Toolkit; climate finance training for national stakeholders			

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
24.	Improving Eastern Caribbean Engagement with the Green Climate Fund for Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, Saint Lucia (LAC-RS-007)	Donor Funding Agency GCF	Executing Agency OECS Commission	493,880.00
Project Objective	To address project development; public-private engagement; facilitate and support non-state stakeholders in project development, and address fiduciary and related gaps within the OECS.			
25.	Early Warning Systems Readiness Proposal for Antigua and Barbuda, Belize, Dominica, Grenada, Guyana, Haiti, St. Kitts and Nevis, Saint Lucia, St, Vincent and the Grenadines, Suriname	Donor Funding Agency GCF	Executing Agency Caribbean Disaster Emergency Management Agency (CDEMA)	1,747,223.00
Project Objectives	To provide support, CDEMA can improve capacity for achieving climate resilience by advancing Multi-hazard Early Warning Systems (MHEWS); to enhance the national ability to apply climate data, and increasing access to financing by strengthening national early warning systems.			
26.	Enhancing Caribbean Civil Society's Access and Readiness for Climate Finance (LAC-RS-004)	Donor Funding Agency GCF	Executing Agency Caribbean Natural Resources Institute (CANARI)	1,296,958.00
Project Objectives	To enhance civil society's capacity, including knowledge, skills, and organisational structures to improve access to climate financing.			
27.	Readiness to support the development of a Credit Risk Abatement Facility (CRAF) for CARICOM States – CARICOM Development Fund. (LAC-RS-002)	Donor Funding Agency GCF	Executing Agency Caribbean Community (CARICOM) Development Fund	124,986.00
Project Objectives	To strengthen SMEs access to finance and encourage the private sector to become a significant player as well as to provide different financing options			
28.	Building Capacity for a Regional Approach to Climate Action in the Caribbean:	Donor Funding Agency GCF	Executing Agency 5Cs	1,802,657.00

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
	Caribbean Community Climate Change Centre for Belize, Dominica, Haiti, Jamaica, Saint Lucia, St. Vincent and the Grenadines (LAC-RS-001)			
Project Objectives	To enhance the capacity of the CCCCC, in supporting beneficiary countries to increase the origination of high-quality funding proposals for GCF consideration, principally in the form of on-demand technical guidance to increase national capacity to access climate financing. Through this project, CCCCC seeks to, among other things to “improve the usability of the Clearinghouse Portal and Website to provide greater uptake of products related to climate change data and GCF related information. This improved portal will support Saint Lucia’s NDA’s efforts under the current readiness to improve the information flow to the Saint Lucian citizenry.			
29.	Improving the capacity of the Fisheries sector in Saint Lucia to enhance resilience to climate change	Donor Funding Agency GCF	Executing Agency FAO	602,470.00
Project Objectives	To strengthen critical institutional, systems and data capacity gaps to ultimately enhance the fisheries sector to adapt to climate change impacts. To this end, the project will seek to strengthen key climate-responsive agencies’ capacity to fulfil their mandate better. In the case of the fisheries NAP, the Department of Fisheries is the primary beneficiary agency while the current readiness focuses on the NDA as the primary beneficiary			
30.	Enhancing Saint Lucia’s understanding, capacity, institutional and strategic frameworks to access climate finance for low-emission Climate-Resilient Pathways	Donor Funding Agency GCF	Executing Agency DSD	662,065.00
	The objective of this readiness grant is to support the NDA in building on the existing structures developed in LCA-RS-001 by facilitating capacity development for the optimization and organization of human capacities inside the NDA and establishing a multi-functional digitalized system. This will enable the systematic and strategic steering of Saint Lucia’s NDA, proposed DAE and other relevant stakeholders’ engagement with the GCF. This readiness grant will enhance the complementarity and coherence between the activities of the GCF and other relevant institutions. Through the digitalisation of processes. This will ensure more efficient, streamlined and transparent systems for the NDA and the nominated			

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
31.	Strengthening the Foundation for a climate-responsive agricultural sector in the Caribbean	Donor Funding Agency GCF	Executing Agency IICA	1,999,943.00
Project Objectives	To raise the agricultural sector profile in GCF's climate financing prioritization processes for CARICOM by increasing awareness of the sector's potential contribution to climate solutions, identifying promising practices and technologies to enhance resilience, and quantifying its contribution to GHG reductions. An outcome of this project is to enhance the agriculture sector access to information on climate change through a regional knowledge management portal. Case studies will be developed and will be shared through this portal. Under the current readiness, the NDA website will link this information available on the portal being designed through the regional agriculture readiness.			
32.	Green Architecture Promotion Pilot (GAPP) toward Building Resilience to the Adverse Effects of Climate Change	Donor Funding Agency United Nations Development Programme-Japan Caribbean Climate Change Partnership (UNDP's JCCCP)	Executing Agency Department of Economic Development	428,924.88
Project Objectives	<p>Consistent with efforts under Saint Lucia's Nationally Determined Contribution (NDC), the project aims to improve national energy efficiency and reduce national greenhouse gas (GHG) emissions, through capacity building in green design and documentation and promotion of best practices in green design.</p> <p>The 3 pilot schools are located in the communities of Forestiere, Desbarras and Vieux-Fort. Components of the GAPP include:</p> <ul style="list-style-type: none"> • Efficient ventilation and cooling systems, including natural ventilation, smart inverter AC units. • Solid waste management, including facilitating sorting and recycling • Water management, including rainwater harvesting, efficient toilets & bathroom fixtures • Efficient renewable energy generation, especially solar photovoltaic systems, wind energy systems, biomass etc. • Sustainable building materials using locally and regionally available materials, recyclable materials • Lighting, including natural lighting, LED lighting, Lighting management systems (photocells, dimmers etc) Knowledge management and transfer for capacity-building to institutional and local level adaptive capacities 			
33.	Climate Investment Funds (CIF) Evaluation and Learning: Saint Lucia's Experience in	Donor Funding Agency Climate Investment	Executing Agency DSD	100,000.00

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
	Private Sector Participation in Response to Climate Change	Funds (CIF)		
Project Objectives	Purpose: Capture lessons learned from Private Sector participation in the Pilot Programme for Climate Resilience (PPCR) and other relevant initiatives in Saint Lucia to facilitate transformational change in the Private Sector towards increasing Private Sector investment in, and response to climate change. Objectives: <ul style="list-style-type: none"> • To assess what knowledge is available to the Private Sector in Saint Lucia to facilitate participation and identify the pathways and barriers to accessing this knowledge. • To evaluate the extent to which the Private Sector in Saint Lucia has participated in PPCR and other relevant initiatives. To assess the policy and regulatory environment that the Saint Lucia Private Sector operates in and how this impacts participation and engagement in climate change adaptation projects and initiatives. • • To determine valuable lessons learned under the PPCR and other relevant initiatives, towards improving Private Sector participation in building climate resilience in Saint Lucia. 			
34.	Nationally Appropriate Mitigation Action (NAMA)	Donor Funding Agency United Nations Development Programme-Japan Caribbean Climate Change Partnership (UNDP's JCCCP)	Executing Agency DSD	41,120.03
Project Objectives	Consistent with efforts under Saint Lucia's Nationally Determined Contribution (NDC), this initiative was aimed at the design of a Nationally Appropriate Mitigation Action (NAMA) for increased renewable energy and energy efficiency solutions and technologies in selected school buildings (Green Schools) in Saint Lucia.			
35.	Mobilization of Technical Support for Climate Action Nationally Determined Contribution (NDC) Coordinator	Donor Funding Agency GIZ-German Corporation for International Cooperation; and NDC Partnership	Executing Agency DSD	41,120.03

Description	Project Name	Donor/Funding Agency	Executing Agency	Project Global Budget in USD
Project Objectives	<p>The NDC Coordinator's role is to work with various partners to lead the charge towards the development and implementation of the Saint Lucia's Nationally Determined Contribution Partnership Plan (NDCPP). The NDCPP was finalised in early 2019 and approved by the Cabinet of Ministers. It is designed to attract coordinated donor funding to facilitate its implementation. The objectives of the NDCPP seek to:</p> <ul style="list-style-type: none"> • increase energy efficiency • increase the penetration of renewable energy • introduce energy and fuel-efficient vehicles • find synergies with the National Adaptation Plan (NAP) and associated Sectoral Adaptation Strategies and Action Plans (SASAPs) • commit financial contributions from the Government of Saint Lucia 			

5.5.2 Capacity Development and Technology Transfer

Saint Lucia also received technical assistance to strengthen its capacity in Climate Change Adaptation and Mitigation. The main contributions in this regard are as follows:

Table 40 - Technology and Capacity Development Assistance Received

	Additional Capacity Development/ Technical Assistance Received	Location and date
1	Consultative Group of Experts (CGE) hands-on training workshop for the Latin-America and Caribbean Region on the institutionalisation of data management for national GHG inventory. This exercise was aimed at enhancing the technical capacity of experts from developing countries and ultimately set the foundation for the institutionalisation of data management for national GHG inventory. One individual trained.	Belize City, Belize 15 to 17 July 2019.
2	UNFCCC hands-on training Workshop on NDCs. One individual trained.	Grenada July 2019
3	The building of Sustainable National Greenhouse Gas Inventory Management Systems, and the Use of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories for the Latin American and the Caribbean Region". The workshop was organized by the UNFCCC Secretariat and the FAO in collaboration with the IPCC. The workshop addressed the institutional arrangements required to support the normal development and submission of national greenhouse gas inventories and provide hands-on training on the use of 2006 IPCC guidelines for national greenhouse gas inventories, including the IPCC inventory. At least five persons were trained.	Santiago Chile 2 - 6 September 2019
4	In 2019, a 200kW rooftop solar photovoltaic system was installed at the Owen King EU hospital through the World Bank, under grant funding from the Support for Small Island Developing States Support Program (SIDSDOCK), managed by the Energy Sector Management Assistance Program (ESMAP). The system is expected to produce in excess of 292 MWh annually which corresponds to avoided use of fuel of 57,816 kg and GHG emissions reduction of 202 tCO ₂ eq annually. Recognising the importance of human capacity strengthening to support greater penetration of renewables including solar into our national and regional energy matrices, a regional training course on Solar PV installation was hosted locally with the participation of Grenada and Saint Vincent. A total of 20 participants were trained through theoretical and practical sessions leading to the National American Board of Certified Energy Practitioners (NABCEP), PV Associate examination. Eleven students passed the examination and attained the NABCEP PV Associate certification.	Saint Lucia OKEU Hospital
5	The OECS Commission along with the Organization of American States and the Government of Saint Lucia, convened the Caribbean Forum on Energy, Transport and Resilience in Saint Lucia in 2019. The overarching objective of the Forum was to explore new technologies and to combine them with existing regional experiences in sustainable urban development to design a roadmap for the Caribbean smart cities of the future. It also sought to further public-private exchanges among governments, energy and transportation experts and the private sector while addressing multiple aspects, such as technology innovation, policy and regulation, infrastructure resilience as well as financing. The exercise brought together policymakers, utility representatives, physical planners, capital providers, city leaders and multi-laterals from across the	Saint Lucia June 27 2019

	Additional Capacity Development/ Technical Assistance Received	Location and date
	Caribbean to build a blueprint for resilient energy and transportation infrastructure, and to exchange ideas, best practices, and technologies.	
6	The Government continues its effort in promoting energy efficiency in buildings. As part of the Green Architecture Promotion Pilot (GAPP) project being implemented under the Japan-Caribbean Climate Change Partnership (J-CCCP), fifty (50) professionals from both the private and public sectors received training in Leadership in Energy and Environment Design (LEED) with sixty-eight per cent receiving full LEED Green Associate accreditation. It is expected that the increased local capacity in energy-efficient design, construction and functioning of sustainable buildings will lead to more green-buildings that offer reduced energy demand, improved air quality and comfort for their occupants.	
7	Under the United Arab Emirates- Caribbean Renewable Energy Fund, support has been received for the installation of a 750kW solar carport at the parking facility of the Hewannorra International Airport. The project is expected to install solar streetlights and electric vehicle rapid charging stations at the airport. The system is expected to produce over 1 GWh annually which corresponds to avoided use of fuel of 216,810 kg and the anticipated reduction in greenhouse gas (GHG) emissions of 760 tCO ₂ eq annually. Procurement for an EPC Contractor is ongoing, and a finalised contract is anticipated by the end of the first quarter of 2021.	Hewannorra Airport Saint Lucia
8	GHG Inventory Training led by Aether Ltd to build capacity of local experts in conducting Greenhouse gas inventories.	Jun- July 2020
9	Introductory and Advanced Training in Low Emission Analysis Platform (LEAP) Facilitated by the Stockholm Environment Institute (SEI) and the Caribbean Cooperative Measurement Reporting and Verification Hub (CCMRVH). The introductory session aimed to achieve a general understanding of the capabilities of LEAP and its operations, including basic skills in demand, transformation and emissions modelling. The goal of the Advanced training was to train Saint Lucia experts in understanding the Leap Model Developed for Saint Lucia and to develop enhanced skills to update the model, add scenarios and explain the results of the model. A total of 11 participants receiving certificates of completion.	December 2020 and February 2021.
10	MRV Portal Training- Facilitated by Aether limited The goal of these training sessions was to build an awareness of MRV concepts and to train stakeholders in the use of Saint Lucia MRV Portal, thereby building capacity for data collection and institutional memory for a sustained MRV system in Saint Lucia- November 2020 and January 2021.	
11	Fossil Fuel Subsidy Training The overall goal of the workshop was to present the structure and use the models that were used to perform analysis of the fossil fuel subsidy/taxation scenarios in Saint Lucia during the Climate Action Enhanced Package (CAEP) project. The workshop aimed to equip participants with the skills and knowledge to access, modify and use the models for further analysis.	January 2021

	Additional Capacity Development/ Technical Assistance Received	Location and date
12	Three Officers were Trained in IPCC Guidelines for various sectors by the UNFCCC in an effort to build capacity in undertaking Greenhouse Gas Inventories. This training was conducted through the Greenhouse Gas Management Institute (GHGMI) during- Training began October 2020	October 2020
13	A variety of capacity building training have been conducted under the NAP process from 2017 to date. Some of these include, training in the development of Sectoral Adaptation Strategies and Action Plans (SASAPS) for Saint Lucia, Training for Creators (Artists and Performers) and Ministers,	2017 to-date
14	Under the "Increase Saint Lucia's Capacity to Monitor Multilateral Environmental Agreements Implementation and Sustainable Development" Project, data contributors and data curators were trained into how to efficiently utilize the NEIS and CDSF platforms for the upload of data and generation of reports. Additionally, Saint Lucia Solid Waste Management Authority, Water and Sewerage Company, Inc., Division of Forest and Land Resource Development, Piton Management Area and Department of Physical Planning received an advanced GIS training to assist in the upload of geospatial data into the NEIS.	2020
15	Training Workshop on the NDA Toolkit and Operational Guidelines for working with the Green Climate Fund. Outcome 1 of Saint Lucia's Readiness Programme is to have 'strengthened capacities within the National Designated Authority to facilitate efficient planning and administration of fund-related responsibilities.' Under this component of the Readiness Programme workshop was mandated to train NDA personnel and selected stakeholders including the Sustainable Development and Environment Division (SDED) and the National Climate Change Committee (NCCC), on the NDA Toolkit that outlines the operational guidelines that will guide the NDA's work with the Green Climate Fund (GCF).	May 2019
16	<p>Training Workshop on the NDA Toolkit and Operational Guidelines for working with the Green Climate Fund. Outcome 1 of Saint Lucia's Readiness Programme is to have 'strengthened capacities within the National Designated Authority to facilitate efficient planning and administration of fund-related responsibilities.' Under this component of the Readiness Programme workshop was mandated to train NDA personnel and selected stakeholders including the Sustainable Development and Environment Division (SDED) and the National Climate Change Committee (NCCC), on the NDA Toolkit that outlines the operational guidelines that will guide the NDA's work with the Green Climate Fund (GCF).</p> <p>The objective of the training workshop was to provide the NDA personnel, and other relevant stakeholders, with the knowledge and skills required to carry out their roles and responsibilities related to the GCF. The workshop provided participants with (a) information and (b) hands-on practical exercises with relevant tools, that participants are required to be familiar with, for the effective delivery of the main functions of the NDA.</p>	

	Additional Capacity Development/ Technical Assistance Received	Location and date
17	National Workshop for Enhancing the Climate Science Basis of the Climate Rationale in GCF Funded Activities. The national workshop produced the following outcomes: <ol style="list-style-type: none"> 1. Climate science basis provided for a National Adaptation Plan or a GCF project in the country context; 2. Feedback and lessons learned to inform GCF/WMO guidelines methods, data and support needed for further climate rationale preparation globally; 3. Expanded understanding and knowledge of climate rationale requirements and preparation within the region. 	
18	Training of fifteen (15) Automotive technicians in the operations of electric and hybrid vehicles supported by the Italian Government as part of the solar carport and electric vehicle charging station project.	Dec 2019
19	PV Training supported by the Taiwan Government. Under the Project Concept to Action, a total of 100kW of Solar PV Systems were installed on four government institutions each with 25kW systems. Maintenance staff and other staff at each facility were trained in basic understanding of PV system operations and maintenance.	2014-2018

5.6 FINANCIAL RESOURCES NEEDED AND RECEIVED BY KEY AGENCIES

5.6.1 Limitations Posed by Lack of Adequate Finance

The sectors most impacted by climate change in Saint Lucia are the natural resource sectors. However, it is noticeable that the size of the budget allocation received by natural resource management agencies in the period 2017/2018 to 2019/2020 was 4% or less. Additionally, the resource management agencies' programs, which require capital investments, are driven primarily by project funds which may not always fit into national development priorities, nor are they sufficient to meet national needs. This is further complicated because the resources allocated to sustain initiatives instituted under various projects beyond the project lifespan are usually limited. Therefore, the heavy reliance on project funds makes it difficult for mainstream national development priorities, including climate change related matters, into the work programs of these agencies. Further, the recurrent cost constitutes a large portion of their operational budget, especially personal emoluments. This makes it challenging to hire persons with the right skills and acquire the required resources to effectively execute their programs.

The competition for national resources is high, and the needs of various sectors are ever growing. However, national GDP growth has not kept pace. Natural resource management agencies, like all other departments, are facing the challenge of addressing climate change-related impacts, which is quite expensive and requires significant resources to address these challenges adequately. Natural

resource wealth can potentially contribute to development outcomes, but the agencies charged with their management are often plagued by severe resource constraints. This leads to less-than-optimal organisation functionality and performance. However, these agencies understand what is needed to create improvement and have shown a sustained commitment to addressing gaps by sourcing funding to achieve their mandate and reducing inefficiency, conflicts, dysfunctional institutions, poor governance, corruption and weak economic performance.

To assess the resources allocated to climate finance, financial analysis of the contribution from the national budget allocated to key sectors identified in the INC, SNC and TNC was undertaken, and the results of this analysis are presented in the table that follows.

Table 41 - Budget Allocations for Each Sector in the last 3 Fiscal Years

Agency Identified in the INC, TNC and TNC	2019/ 2020			2018/2019			2017/2018		
	Budget as a % of National Recurrent Budget	Budget as a % of Total National Capital Budget	Budget as a % of Total National Budget	Budget as a % of Total National Recurrent Budget	Budget as a % of National Capital Budget	Budget as a % of Total National Budget	Budget as a % of National Recurrent Budget	Budget as a % of National Capital Budget	Budget as a % of Total National Budget
Agriculture, Fisheries, Natural Resources and Cooperatives	2.24%	9.56%	3.38%	1.75%	9.43%	3.22%	1.81%	13.61%	4.64%
Infrastructure, Ports and Energy	3.16%	32.35%	7.68%	3.43%	18.00%	6.22%	3.63%	16.78%	6.77%
Tourism, Broadcasting & Information	3.73%	0.52%	3.23%	0.91%	11.25%	2.89%	1.24%	9.29%	3.16%
Physical Planning	0.75%	1.62%	0.89%	0.76%	4.89%	1.55%	0.75%	4.03%	1.53%
Housing, Urban Renewal & Telecommunications	0.21%	4.15%	0.82%	0.12%	6.30%	1.30%	0.13%	7.05%	1.78%
Education, Innovation & Gender Relations	13.86%	7.36%	12.85%	15.14%	0.86%	12.41%	15.62%	0.42%	11.98%
Health and Wellness	9.48%	3.93%	8.62%	9.44%	2.79%	8.17%	9.57%	5.15%	8.51%
DSD	1.12%	0.39%	1.00%	0.90%	1.70%	1.05%	0.92%	2.64%	1.33%
% of National Budget allocated to Selected Sectors	35%	60%	38.48%	32.46%	55.23%	36.82%	33.66%	58.96%	39.71%

The recurrent budget allocations for 2017/2018, 2018/2019 and 2019/2021 of the critical sectors identified in the SNC, TNC and the INC reveal that they receive 33%, 32% and 35% of the recurrent national expenditure, respectively. The total recurrent budget for these sectors ranged from a low of 387k in 2017/2018 to a high of 465k in 2019/2020. Concerning the Capital budget, the allocations to these sectors ranged from a low of 55.23% in 2018 - 2019 to a high of 60% in 2019 - 2020.

5.6.2 Support Received for the Preparation of the BUR

The Saint Lucia BUR was prepared with support primarily from the GEF Trust Fund to the tune of three hundred and fifty-two thousand United States dollars (US\$352,000). Also, the GOSL provided in-kind support of seventy-nine thousand four hundred US dollars. (US\$79,400). The funding was utilised to secure the services of consultants for document preparation and to strengthen the capacity of nationals to participate in the BUR preparation process.

Table 42 - Support Received for the Preparation of the BUR

Cost to the GEF Trust Fund	US\$ 352,000
Split as follows:	
a) BUR project proposal	US\$ 10,000
b) Preparation of the BUR to the UNFCCC	US\$ 342,000
In-kind contribution from the Executing Agency	US\$ 79,400
The total cost of the project:	US\$ 431,400

5.7 REQUIREMENTS TO OVERCOME CONSTRAINTS AND GAPS

According to the World Bank (2019), Saint Lucia places significant emphasis on creating an enabling environment for climate change response, strong government commitment, and high public awareness. The next critical 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 updating the Development Strategy and Coastal Zone Management Strategy and passage of the Climate Change Bill, Sustainable Building Code, and other core legislation. A National Adaptation Plan (NAP) supported by SASAPs for three key sectors (Agriculture, Fisheries and Water and the thematic area of Resilient Ecosystems (marine and terrestrial) has been developed. The Strategies and Action Plans include costed priority projects for inclusion in the pipeline for donor funding.

Given Saint Lucia's existing debt to GDP and the fact that it already allocates at least 2% of its GDP to disaster recovery, by merely maintaining current financing levels Saint Lucia would be allocating around 2% of GDP in future budgetary adaptation investment (WB 2019). The island recognises that more resources will be required to address climate change. As such, it has embarked on two possible

approaches to augment local funds: developing a private sector engagement strategy, including an investment promotion strategy, and getting access to grants from regional and international climate adaptation funds.

5.7.1 Country Capacity Development and Technology needs Priorities

In general, the capacity gaps which Saint Lucia experiences in relation to climate change can be categorised as technical, institutional, financial, regulatory and policy limitations. This means that the island must adopt a multi-prong approach to addressing these gaps. During the development of various strategy documents and in particular the NAP, several key priorities were identified as outlined in the following table. Engagement with various stakeholders both during national consultations and during one-on-one discussions also led to the identification of proposed measures to close these gaps.

Table 43 - Identified National Adaptation and Mitigation Priorities

Area	Priority Areas	Proposed Actions to Address Gaps	Technology Needs
Adaptation			
Cross-cutting priorities	<ul style="list-style-type: none"> ▪ Improved legal and regulatory framework to facilitate climate adaptation across sectors. ▪ Increased generation and use of climate information in national and sectoral decision-making. ▪ Increased capacities to design and implement climate adaptation projects across sectors. ▪ Strengthened national capacities for integrating climate adaptation considerations into national agendas, 	<ul style="list-style-type: none"> ▪ Increase generation and use of climate information in national and sectoral decision-making ▪ Improve access and use of climate, socioeconomic and environmental information relevant to adaptation. ▪ Generate climate, environmental and socioeconomic data and science-based information critical to adaptation across sectors. ▪ Enhance Research and Systematic Observation (RSO) in themes that are critical to climate change adaptation. ▪ Strengthen public communication and outreach efforts on adaptation. ▪ Increase capacities to design and implement climate adaptation projects across sectors. 	<ul style="list-style-type: none"> ▪ Improved climate data collection and analysis ▪ Remote communication systems

Area	Priority Areas	Proposed Actions to Address Gaps	Technology Needs
	<p>programmes, and projects.</p> <ul style="list-style-type: none"> ▪ Strengthened preparedness for climate variability and extremes at sectoral and national levels 	<ul style="list-style-type: none"> ▪ Strengthen institutional capacities to undertake results-based management. ▪ Strengthen institutional capacities to engage civil society and the private sector in adaptation efforts. ▪ Identify and utilise opportunities for climate change adaptation integration at the policy and action level. ▪ Strengthen skills required for adaptation integration at all levels of government. ▪ Strengthen coordination of adaptation planning and action. ▪ Strengthen preparedness for climate variability and extremes at the sectoral and national level. ▪ Increase national human capacity to assess and address climate-related vulnerability and risk. ▪ Increase funding for climate adaptation action. ▪ Increase national capacity to secure funding for adaptation 	
Water	<ul style="list-style-type: none"> ▪ Enhanced enabling environment and improved behaviour for water-related climate adaptation action. ▪ Increased water access, availability, and quality. 	<ul style="list-style-type: none"> ▪ Improve the national policy, legal and regulatory framework to facilitate climate adaptation in the water and water-dependent sectors. ▪ Scale-up national human capacity for the design and implementation of water-related climate adaptation projects. 	<ul style="list-style-type: none"> ▪ Improved water treatment systems ▪ Domestic rainwater harvesting systems ▪ Technology to reduce non-revenue losses (line loss) in water transmission ▪ Systems for riverbank and wetland restoration ▪ Improved wastewater treatment

Area	Priority Areas	Proposed Actions to Address Gaps	Technology Needs
	<ul style="list-style-type: none"> ▪ Increased water efficiency and conservation. ▪ Strengthened preparedness for climate variability and extremes. 	<ul style="list-style-type: none"> ▪ Increase public awareness of integrated water resource management outcomes. ▪ Strengthen Integrated Watershed Management to build climate resilience. ▪ Promote the sustainable use of alternative water sources to ensure water availability under a changing climate. ▪ Improve wastewater management to reduce pollution and increase water availability under a changing climate. ▪ Set and scale-up water quality and pollution control in a changing climate. ▪ Improve water infrastructure to build climate resilience. ▪ Encourage water efficiency under a changing climate by improving water pricing, water utility revenue and water conservation incentives. ▪ Promote climate-smart agriculture outcomes. ▪ Improve hydrometeorological monitoring, emergency planning and decision making ▪ Minimise water-related climate change risks by adopting ecosystem-based adaptation solutions. ▪ Promote climate-resilient business development. 	<ul style="list-style-type: none"> ▪ Improved hydrometeorological monitoring ▪ Alternative water sources systems ▪ Climate-smart agriculture systems
Agriculture	<ul style="list-style-type: none"> ▪ Enhanced enabling 	<ul style="list-style-type: none"> ▪ Improve the national legal, regulatory, and 	<ul style="list-style-type: none"> ▪ Improved access to climate-resilient varieties

Area	Priority Areas	Proposed Actions to Address Gaps	Technology Needs
	<p>environment for climate adaptation action in the agriculture sector.</p> <ul style="list-style-type: none"> ▪ Enhanced nutrition, food availability, quality, and security through adaptation in the agriculture sector. ▪ Strengthened partnerships for scaling up climate-resilient agriculture. ▪ Strengthened preparedness for climate variability. 	<p>institutional framework to facilitate climate adaptation in the agriculture sector.</p> <ul style="list-style-type: none"> ▪ Strengthen research and development in climate-resilient agriculture to improve access to climate-resilient varieties and local inputs (organic fertilizer and natural pesticides). ▪ Enhance human and institutional capacity for the design, implementation, monitoring and evaluation of agriculture-related climate adaptation projects. ▪ Promote climate-resilient crop production. ▪ Promote climate resilient livestock production. ▪ Strengthen resilience and ecosystem services through Integrated Sustainable Land and Watershed Management. ▪ Advance water supply side management by improving rainwater harvesting and water storage infrastructure. ▪ Scale-up water demand side management by improving water and soil conservation best practices. ▪ Promote sustainable wastewater management by reducing, reusing and recycling agro-waste resources. ▪ Forge a strong public-private partnership to scale 	<p>and local inputs (organic fertilizer and natural pesticides)</p> <ul style="list-style-type: none"> ▪ Climate- resilient crop production techniques ▪ Improved rainwater harvesting and storage ▪ Reducing, reusing, and recycling agro-waste resources. ▪ Improved agro-meteorological data monitoring systems

Area	Priority Areas	Proposed Actions to Address Gaps	Technology Needs
		<p>up climate-resilient agriculture best practices and businesses.</p> <ul style="list-style-type: none"> ▪ Leverage private sector resources by improving access to resilient financial and business supports and best practices for scaling up crop and livestock production. ▪ Improve agro-meteorological data monitoring, emergency planning and informed decision-making. ▪ Minimise agriculture-related climate change risks by adopting Ecosystem-based Adaptation solutions. ▪ Scale-up climate-resilient agricultural infrastructure to reduce climate risks. 	
Fisheries	<ul style="list-style-type: none"> ▪ Enhanced enabling environment for climate adaptation action in the fisheries sector. ▪ Enhanced nutrition, food availability, quality, and security through adaptation in the fisheries sector. ▪ Strengthened partnerships for building sustainable and resilient fisheries in a changing climate. ▪ Strengthened preparedness for 	<ul style="list-style-type: none"> ▪ Improve the national policy, legal, regulatory and institutional framework to facilitate climate adaptation in the fisheries sector. ▪ Enhance human and institutional capacities for the design, implementation, monitoring and evaluation of fisheries-related climate adaptation projects. ▪ Improve productivity through climate-resilient fisheries management systems. ▪ Promote climate resilient aquaculture production in response to a changing climate. 	<ul style="list-style-type: none"> ▪ climate-resilient fisheries management systems. ▪ climate resilient aquaculture production ▪ Scale-up climate-resilient fisheries infrastructure

Area	Priority Areas	Proposed Actions to Address Gaps	Technology Needs
	<p>climate variability and extremes in the fisheries sector.</p>	<ul style="list-style-type: none"> ▪ Promote alternative livelihoods creation and development to strengthen climate resilience in fishery-dependent businesses. ▪ Improve access to financial and business support for leveraging private sector investment into the fisheries sector. ▪ Strengthen climate monitoring and communication for emergency planning and informed decision making. ▪ Scale-up climate-resilient fisheries infrastructure to reduce climate risks. 	
<p>Infrastructure and spatial planning</p>	<ul style="list-style-type: none"> ▪ Enhanced enabling environment for climate adaptation action in infrastructure and spatial planning. ▪ Strengthened infrastructure to withstand climate impacts. ▪ Enhanced infrastructure-based climate adaptation. ▪ Strengthened preparedness for climate variability and extremes. 	<ul style="list-style-type: none"> ▪ Accelerate policy, legislative and regulatory processes indispensable for adaptation planning and implementation. ▪ Retrofit existing infrastructure to strengthen resilience and build new climate-resilient infrastructure. ▪ Promote infrastructural upgrades for climate adaptation. ▪ Enhance port operations and safety under a changing climate. ▪ Increase emergency response capacity. ▪ Increase national capacity to assess and address climate-related vulnerability and risk. 	<ul style="list-style-type: none"> ▪ Retrofit existing infrastructure to strengthen resilience and build new climate-resilient infrastructure

Area	Priority Areas	Proposed Actions to Address Gaps	Technology Needs
Natural Resource Management / Resilient Ecosystems	<ul style="list-style-type: none"> ▪ Enhanced enabling environment for ecosystem-based adaptation and natural resource management under a changing climate. ▪ Increased ecosystem quality and coverage ▪ Strengthened ecosystem-based adaptation 	<ul style="list-style-type: none"> ▪ Improve the national legal and regulatory framework to facilitate natural resource management and ecosystem-based adaptation under a changing climate. ▪ Increase coverage of sustainably managed and protected ecosystems. ▪ Reduce the impact of ecosystem degradation factors. ▪ Enhance ecosystem services to reduce climate risks. 	<ul style="list-style-type: none"> ▪ Improved GIS systems
Education	<ul style="list-style-type: none"> ▪ Enhanced environment for climate adaptation education. ▪ Improved and expanded climate change education as the basis for effective adaptation. ▪ Professional capacities built for leading future climate adaptation planning implementation. ▪ Strengthened preparedness for climate variability and extremes. 	<ul style="list-style-type: none"> ▪ Facilitate climate adaptation learning. ▪ Facilitate climate change teaching. ▪ Increase public awareness on climate change and adaptation options. ▪ Build in-country specialised professional capacities for climate change adaptation planning and implementation. ▪ Improve infrastructure for education continuity under a changing climate. 	<ul style="list-style-type: none"> ▪ Infrastructure for education continuity under a changing climate ▪ Climate Change teaching technical assistance
Health	<ul style="list-style-type: none"> ▪ Enhanced enabling environment for health-related climate adaptation action. ▪ Improved public health under a changing climate. 	<ul style="list-style-type: none"> ▪ Improve the national legal and regulatory framework to facilitate adaptation in the health sector. ▪ Generate climate, environmental and socioeconomic data and science-based information 	<ul style="list-style-type: none"> ▪ Technology to generate climate, environmental and socioeconomic data ▪ Technology to reduce the risk of climate-sensitive vector-borne disease outbreaks and improve outbreak management

Area	Priority Areas	Proposed Actions to Address Gaps	Technology Needs
	<ul style="list-style-type: none"> ▪ Strengthened preparedness for climate variability and extremes. 	<p>critical to adaptation in the health sector.</p> <ul style="list-style-type: none"> ▪ Reduce the risk of climate-sensitive vector-borne disease outbreaks and improve outbreak management. ▪ Reduce health risks during heatwaves. ▪ Improve health surveillance systems. ▪ Improve health care and information for vulnerable groups. ▪ Strengthen health system emergency planning and response. 	<ul style="list-style-type: none"> ▪ Technology to reduce health risks during heat waves ▪ Technology to improve health surveillance ▪ Technology to strengthen health system emergency planning and response
Tourism	<ul style="list-style-type: none"> ▪ Viable and productive tourism sector through direct interventions and collaborations and synergies with all other sectors 	<ul style="list-style-type: none"> ▪ Improve recommended guidelines to tourism operators to more effectively address climate change ▪ Use more energy-efficient cooling systems as well as proper maintenance. ▪ Develop public awareness programmes for tourists; develop pilot projects to encourage the participation of tourists (in reducing carbon emissions while supporting climate change adaptation). ▪ Put in place new attractions and implement alternative tours (to adapt to changing environmental conditions) and develop alternative underwater attractions to reduce threats on reef systems. ▪ Develop a programme that will determine the impacts of coastal hotel 	<ul style="list-style-type: none"> ▪ Energy efficient cooling systems ▪ Technology to improve public awareness programmes for tourists in reducing carbon emissions ▪ Technology to develop alternative underwater attractions to reduce threats on reef systems. ▪ Technology to assess impacts of coastal hotel development.

Area	Priority Areas	Proposed Actions to Address Gaps	Technology Needs
		development along the coastline in Saint Lucia.	
Mitigation			
Energy Efficiency	<ul style="list-style-type: none"> ▪ Greater use of energy-efficient appliances ▪ Improved energy efficiency in the public sector: 20% reduction in energy use in public buildings by 2020 ▪ Improved energy efficiency in schools 	<ul style="list-style-type: none"> • Improve human capacity for energy audits, conservation, and management 	<ul style="list-style-type: none"> • Technology to undertake energy audits • Energy Efficient equipment • Data collection and monitoring systems
Electricity Generation	<ul style="list-style-type: none"> ▪ Achievement of 35% Renewable Energy in electricity by 2025; 50% by 2030 ▪ Improvements to Grid Distribution and Transmission Efficiency ▪ Increased Geothermal Energy development. 	<ul style="list-style-type: none"> ▪ Decentralise financing for distributed renewable energy development ▪ Distribute renewable energy in health centres, schools, and other areas that act as disaster shelters ▪ Enforce of Electricity Act and legislation 	<ul style="list-style-type: none"> ▪ Renewable energy technologies ▪ Exchange of knowledge for electricity legislation ▪ Technology transfer to stakeholders ▪
Transport	<ul style="list-style-type: none"> ▪ Increased use of efficient vehicles and electric vehicles ▪ Improved and Expanded Public Transit 	<ul style="list-style-type: none"> ▪ Improve public understanding and acceptance of electric vehicles. ▪ Improve infrastructure and service capacity for electric vehicles. ▪ Create enabling environment for EV- uptake 	<ul style="list-style-type: none"> ▪ Improved infrastructure and service capacity for electric vehicles ▪ Improved public transport systems ▪ Technology needs for creating an enabling environment for EV-uptake

According to the 2018-2028 NAP it is anticipated that the adaptation measures presented will be implemented or initiated during the 2018-2028 period, according to their degree of urgency. However, it is also clear that their implementation will depend on funding, policy and other opportunities presented during this time. The island is committed to seizing opportunities for implementation as they arise, cross-sectoral or sectoral. In this regard, the island has developed a portfolio of project concept notes to increase its readiness to access funds. Project concept note development is ongoing and is reflective of the prioritized measures. Some of these concepts have been combined to develop funding concept notes or proposals, e.g., to the Adaptation Fund and GCF.

5.7.2 Capacity Building Needs for Saint Lucia's NAP Implementation

Saint Lucia undertook a NAP exercise from 2017 through to 2018. During the cross-sectoral, multi-stakeholder consultation participants were asked to identify the capacity gaps and weaknesses which were likely to impact the island's ability to address climate change. While financial constraints were identified by most of the participants, several of them also noted that a deficit of key skill and capacity gaps were of continuing concern. Among the skills deficit and capacity gaps identified were the following:

- 1) Communications and reporting skills (at the policy, coordination and operational levels of all four groups).
- 2) Results-based management skills (Planning for outcomes; monitoring and evaluation skills)
- 3) Project management skills (Project development; cross-cutting management)
- 4) Coordination skills
- 5) Climate change education (cc education, training and awareness; training content design and delivery; national curriculum design)
- 6) Climate change integration and implementation (cc integration and implementing; policies; sector-wide approach skills; national budget process)
- 7) Climate risk assessment (Application of V&A approaches and tools; environmental assessment skills; climate change proofing)
- 8) Visioning, creating and inspiring
- 9) Human resource management
- 10) Strategic leadership
- 11) IT, GIS, and data management (IT, GIS and data integration; ICT and data management skills; software skills; GIS skills; Geo-referencing skills)
- 12) Listening and interpretation
- 13) Cooperation

In addition to identifying these skills deficit and capacity gaps, several measures and initiatives were recommended to have these gaps closed. These include:

- 1) Facilitate a series of short seminars on strategic climate change leadership for Ministers and Permanent Secretaries. The seminars' content and agenda should be designed such that international/regional case studies of effective adaptation activities - applicable to Saint Lucia - will be incorporated. It is believed that this intervention should take place on a rolling basis to address personnel changes. It should also include presentations on how to build and use those skills.
- 2) Organise a regional NAP workshop for policymakers in Saint Lucia. This activity could help raise awareness of the process and increase high-level ownership and leadership for adaptation in the country. The workshop objectives should include:
 - Improving the understanding of the NAP process;
 - Taking stock of the existing guidance, tools and methods relevant to the NAPs to assist countries to develop roadmaps/ strategies for their NAPs;
 - Taking stock of what countries are doing on advancing their respective NAP processes and exchange lessons learnt and experiences;
 - Exchanging information on the mechanisms and options for supporting NAPs
- 3) Initiate training for Heads of Department, and Middle managers on integrating climate change adaptation into policy, programmes, and projects. It is recommended that a request be made for the GCCA-CSF to tailor a 2-day training workshop for Heads of Department, Middle Managers and Team Leaders, and that this training include elements of the following modules.
 - Basic climate change science
 - Climate change and development linkages
 - Why and how to integrate adaptation into policy
 - Costing, assessing, and financing adaptation measures
 - How to increase institutional capacity for adaptation integration
- 4) Establish a series of peer-exchange short workshops for Heads of Department, Middle Managers and Team Leaders on results-based management, to be followed by experience and knowledge sharing activities. The workshops are proposed to improve the individual and institutional capacities required for managing adaptation programs/projects, strengthening/establishing cooperation and relationships and learning from others' best management practices. The workshops will also offer an environment for seeking solutions to common problems, discussion, and agreement on joint support to cross-sectoral adaptation measures. These workshops should, therefore, seek to increase the participants' engagement

and ownership of the NAP process. These half-a-day workshops could take place on a rolling basis (twice per year).

- 5) Provide training on Integrated Climate Risk Management and tools for Heads of Department, Middle Managers, Team Leaders and Technical Officers. This training should cover at least the following topics:
 - a. basic climate change science;
 - b. climate change modelling approaches;
 - c. risk, vulnerability and resilience concepts and measures;
 - d. tools and resources available to assess vulnerability and risk, screen climate risks in projects and activities and establish acceptable risk thresholds;
 - e. Risk management options. This training should be delivered at least twice during the NAP cycle and include some hands-on exercises. It should be targeted at technical officers.

The training should be wider in scope and thus longer in duration (3.5 days). It should include elements from all their modules, tailored to Saint Lucia's government context and focus on technical aspects such as:

- Costing, assessing and selecting adaptation measures
 - Integrating climate change adaptation in the budgetary process
 - Integrating climate change adaptation in monitoring systems
 - Integrating climate change adaptation within the project cycle
 - Enhancement of communities' participation in adaptation
- 6) Convene workshop on results-based management of climate adaptation projects. This training should target Heads of Department, Line Managers, Team Leaders and Technical Officers engaged in climate change adaptation initiatives (all Ministries and Departments). It should include modules on project design, budgeting, monitoring and evaluation, reporting and communicating results and resource mobilization. It should also include a module on organizational skills (including planning, scheduling, deadline setting and time management). Provided that funding is available, a Training of Trainers (ToT) course for local consultants to deliver this training as opportunities arise along the course of the NAP 10-year cycle, could be considered.
 - 7) Provide hands-on training on climate finance for adaptation projects. This training should target technical officers at all Ministries and Departments and its content should encompass an overview of the international climate finance landscape and identification of potential climate finance sources and mechanisms accessible to Saint Lucia's government and hands-

on activities and guidance for building a climate adaptation proposal (log frame and concept note) for submission to a funding source. As the demand for community mobilisation for adaptation action will increase as the NAP process develops, it is suggested that in-country facilitation capacities are built by a Trainer of Trainers (ToT). This will enable Technical Officers and NGO representatives to train community leaders on a project basis as required.

CHAPTER 6: OTHER RELEVANT INFORMATION

6.1 AWARENESS AND EDUCATION

6.1.1 Awareness and Response to Climate Change in Saint Lucia

Several Knowledge, Attitudes and Practices (KAP) studies have been conducted over the past several years in Saint Lucia to determine the level of public awareness of and response to climate change at a national level. Most recently, a KAP study conducted on behalf of the OECS by Kairi Consultants Limited indicates that 99.8% of persons were familiar with the term “climate change” and that 84.6% of respondents had a general awareness of the meaning of this term. Of these respondents, 77.5% thought that climate change was a very serious problem (KAIRI 2019). Additionally, most persons stated that they had indeed observed changes in the weather over the past decade. Other trends in public perception that were noted include that of women and older persons, that women and older person feel less educated than men and younger persons about the effects of climate change and possible mitigation measures that can be taken. The level of self-perceived knowledge also increased with the level of education. Among the respondents, the general feeling was that persons needed more information on the causes and impacts of climate change and possible mitigation and adaptation measures to reduce these impacts. Most also had the view that tackling climate change was the responsibility of the Government of Saint Lucia (GOSL 2017).

6.1.1.1 Public Participation in climate change activities

The institutional framework for public participation in climate change activities is outlined in the National Adaptation Plan (NAP) and the Climate Change Communications Strategy, which forms a part of the NAP. This Strategy outlines the various stakeholders who need to be engaged. They include high-level political authorities, and technical, policy and budgetary officials within government ministries and agencies. The Strategy highlights changes in knowledge, options, and behaviour that the Government of Saint Lucia is seeking to review, and how different government agencies share communications-related responsibilities. The Communications Strategy focuses on internal audiences inclusive of the political leadership, officers within ministries and agency officers, and external audiences that include NGOs, members of the media, technical experts, small and medium enterprises, and persons involved in sports, entertainment and the creative arts. All these stakeholders, it is believed, have a role to play in increasing the level of awareness among the public. Additionally, public engagement on the issue of climate change is being encouraged through The Ministry of Education, Innovation, Gender Relations, and Sustainable Development's Decade of Research and Innovation (2019-2029). This initiative aims to engage key stakeholders within the public and private sectors under the theme “Unleashing our Creativity, Crafting Our Destiny.” Public

engagement is also being pursued through the National Climate Change Committee, (NCCC). In the past, this Committee has guided and participated in various initiatives undertaken by ministries and organisations to promote education, training, and awareness campaigns targeted at the general population to sensitise them to climate change's adverse impacts.

6.1.1.2 Public Outreach, education, and training initiatives

There have been several initiatives undertaken by the GOSL to provide education and training and promote public awareness on the issue of climate change on a national level. Under Saint Lucia's Climate Change Communications Strategy, educational products including television and radio broadcasts, public outreach initiatives, and the use of creative arts and other media are shared publicly to increase public awareness of climate change. There has also been considerable work done to promote Public Education and Awareness under the Disaster Vulnerability Reduction Project (DVRP), a collaboration between the World Bank and the GOSL. Under the DVRP, a Public Education and Awareness Strategy was developed, which will span the project's lifetime. This Strategy will be executed through a Public Awareness Campaign headed by the Department of Sustainable Development.

As part of the Climate Change Communications Strategy, the GOSL has developed a website called Climate Change in Saint Lucia which will be used to inform members of the public both nationally and internationally of the latest news, events and key policy documents related to climate change mitigation and adaptation, including actions being carried out under the NAP process. The website contains summaries of the NAP and Sectoral Adaptation Strategies and Action Plans (SASAPs) as well as multimedia content including music and animated videos, news articles and technical documents. The site is maintained by DSD personnel who have been trained in webpage management and updating content. (Ledwell 2018)

Another example of a public outreach initiative is the NAP facilitation team's hosting of a special training session in March 2018 for persons involved in the creative arts. This session, which was conducted following the NAP launch in 2018, was intended to create a dialogue on how persons in these industries can help build public awareness about the country's efforts to adapt to climate change by stimulating public interest around adaptation action. Media personnel and technical officers were also trained. Additionally, the "ACT (Adapt, Change behaviour, Take action) Now Saint Lucia" campaign also took place in 2018 with the support of the UNDP in collaboration with the Government of Japan through the Japan-Caribbean Climate Change Partnership (J-CCCP) and the GOSL. This campaign called on citizens to take personal responsibility for reducing their vulnerability to climate change impacts by taking mitigation actions at an individual, family and community level. By taking a participatory approach and aligning with influential groups such as calypsonians and

schools, the program sought to engage the public and promote action and awareness. This goal was executed by producing a calypso song and an accompanying music video on climate change that was broadcast to the public (UNDP 2018).

A social media campaign and challenge was also held in partnership with the Caribbean Youth Environmental Network (CYEN) and the Sir Arthur Lewis Community College of Digital Media to engage tertiary students and young adults (UNDP 2018). The CYEN is a non-profit organisation which aims to improve the quality of life of Caribbean young people by facilitating their personal development and full involvement in all matters pertaining to the environment and sustainable development. The organisation has chapters across 15 Caribbean countries, including Saint Lucia. The CYEN is represented on the Saint Lucia National Climate Change Council and the Saint Lucia National Conservation Fund Board and have participated in local and international activities such as Saint Lucia's 1.5 to Stay Alive campaign, UNFCCC 8th Dialogue on Action for Climate Empowerment (ACE) and Earth Hour, which is observed worldwide every March. By participating in these events, not only is CYEN membership benefiting from the valuable climate change adaptation information shared but obtaining the tools which are then applied in their continuing effort to inform other youths in the respective countries.

Social media has been a critical tool utilised by the GOSL to promote greater public education and awareness under the goal of "Increasing St. Lucia's Capacity to Monitor Multilateral Environmental Agreement (MEA) Implementation and Sustainable Development". In the era of technology, the establishment of social media accounts used to share information with the public is critical, as many persons use these platforms daily. An example of social media's successful promotion of public education and awareness is the Sustaining Saint Lucia 411 Facebook page, managed by the Department of Sustainable Development. This page is used to broadcast various initiatives being undertaken by the DSD using informational videos, webinars and seminars on various topics relating to climate change.

The Facebook platform was also used to host a video series titled "Saint Lucia: Into the Future", an audio-video feature produced and shared via social media to demonstrate the use of the NEIS for scenario development and communication of environmental trends (inclusive of climate change) and projections at the national and sub-national level.

6.1.2 Scientific Research and Observation

The Government of Saint Lucia defines scientific research as all studies that follow the Scientific Method to answer well-defined questions. The answers to these questions are invaluable in planning

climate change adaptation and mitigation strategies and monitoring their effectiveness. Several agencies are involved in scientific research and observation in Saint Lucia. They include the Ministry of Planning, the Meteorological Services Department, Water Resources Management Agency, Department of Forestry, Department of Fisheries and the Department of Sustainable Development. To detect and quantify climate change effects, long term meteorological and hydrological data and observations must be recorded and analysed. However, like other Small Island Developing States (SIDS) in the Caribbean, Saint Lucia has faced a challenge in obtaining and using data and peer-reviewed research into climate change.

The Department of Economic Development, Transport and Civil Aviation (DEDTCA) manages the preparation, appraisal and approval of all capital projects in Saint Lucia, regardless of funding source or procurement type. To ensure that such projects are climate resilient, DEDTCA is currently utilising the Caribbean Climate Online Risk and Adaptation Tool (CCORAL), developed by the CCCCC. This tool enables users to assess any project's climate sensitivity across several indicators and identify areas where climate resilience should be considered in project design.

6.1.2.1 Measures to Improve National Programmes

To draw awareness to the importance of scientific research and establish a national programme for research and systematic observation in Saint Lucia, the Saint Lucia Climate Change Research Policy 2020-2030 and the Saint Lucia Climate Change Research Strategy 2020-2030 were developed to support the NAP. The National Climate Change Research Policy addresses the urgent need for all sectors of the Government and society in Saint Lucia to promote the generation, access to and use of science-based information. This is intended to facilitate identifying, implementing, monitoring and evaluating effective and meaningful climate actions, including mitigation, adaptation, and addressing property loss and damage.

The National Climate Change Research Strategy's goal is to enhance the availability and use of climate change-relevant information in national decision-making by informing the design and execution of climate change-related scientific research initiatives in Saint Lucia. The strategy emphasises identifying the existing gaps in critical data and knowledge that the country urgently needs to address and execute its climate change agenda. Both the Policy and Strategy and the Decade of Research and Innovation, which was launched by the Ministry of Education, Innovation, Gender Relations and Sustainable Development in 2019, are integrated into the framework of the CCAP.

6.1.2.2 Challenges, Gaps, Needs and Priorities

One of the many challenges faced by agencies engaged in climate change research is the need for greater numbers of trained personnel who can effectively carry out the necessary research and

undertake projects that will provide data for policymakers to drive evidence-based decision making. This lack of personnel has led to a frequent need for external consultants to be engaged on various projects since local staff are usually spread between multiple projects and agency programmes. This means that projects undertaken by these agencies and units usually compete for staff members' resources and time.

This lack of human capabilities leads to trickle down effects which cause other gaps to appear in the climate change adaptation and mitigation process, such as a lack of data collection, poor data sharing and delayed reporting to regional and international entities. Improving the human and technical capacity of the various research and observation agencies is, therefore, a top priority to ensure that climate change adaptation and mitigation strategies are successfully implemented and monitored for effectiveness.

Some specific recommendations aimed at improving research and systematic observation in Saint Lucia include:

- Improving the technical and human resource capacities of agencies involved in research and observation of climate-related events such as the Meteorological Services Department, Water Resources Management Agency, Department of Forestry, Department of Fisheries and several others to enable more projects to be successfully and efficiently carried out and to improve the overall work programmes of the relevant agencies.
- Improve data collection, management and sharing of climate-related data between local agencies as well as internationally.
- Provide additional equipment and train staff in the maintenance of existing equipment to ensure proper functionality.

These improvements can be achieved through various means such as partnerships with regional and international bodies that provide resources and funding, and better integration of climate change into educational programmes that align with institutions that offer adequately trained professionals.

6.1.2.3 Opportunities for Improving Climate Change Research and Systematic Observation

The National Climate Change Research Strategy's stated goal is to enhance the availability and use of climate change-relevant information in national decision-making. This strategy also aims to promote Research Collaboration Agreements with research partners who may be interested in conducting studies and scientific investigations which address topics and questions relevant to building climate resilience in the country

Research is also supported and encouraged through several regional and international funding initiatives and project grants including the United Nations Education and Scientific Organisation (UNESCO), the Green Climate Fund (GCF) and the Global Environmental Facility (GEF). An example of

this is a UNESCO funded project titled “Strengthening the Institutional Framework for the Promotion of Science and Technology in Saint Lucia”. The project is aimed at transforming and strengthening the current legislative and institutional landscape of Saint Lucia concerning Science and Technology and received funding of US\$20,000. Under this project, several activities are planned, including analysis into the Perception of Science in Secondary Schools and a Science and a Technology Mascot Competition. (Department of Sustainable Development, 2020).

The following initiatives are also aimed at improving Climate Change Research and Systematic Observation in Saint Lucia:

1. Launch of the Decade of Research and Innovation in 2019
2. The establishment of the Vaughn Arthur Lewis Institute for Research and Innovation (VALIRI)
3. The development of the National Science, Technology and Innovation Policy in collaboration with the National Competitiveness and Productivity Council (NCPC). An output document from the National Competitiveness Agenda for Saint Lucia is also expected to be produced.

6.1.3 Livelihood Protection and Vulnerable Populations

It is generally agreed that vulnerable groups in society such as the homeless, low-income households, women and children are most susceptible to the effects of climate change. This is because they often lack the adaptive capacity to deal with fluctuations in climate and weather patterns, leading to extreme weather events. Such persons usually have low-income levels from a single source. This makes adaptation and mitigation strategies challenging to achieve, as additional adaptation and mitigation measures are often costly and put further strain on already scarce resources.

Additionally, income sources for vulnerable populations also tend to be adversely impacted by climate change. An example of this can be found in the agricultural and fishing industries where alterations in the normal weather patterns may cause destruction of crops or an inability to work because of adverse weather conditions. These constraints, therefore, negatively impact the income of a household. It is often very difficult for persons in this group to recover from these shocks, driving them further into poverty and further reducing their resilience to adverse climatic impacts.

To help address this issue, Saint Lucia adopted a National Social Protection Policy in 2015. The policy aims to guide the various programmes of the country's social safety net to ensure that the delivery of Social Protection initiatives in Saint Lucia considers “green, economic, and other social and legal considerations”. It also seeks to ensure that efforts at improving human well-being should be “considered within a broader national effort for transitioning to a green economy” (Government of Saint Lucia, 2015b).

Another significant stride in addressing vulnerable populations is the GOSL's ratification of the Regional Agreement on Access to Information, Public Participation and Justice in Latin America and the Caribbean, better known as the "Escazú Agreement". This Agreement was adopted in Escazú, Costa Rica on March 4, 2018, and ratified by the GOSL in 2020 after two years of public consultations. The Agreement requires each participating state to guarantee every person's right to live in a healthy environment and sustainable development while being guided by the principles of equality, non-discrimination, intergenerational equity, and the balancing of economic, social and environmental concerns. The Agreement also seeks to strengthen environmental governance through community engagement in environmental stewardship, generation of and access to environmental information and the prevention and remedy of environmental harm. The ratification of the Agreement signals the GOSL's commitment to sustainable development, human rights and environmental justice for all (Department of Sustainable Development, 2020).

Additionally, as an OECS state, Saint Lucia is also a party to the OECS Strategic Plan 2020-2030: Human Mobility in the Context of Climate Change. This Plan, developed in 2020, recognises that SIDS are on the front lines of climate change due to their high vulnerability and exposure to climate hazards and aims to address the issue of human mobility in the context of climate change in OECS member states by strengthening institutional frameworks both on a national and regional level. The Plan identifies strategic areas to be addressed by member states in the period 2020. It focuses on strengthening the management of climate-induced human mobility in the OECS region through national, regional and international initiatives (OECS 2020).

There have also been several other projects that have sought to increase the resilience of vulnerable groups when faced with climate change's negative effects. One such project is the Disaster Vulnerability Reduction Project (DVRP) funded by the World Bank. This project seeks to reduce urgent disaster vulnerability and increase long term climate resilience in Saint Lucia and is carried out in five phases. The first phase addresses risk reduction and adaptation measures to support structural and non-structural flood and landslide risk reduction interventions. It also supports climate adaptation measures to improve Saint Lucia's resilience against current and future climate shocks. The second phase involves providing technical assistance to generate improved assessments and ensure proper application of disaster and climate risk information in decision-making. Under this component, open systems and platforms would create, share, analyse, and use disaster risk and climate change data and information for improved decision making. The third phase is a climate adaptation financing facility, designed as a pilot financing mechanism, to promote increased climate resilience. The fourth phase is an emergency response component. This would support emergency recovery and reconstruction subprojects under an agreed action plan to improve Saint Lucia's ability to respond to an emergency.

The final phase deals with management and implementation and supports the strengthening of institutional capacity for project management and implementation activities. The project, which began in 2014, is expected to end in December 2021 at a total project cost of US\$68M (The World Bank Group, 2020).

Notwithstanding the acknowledgement that vulnerable populations can be most impacted by the effects of climate change, in most circumstances, there are limited resources available to vulnerable persons to help increase their resilience in the face of a changing climate system. However, they are not altogether absent in Saint Lucia. One such resource is the Livelihood Protection Policy (LPP) which is available through various financial institutions. This Policy offers insurance to individuals and is designed to help protect the livelihoods of vulnerable low-income individuals by providing swift un-bureaucratic cash payments following extreme weather events such as heavy rainfall, flooding and high wind. This support is intended to reduce poverty and vulnerability by enabling these groups to recover quickly following a disaster (EC Global 2012). Under this Policy, small farmers and other individuals in Saint Lucia benefited from quick insurance pay-outs on their LPPs in the wake of Tropical Cyclone Matthew; thirty-one individuals received payments totalling US\$102,000. This micro-insurance product was developed under the Climate Risk Adaptation and Insurance in the Caribbean Project and implemented by the Munich Climate Insurance Initiative (MCII) in collaboration with CCRIF, MicroEnsure and Munich Re (CARICOM 2016). This programme has been met with limited success since the operational model often causes farmer disenchantment leading to a reluctance to pay premiums after a few years of disaster avoidance (Ministry of Agriculture 2017).

6.1.3.1 Gender Considerations

Gender plays a role in the economic dynamics of vulnerable groups, and gender inequalities are often further heightened by climate-related hazards. These impacts can include higher workloads, increased occupational hazards, psychological and emotional distress and mortality in climate-related disasters. Article 7, paragraph 5 of the Paris Agreement indicates that Parties acknowledge that “adaptation action should follow a country-driven, gender-responsive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems” (UNFCCC 2020). As part of its move to include more gender considerations in national initiatives, the GOSL has ensured that gender issues are addressed in the NAP and the SASAPs for various sectors. This signals the GOSL's commitment to closing its gender divide and narrowing gender disparities at the policy level. This commitment is also clearly seen through the prominent roles of women in the national decision-making process. Saint Lucia's Gender Relations Department is developing the national gender equality policy and strategic plan, which includes environmental sustainability with focus on climate change as

a thematic priority. The thematic priorities are geared toward capacity development, institutional strengthening institutional architecture and greater accountability

Additionally, the GOSL in collaboration with the UNDP is implementing the “Enabling Gender-Responsive Disaster Recovery, Climate and Environmental Resilience in the Caribbean (EnGenDER)” Project in partnership with UN Women and the World Food Programme. The project, which will take place from 2019-2022, aims to integrate gender equality and human rights into climate change and disaster risk reduction actions across nine countries, including Saint Lucia. EnGenDER will provide the financial and technical support needed by the Government of Saint Lucia to facilitate the development and implementation of gender budgeted project proposals initially outlined under the sector-specific SASAPs, as well as to provide support to the GOSL to leverage additional climate financing under the Green Climate Fund (GCF) to support gender assessments for the Health, Energy, Resilient Ecosystems, Tourism, Education, Infrastructure and Spatial Planning Sectors (Joseph and Pierre-Nathaniel 2020). To facilitate the successful implementation of this project, The Caribbean Natural Resources Institute (CANARI) has been contracted by UNDP to provide technical assistance in undertaking a baseline gender-based climate resilience analysis for priority sectors identified in Saint Lucia and other participating countries. It is expected that the data generated from this assessment will be used to inform national plans and policies better to ensure that gender inequalities are taken into consideration and that these inequalities are alleviated (CANARI 2020).

6.1.3.2 Capacity Limitations

Addressing vulnerable populations' concerns has often proven difficult, due many impediments, such as human resource constraints and a limited capacity to recover after extreme weather events. With many initiatives vying for limited resources, care must be taken to ensure that vulnerable populations are not left behind entirely when planning for and implementing climate adaptation measures. This can be done through improvements in private and public sector engagement, increasing the human and technical capacity of involved agencies, education campaigns targeted at vulnerable communities and persons and initiatives to make climate adaptation information and solutions more accessible to the broader community.

6.1.4 Adequacy of Technical Personnel Involved in Climate Change Planning and Adaptation

Human capacity is an area where resources often tend to be severely constrained, particularly in climate change planning and implementation. In Saint Lucia there are human resource constraints that hamper planning and execution of climate change adaptation and mitigation strategies. There are trained personnel in many instances, but they are often not placed in positions to effectively apply their knowledge. In some other cases, where there are several ongoing projects, and where local staff

are already burdened with various related tasks, they cannot provide the undivided attention needed to ensure the project's successful implementation.

There is an urgent need to build and retain the human capacity and technical expertise in climate change at the local level. Currently, the public service structure, in terms of reasonable compensation and timely promotion of qualified persons, is not attractive. A few local experts are lost as a result. By providing routine training to persons currently employed within the relevant departments, staff can expand their knowledge base and keep up to date with current information and issues. By building this technical capacity, the need for external consultants can also be reduced as the required expertise and skills will be available locally.

6.1.5 Capacity Building Activities, Options and Priorities

The overall objective of capacity building activities is to enable government staff members and stakeholders across all sectors to acquire the necessary skills needed to carry out and support the undertaking of most tasks relating to climate change planning, mitigation, adaptation and implementation. This minimises the need for external consultants to work on projects. Capacity building is also essential at the community and individual levels, since creating better adaptive capacity on an individual and community scale leads to improvements in the nation's overall resilience. Currently, there is an urgent need for capacity building at both institutional and personal levels. To address this need, several projects have been undertaken by the Government of Saint Lucia to increase capacity in various areas.

Saint Lucia's National Adaptation Plan Roadmap and Capacity Development Plan 2018-2028 outlines the individual skills, institutional capacities and functions which need to be prioritised and strengthened to ensure successful implementation of the NAP. The area given the greatest priority, according to the Plan, is communication and reporting skills. Some of the other areas identified as weakest include project management, coordination, education and awareness, and human resource management. (See Chapter 5 for further information on capacity development needs)

Most climate change projects typically include a capacity-building component within the overall project structure and goals, while others focus, specifically on this aspect. One such project is entitled "Building Capacity in the Public Sector to Facilitate Evidenced-Based Decision Making Towards the Reduction of Climate Change and Environmental Risks". The project, began in 2014, was funded by the Caribbean Development Bank (CDB) and designed to provide policymakers with the necessary information to enable the mainstreaming of climate change into development planning at a national level. It also facilitated Vulnerability Capacity Assessment (VCA) and Climate Change training and

enabled national reporting under the United Nations Framework Convention on Climate Change (UNFCCC).

REFERENCES

1. Bunker, K. D. (2017). Saint Lucia National Energy Transition Strategy. Rocky Mountain Institute.
2. Callum M. Roberts, Nola L.H. Barker, Alice J. Clarke, Fiona R. Gell, Julie P. Hawkins, Maggy M. Nugues and Chris K. Schelten. Impact and amelioration of sediment pollution on coral reefs of St. Lucia, West Indies
3. Caribbean Community Climate Change Centre (5Cs) and Government of Saint Lucia. (2015). Impact Assessment and National Adaptation Strategy and Action Plan to Address Climate Change in the Tourism Sector of Saint Lucia (Vol I and II). European Union Global.
4. Department of Sustainable Development. (2020) "Saint Lucia Moves to Ratify the Escazú Agreement." Saint Lucia - Access Government, December 4, 2020. <http://www.govt.lc/news/saint-lucia-moves-to-ratify-the-escaz-agreement>.
5. Department of Sustainable Development. (2020) "Saint Lucia to Strengthen Science and Technology Landscape." Saint Lucia - Access Government, December 10, 2020. <http://www.govt.lc/news/saint-lucia-to-strengthen-science-and-technology-landscape>
6. Laretta Burke, Suzie Greenhalgh, Daniel Prager and Emily Cooper Final Report - June 2008 Coastal Capital – Economic Valuation of Coral Reefs in Tobago and St. Lucia by
7. Effects of Protection and Sediment Stress on Coral Reefs in Saint Lucia February 2016 PLoS ONE 11(2):e0146855 DOI: 10.1371/journal.pone.01468
8. FAO (2015) Country profile – Saint Lucia
9. GOSL (2009) Saint Lucia's Fourth National Report to the Convention on Biological Diversity
10. GOSL (2011) Saint Lucia's Strategic Programme for Climate Resilience (SPCR), Under and Beyond the Pilot Programme for Climate Resilience (PPCR).
11. GOSL (2014) Ministry of Sustainable Development, Energy, Science and Technology Fifth National Biodiversity Report for Saint Lucia
12. Government of Saint Lucia. (2015, November 18). Intended Nationally determined contribution of Saint Lucia. Retrieved November 2020, from <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Saint%20Lucia%20First/Saint%20Lucia%27s%20INDC%2018th%20November%202015.pdf>
13. GOSL (2015) Ministry of Sustainable Development, Energy, Science and Technology. Saint Lucia Climate Change Adaptation Policy: Adapting One Individual, One Household, One Community, One Enterprise and One Sector at a Time.
14. GOSL (2015) Ministry of Sustainable Development, Energy, Science and Technology. Saint Lucia Climate Change Adaptation Policy: Adapting One Individual, One Household, One Community, One Enterprise and One Sector at a Time.

15. GOSL (2015) Saint Lucia National Report of Living Conditions 2016 Final Report December 2018
https://www.stats.gov.lc/wp-content/uploads/2019/01/Saint-Lucia-National-Report-of-Living-Conditions-2016-Final_December-2018.pdf
16. GOSL (2015). State of the Environment Report 2015. Sustainable Development and Environment Division, Ministry of Sustainable Development, Energy, Science and Technology.
17. GOSL (2016) Final Country Report of the Land Degradation Neutrality Target Setting Programme (LDN TSP) https://www.agrra.org/wp-content/uploads/2016/06/STL-Report-Card_2016_WebLowRes.pdf
18. Government of Saint Lucia. (2017). Third National Communication on Climate Change for Saint Lucia. Castries: Government of Saint Lucia.
19. GOSL (2018) Portfolio of Project Concept Notes for the Fisheries Sector 2018-2028
20. GOSL (2018) SASAP for the Agriculture Sector 2018-2028: Finalized adaptation strategies and action plans for the agriculture sector.
21. GOSL (2018) SASAP for the Fisheries Sector 2018-2028: Finalized adaptation strategies and action plans for the fisheries sector.
22. GOSL (2018) SASAP for the Water Sector 2018-2028: Prepared a guidance document addressing different adaptation considerations for Saint Lucia's water sector.
23. GOSL (2018). Monitoring and Evaluation Plan of Saint Lucia's National Adaptation Planning Process. Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development. <https://www4.unfccc.int/sites/NAPC/Documents/Parties/Saint%20Lucia%20Monitoring%20and%20Evaluation%20for%20NAP.pdf>
24. GOSL (2018). Saint Lucia's National Adaptation Plan (NAP) 2018–2028. <https://www4.unfccc.int/sites/NAPC/Documents/Parties/SLU-NAP-May-2018.pdf>
25. GOSL (2019) Tourism Strategy and Action Plan 2020 to 2030
26. GOSL (2020) Ministry of Finance, Economic Affairs, Planning and Social Security. Government of Saint Lucia Review of the Economy 2019.
27. GOSL (2020). Draft Saint Lucia's private sector engagement strategy, under the National Adaptation Planning Process. Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development.
28. GOSL (2020). Draft Saint Lucia's private sector engagement strategy, under the National Adaptation Planning Process. Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development.
29. Government of Saint Lucia. (2020). Saint Lucia BUR Inventory Chapter. Oxford: Aether Ltd.

30. Government of Saint Lucia. (2020). SAINT LUCIA'S UPDATED NATIONALLY DETERMINED CONTRIBUTION. United Nations Framework Convention on Climate Change.
31. Government of Saint Lucia-Department of Sustainable Development. (2020). Saint Lucia BUR Inventory Chapter. Oxford: Aether Ltd.
32. GOSL (December 2013, Revised March 2016) Disaster Vulnerability Reduction Project (DVRP) Environmental Assessment & Environmental Management Framework
33. GOSL Ministry of Finance, Economic Affairs, Planning and Social Security (2016). Government of Saint Lucia Review of the Economy 2015.
34. GOSL Ministry of Finance, Economic Affairs, Planning and Social Security Budget estimates 2017/2018
35. GOSL Ministry of Finance, Economic Affairs, Planning and Social Security Budget Estimates 2018/2019
36. GOSL Ministry of Finance, Economic Affairs, Planning and Social Security Budget Estimates 2019/2020
37. GOSL. (2001). Saint Lucia Initial National Communication to the United Nations Framework Convention on Climate Change. Castries: Government of Saint Lucia, Ministry of Physical Development, Environment and Housing.
38. GOSL. (2014). Stocktaking Report. Report prepared in the framework of Saint Lucia's Third National Communication to the UNFCCC.
39. GOSL. (2015). Saint Lucia: Intended Nationally Determined Contribution under the United Nations Framework Convention on Climate Change (UNFCCC).
40. GOSL. (2017). Third National Communication on Climate Change for Saint Lucia. Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development.
41. GOSL. (2018). Guidelines for the Development of Sectoral Adaptation Strategies and Action Plans (SASAPs): Saint Lucia's Experience under the National Adaptation Planning Process. Department of Sustainable Development, Ministry of Education, Innovation, Ge.
42. GOSL. (2018). NAP Roadmap and Capacity Building Plan. Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development.
43. GOSL. (2018). Saint Lucia's Climate Change Communications Strategy under the National Adaptation Planning Process. Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development.
44. <https://gggi.org/site/assets/uploads/2020/09/NDC-newsletter-2020-no.-3-.pdf>
45. IPCC. (2007). AR4 Climate Change 2007: Mitigation of Climate Change.

46. Joseph and Pierre-Nathaniel. (2020) "Closing the Gender Divide: Saint Lucia's progress narrowing gender disparities in climate change action"
47. Kevin De Cuba, Francisco Burgos, Ruben Contreras-Lisperguer, And Renortha Penny Limits and Potential of Waste-To-Energy Systems in The Caribbean Department of Sustainable Development Organization of American States
<https://www.oas.org/dsd/reia/Documents/LimitsandPotentialofWastetoEnergy.pdf>
48. Ledwell, Christian. (2018) "SNAPshot Strategic Communications for the National Adaptation Plan (NAP) Process in Saint Lucia Country Brief 4A." NAP Global Network, 2018.
<https://napglobalnetwork.org/wp-content/uploads/2018/06/napgn-en-2018-strategic-communications-for-the-national-adaptation-plan-process-in-saint-lucia.pdf>
49. Masson-Delmotte, V. P.-O.-O. (2018). Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change,. IPCC.
50. Ministry of Finance, E. G. (2017). Government of Saint Lucia - Economic and Social Review 2016. Castries: Research and Policy Unit. Retrieved from www.finance.gov.lc
51. Ministry of Finance, E. G. (2018). Government of Saint Lucia - Economic and Social Review 2017. Research and Policy Unit. Retrieved from www.finance.gov.lc
52. Ministry of Finance, E. G. (2019). Government of Saint Lucia - Economic and Social Review 2018. Research and Policy Unit. Retrieved from www.finance.gov.lc
53. Ministry of Finance, E. G. (2020). Government of Saint Lucia - Economic and Social Review 2019. Castries: Research and Policy Unit, Saint Lucia. Retrieved from www.finance.gov.lc
54. NATIONS, U. (1992). Article 4, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC). UNFCCC.
55. Office, S. L. (2018). Estimated mid year population 2011-2018. Castries: Department of Statistics.
56. OECS Commission (2018) Enhanced Country Poverty Assessment Project Saint Lucia National Report of Living Conditions 2016 Final Report
57. OECS (2020) "OECS Strategic Plan on Human Mobility in the Context of Climate Change." The Organisation of Eastern Caribbean States press room, April 28, 2020.
<https://pressroom.oecs.org/oecs-strategic-plan-on-human-mobility-in-the-context-of-climate-change>.
58. Owen Day and Newton Eristhee (2020) Ecosystems and Sustainable Livelihoods Final Report of CLEAR Caribbean Ltd,

59. Program, E. S. (2020). Tracking SD7 - The Energy Progress Report. (World Bank) Retrieved November 2020, from <https://trackingsdg7.esmap.org/country/saint-lucia>
60. Public-Private Partnership for the Saint Lucia Coral Restoration Programme for Resilient
61. St. Lucia Electricity Services Limited -LUCELEC. (2018). 2018 Annual Report - Transforming The Electricity Sector. Castries: Savvy Caribbean Marketing.
62. Saint Luca's NDC Newsletter August 2020, <https://ggi.org/site/assets/uploads/2020/09/NDC-newsletter-2020-no.-3-.pdf>
63. Saint Lucia Coral Reef Report Card (2016) https://www.agrra.org/wp-content/uploads/2016/06/STL-Report-Card_2016_WebLowRes.pdf
64. Saint Lucia National Trust News 31st July 2020
65. Singh, B. et. al. (2016). Vulnerability and Adaptation Assessment for Saint Lucia's Third National Communication (TNC) to the United Nations Framework Convention on Climate Change (UNFCCC).
66. Singh, B. et. al. (2016). Vulnerability and Adaptation Assessment for Saint Lucia's Third National Communication (TNC) to the United Nations Framework Convention on Climate Change (UNFCCC).
67. Tourism Sector in the English- and Dutch speaking Caribbean an overview and the impact of COVID-19 on growth and employment https://www.ilo.org/wcmsp5/groups/public/---Americas/---or-lima/--or/documents/publication/wcms_753077.pdf
68. Towle, J.A., & Towle, E. L. (eds) (1991) St. Lucia: Environmental Profile. Caribbean Conservation Association, St. Michael, Barbados.
69. UNDP (2010) Social Implications of the Global Economic Crisis in Caribbean Small Island Developing States: 2008-2009
70. UNDP (2018) "A.C.T. NOW SAINT LUCIA' CLIMATE CHANGE AWARENESS CAMPAIGN LAUNCHED." UNDP in Barbados & the OECS, March 28, 2018. <https://www.bb.undp.org/content/barbados/en/home/presscenter/articles/2018/03/28/-a-c-t-now-saint-lucia-climate-change-awareness-campaign-launched.html>.
71. UNDP (2020) Human Development Report 2019 Inequalities in Human Development in the 21st Century Briefing note for countries on the 2019 Human Development Report Saint Lucia
72. UNFCCC (2020) Handbook on Institutional Arrangements to support MRV/Transparency of Climate Action Support. Consultative Group of Experts. Accessed from: Handbook on institutional arrangements to support MRV/transparency of climate action and support (unfccc.int)
73. World Bank (2020) St Lucia COVID 19 Response, Recovery and Resilience Development Policy Credit (P174346) (2020) IRENA Website https://islands.irena.org/-/media/Files/IRENA/Sids/CountryProfile/Saint-Lucia_Central-America-and-the-Caribbean_RE_CP.ashx?la=en&hash=F1816BDDE01BB7CC81BA739B125379293A62B3F9

74. World Bank (2020) "Saint Lucia Disaster Vulnerability Reduction Project - P127226." World Bank. Accessed December 16, 2020. <https://projects.worldbank.org/en/projects-operations/project-detail/P127226>.
75. Worldometer. (2020). Retrieved November 2020, from <https://www.worldometers.info/demographics/saint-lucia-demographics/>

ANNEXES

ANNEX I – TERMS OF REFERENCE FOR THE NCCC

1.0. The Committee

1.1.1. Formation

Saint Lucia's NCCC was appointed by the Cabinet of Ministers in 1998, with a mandate to provide advice and support to national climate change-related programmes and processes.

The NCCC sits within the Department with responsibility for coordinating climate change efforts, that is, the Sustainable Development and Environment Division of the Department of Sustainable Development, which is currently within the Ministry of Education, Innovation, Gender Relations and Sustainable Development.

1.1.2. Current Role and Function

The role of Saint Lucia's NCCC has expanded over time. Over the years, it has helped to facilitate and guide national efforts relating to: climate change adaptation and building resilience; national climate change action plans and strategies; and climate change education, training, and raising public awareness. The Cabinet-approved Climate Change Adaptation Policy (in 2003 and 2015) also recognises the role of the NCCC in monitoring²¹, evaluating and enhancing the implementation of climate change adaptation measures across sectors and agencies.

It currently performs and has been assigned a range of functions, including:

- Facilitation of inter-agency coordination on matters pertaining to climate change;
- Guiding national efforts on climate change;
- Guiding the development of national climate change action plans and strategies;
- Guiding the development of education, training and public awareness campaigns designed to engage the general populace on the problem of climate change; and
- Monitoring, evaluating and enhancing the implementation of climate change adaptation measures across sectors and agencies.

1.1.3. NCCC Membership

Over time, membership has unofficially expanded to give due consideration to involvement of public, statutory, academic and private sector bodies whose work is related to climate change. Noting the formation of new agencies, the merging or disaggregation of agencies and changing nomenclature

²¹ This monitoring role is evident, for example, in the monitoring and evaluation tool under the Pilot Programme for Climate Resilience (PPCR), where a report is completed through the NCCC and submitted annually to the Climate Investment Funds (CIF). Note the review and monitoring role of the NCCC was also included in the Climate Change Policy of 2003.

over time, the following entities form part of the regular list of invitees/participants. Some of the entities individually listed below form part of one organisation, covering various thematic areas.

1. Government entity responsible for Climate Change²²;
2. Government entity responsible for Protected Areas;
3. Government entity responsible for Biodiversity;
4. Government entity responsible for Coastal Zones;
5. Government entity responsible for Infrastructure²³;
6. Government entity responsible for Meteorology;
7. Government entity responsible for Renewable Energy;
8. Government entity responsible for Agriculture;
9. Government entity responsible for Forests;
10. Government entity responsible for Fisheries;
11. Government entity responsible for Water Resources;
12. Government entity responsible for Physical Planning;
13. Government entity responsible for Health;
14. Government entity responsible for Tourism;
15. Government entity responsible for Finance;
16. Government entity responsible for Economic Development;
17. Government entity responsible for Transport;
18. Government entity responsible for Education;
19. Government entity responsible for Gender;
20. Government entity responsible for Social Equity or Transformation;
21. Government entity responsible for External Affairs;
22. Government entity responsible for disasters and emergency management²⁴;
23. Water and Sewerage Company Inc.;
24. The National Insurance Council of Saint Lucia;
25. Saint Lucia Bankers Association²⁵;
26. National Conservation Authority;
27. Saint Lucia Electrical Services Limited;
28. Saint Lucia Solid Waste Management Authority;
29. Saint Lucia Air and Sea Ports Authority;

²² This is currently the Department of Sustainable Development.

²³ Representation through an engineer.

²⁴ Currently National Emergency Management Organisation.

²⁵ Representation through Saint Lucia Development Bank.

30. Saint Lucia National Trust;
31. Saint Lucia National Youth Council;
32. Soufriere Marine Management Association;
33. Saint Lucia Chapter of Caribbean Youth Environment Network;
34. Sir Arthur Lewis Community College;
35. Coalition of Civil Society Organisation;
36. Saint Lucia Chamber of Commerce, Industry and Agriculture;
37. Other representatives from the private sector, civil society, and vulnerable groups as the Committee considers appropriate.

Upon approval of the NCCC TORs and structure by the Cabinet of Ministers, representatives (and their alternates) should be formally appointed to the committee through a nomination/notification letter issued by the requisite authority of their agency, to the Permanent Secretary of the Department of Sustainable Development. Representatives should be working in managerial or senior supervisory positions in a department within their agency that has the responsibility for working on climate change matters.

The participation at meetings of the NCCC to date averages about 20-30 persons, excluding representatives from the Sustainable Development and Environment Division, who provide technical and administrative support at these meetings. Others have been/can be co-opted over time, including, among others: Government entity responsible for Commerce; National Utilities Regulatory Commission; and Saint Lucia Hotel and Tourism Association.

While the membership is large, this inclusivity is appreciated by its members; has functioned well as an advisory body on climate change matters for two decades; has contributed to climate change integration efforts across sectors and agencies, including awareness-raising and sensitisation, enhanced ownership and active participation in programming efforts. Efforts to streamline the membership, including the recommendation of a smaller core NCCC, have not been well received by a number of key stakeholder agencies.

1.1.4. Funding

The NCCC does not have a formalised funding mechanism. Its activities have been funded in the past from various project initiatives, including the United Nations Framework Convention on Climate Change (UNFCCC) National Communications, the Disaster Vulnerability Reduction Project (DVRP) and the Multilateral Environmental Agreement (MEA) Project.

1.1.5. Functioning

The NCCC interacts in a variety of formats including in-person and/or electronic means, and conducts its work in plenary, as well as in sub-committees. Sub-committees may include agencies and/or persons that are not on the NCCC, but are co-opted based on special expertise required for consideration of the matter(s) under discussion.

In-person meetings are not frequent and have taken place on an average of once to twice per year²⁶ over the last few years. Such meetings have been convened as part of the annual monitoring under the Pilot Programme for Climate Resilience; as part of pre-Conference of Parties (COP) engagement; to apprise on climate change initiatives and developments; and when NCCC consultations are needed by projects and covered by project budgets. Prior to this, meetings were held at least three times per year. Due to budgetary constraints, coupled with the increasing workload and dwindling human resource personnel of the Division, the frequency of meetings has reduced.

1.2. Rationale for Change

1.2.1. Expansion of NCCC Role

The Government of Saint Lucia has decided to redefine the role and hence the TORs of the NCCC, given the critical and expanded role that the NCCC is expected to play in climate change programming in Saint Lucia in the future. That role is reflected in its formal inclusion in new and emerging initiatives, including the Climate Change Adaptation Policy (CCAP); the National Adaptation Plan (NAP) process; the climate financing process in collaboration with the National Designated Authority (NDA) to the Green Climate Fund (GCF); and the Climate Change Bill that is under development, as elaborated below:

- Climate Change Adaptation Policy (CCAP) – Under the CCAP, the NCCC is recognised as the body responsible for coordinating and facilitating the implementation of climate change adaptation measures across sectors and agencies and at all levels of society.
- National Adaptation Plan (NAP) – The process of monitoring and evaluating the NAP is being led by the Department of Sustainable Development (DSD), with the support of the NCCC. Through very simple questionnaires, NCCC partners will be requested to provide information on the implementation of NAP measures and non-NAP-specific adaptation initiatives. The questionnaires may be complemented by one-on-one or focus group interviews, as necessary. There may also be the opportunity, during the same time frame, for in-person progress reports via NCCC meeting(s), to supplement the information in the

²⁶ The NCCC has met twice as a Committee in 2018 (May and October) and multiple times (between February 2018 and May 2019) as part of a wider grouping under the NAP process.

questionnaires. The DSD will collate all inputs received, analyse the data, assess the progress made at the sectoral and national levels, and in each of the three core areas of the CCAP (adaptation facilitation, adaptation implementation and adaptation financing. An annual NAP Performance Report will be prepared by DSD.

- Climate Financing – The NDA has proposed to utilise the NCCC as Saint Lucia's formal coordination and consultation mechanism. This approach is intended to ensure that the consultative process is continuous, through the design, implementation, monitoring and evaluation and exit stages of future projects or programmes, rather than a discrete activity occurring only once.
- Climate Change Legislation – The draft Climate Change legislation makes provisions for the establishment of a National Climate Change Committee comprised of representatives from the above-referenced listing. The legislation proposes an advisory role for the Committee and lists multiple functions to be carried out. These functions contain mandates related to, for example, adaptation, mitigation, loss and damage, capacity building, education, training, public awareness, climate research and technology needs. In carrying out these mandates, the Committee is expected to provide advice and guidance, coordinate and consult with stakeholders and report to Cabinet of Ministers and an annual basis.

All of these initiatives seek to engage and coordinate the activities of multiple stakeholders, and the NCCC, being the formal coordination and consultation mechanism on climate change, has been mandated to take up that role. It is anticipated that expanding the role of the NCCC to include such a role will strengthen the overall governance of climate change related activities.

1.3. Proposed TOR

The proposed revised Terms of Reference of the NCCC are designed to achieve the goals and objectives specified in the draft Climate Change legislation and other related policy documents.

1.3.1 Role

The role of the NCCC is to provide strategic guidance to the Government of Saint Lucia on matters related to climate change and its impacts on Saint Lucia. It is the main advisory body to the Government of Saint Lucia on all matters related to climate change.

1.3.2 General Functioning of the NCCC

- Chairman: The NCCC will be chaired by the Permanent Secretary of the Department of Sustainable Development and in the absence of the Permanent Secretary, by the Deputy Permanent Secretary, or the Chief Technical Officer of the Department for Sustainable Development, as designated by the Chairman.

- Secretariat: The Sustainable Development and Environment Division will be the Secretariat of the NCCC and will provide secretarial and logistical support to its operations.
- Depository: The Sustainable Development and Environment Division will act as the depository for all documentation pertaining to the work of the NCCC.
- Funding: Funding support for the work of the NCCC, will be allocated and approved by the Government, as appropriate, in accordance with the procedures in place for the allocation of budgetary support. This budgetary provision for the NCCC will be included under an appropriate existing line item in the budget allocation of the Department of Sustainable Development, as the Climate Change Focal Point.

1.3.3 Functions of the NCCC

- a) Guide the development of cross-sectoral national policies, positions, laws, strategies and action plans to reduce greenhouse gas emissions, build resilience to climate change impacts and loss and damage from climate change, and fulfil Saint Lucia's obligations under the United Nations Framework Convention on Climate Change and related instruments.
- b) Facilitate the development and implementation of guidelines and standards, processes, programmes and projects on climate change, including mitigation, adaptation, loss and damage, education, training and public awareness.
- c) Identify capacity gaps for responding to climate change and provide guidance on capacity building initiatives that address these needs, inclusive of institutional development, human skills, research and technology needs.
- d) Provide guidance and collaborate with the NDA to the GCF, and other institutional mechanisms for accessing climate finance in Saint Lucia, to ensure that programme and project proposals that are developed and submitted for climate financing, are contributing to the achievement of the objectives of the national climate change strategies and national development strategies and are compatible with the objectives of the UNFCCC and the Paris Agreement.
- e) Facilitate coordination and a smooth flow of information among agencies implementing climate change programmes so as to minimize duplication of effort.
- f) Review the status of climate change programming in Saint Lucia on an annual basis, including the implementation and effectiveness of current national policies and programmes, as expressed through the National Climate Change Report and other relevant documents and report to Cabinet on same, with recommendations for improvement, as appropriate.

- g) Other functions considered necessary to achieve the Committee's mandate, consistent with any international climate change agreement to which Saint Lucia is a party, this Act, relevant national policies, strategies and plans or other national instrument.

1.3.4 Sub-Committees

The work of the NCCC will be supplemented by standing sub-committees which will meet as required and report back to the NCCC at its next quarterly meeting.

A new technical sub-committee is proposed to comprise agencies and entities that play a leadership role, especially in a cross-cutting manner. These entities are government agencies, or non-state actors that are active in the respective programming areas or represent critical constituencies that have a role to play in the climate change response. The co-chairs are recommended to be:

- Permanent Secretary or designate of the Department of Economic Development; and
- Permanent Secretary or Designate of Department of Sustainable Development.

The proposed ten (10) entities, under the guidance of the co-chairs will be responsible for providing rapid responses on programming and operational matters, including, among others, operational procedures under the GCF. All other key entities are represented in the broader committee of entities represented in Section 1.1.3, who will receive updates electronically and during quarterly meetings of the NCCC.

The technical sub-committee is proposed as follows:

1. Agency responsible for Climate Change²⁷ (2)

- 1.1. Lead UNFCCC Negotiator
- 1.2. Technical Focal Point

2. Agency that leads on Mitigation (2)

- 2.1. Agency responsible for Energy – Head or designated Senior Energy Officer
- 2.2. Agency involved in energy policy and/or implementation – LUCELEC

3. Agency that leads on Finance (2)

- 3.1. NDA or designate.
- 3.2. One representative from the from the Department with responsibility for Finance

4. Agency that leads on gender equity (1)

- 4.1. Gender representative from the Department of Education, Innovation and Gender Relations

5. Agency responsible for Social Inclusion (1)

²⁷ This agency will also represent the Adaptation and Loss and Damage programming areas; it is responsible for the coordination of national programming in these areas.

5.1. One representative from the Department of Equity, Social Justice, Local Government and Empowerment

6. Civil Society (1)

6.1. One representative from the Coalition of Civil Society Organisations

7. Private Sector (1)

7.1. One representative from the Saint Lucia Chamber of Commerce

8. Youth (1)

8.1. One youth representative from the Caribbean Youth Environment Network (Saint Lucia Chapter)

Upon approval of the NCCC TORs and structure by the Cabinet of Ministers, representatives (and their alternates) should be formally appointed to the technical sub-committee through a nomination/notification letter issued by the requisite authority of their agency, to the Permanent Secretary of the Department of Sustainable Development. Representatives should be working in managerial or senior supervisory positions in a department within their agency that has the responsibility for working on climate change matters.

Funding support for the meetings of the technical sub-committee, will be allocated and approved by the Government, as appropriate, in accordance with the procedures in place for the allocation of budgetary support. This budgetary provision will be included under an appropriate existing line item in the budget allocation of the Department of Economic Development, as the NDA to the GCF, especially to facilitate meetings of a climate finance nature.

The NCCC can establish other sub-committees related to other aspects of its work, as deemed appropriate. All sub-committees will have the authority to co-opt other technical personnel with expertise in the matters under consideration and invite them to participate in sub-committee meetings, as deemed necessary. However, it is not recommended that a large number of standing sub-committees be formed, as this places a strain on the limited manpower and financial resources of the Department of Sustainable Development; creates disjointedness (e.g., between mitigation and adaptation or awareness-raising across sectors) and contributes to stakeholder exhaustion, given that the same entities would likely be required to give input on a number of sub-committees.

1.3.5 Working Groups.

The NCCC may also establish working groups to address specific one-off matters of national importance. The scope of work of these working groups will focus on the specific matter under consideration and the working group will cease to exist once its mandate has been fulfilled. Membership in these working groups will consist of key stakeholders as deemed appropriate by the NCCC.

1.3.6 Meetings

The NCCC will meet on a quarterly basis, or more regularly, if required. The agenda at these meetings will be determined by the Chairman and members and will include reports from the sub-committees, as well as matters related to the performance of its functions as laid out in its TORs. The agenda and relevant background documentation should be communicated to the membership of the NCCC two weeks prior to the scheduled meeting.

ANNEX II- DETAILS FOR EACH MITIGATION ACTION PROPOSED

Table 44: Mitigation Action 1 - Implementation of Regional Energy Efficient Building Codes

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Implementation of Regional Energy Efficient Building Codes	Ongoing	Planning Division; Saint Lucia Bureau of Standards	2019-2025	Energy, Energy Demand	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To implement the Regional Energy Efficiency building codes for all new construction and renovations						
Brief description and activities planned under the mitigation action						
<p>The Regional Energy Efficiency building code (REEBC) is expected to help in design and construction of low carbon buildings. Improved building design can reduce the demand for energy and improve resilience. The implementation of this code will help reduce emissions for commercial and residential buildings.</p> <ol style="list-style-type: none"> 1. Implementation of the REEBC; 2. Public Education and Awareness of the Regional Energy Efficiency Building Code to practitioners and the general public; 3. Training of practitioners and interested persons on the REEBC 						
Estimated outcomes and estimated emission reductions						
By 2030, the energy demand in new buildings have been reduced due to implementation of the regional energy efficiency building code.						
Methodologies and assumptions						
<ul style="list-style-type: none"> - This strategy assumes a 20% penetration of energy efficient equipment for space cooling, 100% improvement in lighting and 30% improvement in energy efficient equipment for refrigerant by 2030 in the residential sector. -Assumes a 30% penetration of energy efficient equipment for space cooling and 100% penetration of energy efficient equipment for lighting in 2030 in the commercial sector - For other electric appliances in both residential and commercial sector, it is assumed that there was an increase in energy efficiency of appliances of 1.5% annually. - <i>The Regional Energy Efficiency building code would impact new construction of residential and commercial buildings between 2022 and 2030. This mitigation strategy is modelled together with</i> 						

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
	<i>other mitigation strategies as outlined in Table 16 under energy efficient equipment. The assumptions can be found in Table 17 and</i>					
	Table 18					
	General description of progress indicators					
	# of new and renovated buildings implemented using regional energy efficiency building code; # of education and awareness programs conducted on regional energy efficiency building code; # of people trained on REEBC					

Table 45: Mitigation Action 2 - Energy Audits for all Government Occupied Buildings including schools by 2025

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Energy Audits for all Government Occupied Buildings including schools by 2025	Ongoing	Renewable Energy Division	2019-2025	Energy, Energy Demand	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To conduct energy audits for all government occupied buildings including schools and identify energy efficiency measures.					
	Brief description and activities planned under the mitigation action					
	Energy Audits help identify specific energy efficiency options for a building. Therefore, create a pathway for energy efficiency building measures. 1. Identify Buildings to be audited. 2. Develop terms of reference for audits. 3. Undertake audits of the identified buildings.					
	Estimated outcomes and estimated emission reductions					
	Building mitigation measures identified for government buildings including schools					
	Methodologies and assumptions					
	This action is a precursor to the actual retrofits. The buildings identified are expected to be occupied for long term. This action is not expected to have emission reduction potential but will help identify and quantify energy efficiency measures					
	General description of progress indicators					
	# government buildings audited					

Table 46: Mitigation Action 3 - Lighting Retrofits for all Government Occupied Buildings

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Lighting Retrofits for all Government Occupied Buildings	Ongoing	Renewable Energy Division	2019-2025	Energy, Energy Demand	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To undertake comprehensive lighting retrofits for all government occupied buildings. To reduce energy demand and emissions in government buildings. To improve energy efficiency in Government buildings.						
Brief description and activities planned under the mitigation action						
Adopting lighting retrofits as an energy efficiency measure will help reduce the energy demand in the government buildings 1. Identify current lighting technology in government buildings; 2. Baseline assessment can be done with energy audits; 3. Identify suitable replacement technology replacement;						
Estimated outcomes and estimated emission reductions						
Reduction in energy demand of government buildings.						
Methodologies and assumptions						
<i>This Mitigation scenario is modelling together with other mitigation scenarios as shown in Table 16 under Energy efficient equipment. The assumptions can be found in Table 17 and Table 18.</i>						
General description of progress indicators						
# buildings retrofitted for lighting; # and type of lights replaced						

Table 47: Mitigation Action 4 - Public Awareness campaigns on incentives for renewable energy equipment including solar water heaters

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Public Awareness campaigns on incentives for renewable energy equipment including solar water heaters	Ongoing	Renewable Energy Division	2019-onwards	Energy, Energy Demand	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						

	To encourage the installation of renewable energy systems and solar water heaters
	Brief description and activities planned under the mitigation action
	Education of the public on the available concessions and benefits for renewable energy equipment including solar water heaters may help increase the use of these equipment on island 1. Develop comprehensive education and awareness plan based on current incentives and concessions
	Estimated outcomes and estimated emission reductions
	Increased uptake for solar water heaters and renewable energy systems
	Methodologies and assumptions
	- Solar water heaters were be modelled in this activity; the other renewable energy equipment will be captured under renewable energy. The assumptions made for this mitigation strategy are described in Table 19. The ownership rate for water heaters is assumed to increase by 40% in 2030 and 50% by 2050. The assumption is penetration of solar water heater in residential sector is 80% by 2030 and 95% by 2050 and in the commercial sector 30% by 2030 and 50% by 2050
	General description of progress indicators
	# newly installed solar water heater; # concessions processed for solar water heaters;

Table 48: Mitigation Action 5 - Development of comprehensive incentives for Energy Efficient equipment

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Development of comprehensive incentives for Energy Efficient equipment	Planned	Renewable Energy Division	2019-2022	Energy, Energy Demand	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To encourage the up-take of more energy efficient equipment					
	Brief description and activities planned under the mitigation action					
	Development of incentives that would reduce the cost of energy efficient appliances. It is expected that these incentives would encourage the adoption of more energy efficient equipment as compared to less efficient equipment 1. Identify the appliances to be included in the suite of incentives; 2. Develop the list of incentives for appliances.					
	Estimated outcomes and estimated emission reductions					
	Increase adoption of energy efficient equipment					

	Methodologies and assumptions
	Assumption that the adoption of the incentives would increase the use of energy efficient appliance. This mitigation scenario is modelled under energy efficient equipment as described in Table 16. The assumptions can be found in Table 17 and Table 18.
	General description of progress indicators
	Comprehensive list of incentives for energy efficient equipment developed

Table 49: Mitigation Action 6 - Adoption of Mandatory Energy Efficiency Standards for Appliances by 2025

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Adoption of Mandatory Energy Efficiency Standards for Appliances by 2025	Ongoing	Saint Lucia Bureau of Standards	2019-2025	Energy, Energy Demand	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To encourage the shift to more energy efficient equipment in all sectors						
Brief description and activities planned under the mitigation action						
Mandatory standards will force the adoption of energy efficient appliances. A shift to more efficient appliances will reduce energy consumption and long-term costs to consumer. Reduction in emissions. 1. Full identification of all the standards related to energy efficient equipment that have been developed and ready for mandatory implementation. 2. Identify a system for implementation and enforcement of the standards						
Estimated outcomes and estimated emission reductions						
Increase energy efficiency in appliance available and used by consumers across all sectors.						
Methodologies and assumptions						
National standards for AC, incandescent lamps, and fluorescent lamps have been developed - Standards under development: refrigerators, washing machines, fans, solar panels - Additional appliances should be considered: TVs, LED lamps, stoves, freezers - The appliance labelling and efficiency standards would impact new appliances between 2019 and 2030 - Baseline already considers some EE improvements. This measure considers an additional improvement. This mitigation scenario is modelled under energy efficient equipment as shown in Table 16. The assumptions can be found in Table 17 and Table 18.						
General description of progress indicators						
# mandatory energy standards for appliances						

Table 50: Mitigation Action 7 - Streetlighting Retrofit 22,000 HPS to LEDs by 2025

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Streetlighting Retrofit 22,000 HPS to LEDs by 2025	Ongoing	Electrical Division/ Renewable Energy Division	2019-2025	Energy, Energy Demand	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To undertake lighting retrofits to reduce energy consumption and emissions from streetlighting						
Brief description and activities planned under the mitigation action						
Retrofits of HPS streetlights to LED will help reduce consumption. 1. Finalise contract 2. Implement contract						
Estimated outcomes and estimated emission reductions						
Reduction in energy demand for streetlighting						
Methodologies and assumptions						
- Changing high pressure sodium street lights to LED. 3, 850 - 250 W HPS bulbs would be replaced by 75 W LED bulbs, and 18,150 -70W HPS will be replaced with 21W. Assumptions for street lighting can be found in Table 20. - only 5% has been achieved so far replacement achieved						
General description of progress indicators						
# of HPS streetlights retrofitted to LEDs						

Table 51: Mitigation Action 8 - Reduction of 20% energy consumption in schools by 2030

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector ¹ and subsector	Scope	GHGs covered
Reduction of 20% energy consumption in schools by 2030	Ongoing	Ministry of Education	2019-2030	Energy, Energy Demand	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To reduce energy consumption in schools by 20% through energy efficient measures from Green Schools NAMA						
Brief description and activities planned under the mitigation action						
Implementing the green schools NAMA with retrofits of lighting in schools will help reduce energy consumption in schools.						
1. Further project identification for full implementation of the NAMA						
Estimated outcomes and estimated emission reductions						
Reduction in energy demand in schools. Estimated that 356,800 kgCO ₂ for 13,500 replaced lights						
Methodologies and assumptions						
It assumed that measures for school will be absorbed by the commercial sector and therefore it would be difficult to model exact measures for schools separately; Green schools NAMA assumed a reduction in emission 0.6648tCO ₂ /MWh.						
General description of progress indicators						
# schools with lighting retrofits; % reduction in consumption; # and type of lamps replaced						

Table 52: Mitigation Action 9 - Reduction in system water losses to less than 20% by 2030

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Reduction in system water losses to less than 20% by 2030	Ongoing	Public Utilities Division/National Utilities Regulatory Commission	2019-2030	Energy, Energy Demand	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To improve efficiency in the water sector						
Brief description and activities planned under the mitigation action						
The water system experiences high losses in transmission and distribution. Reduction in these losses will reduce the energy spent to transmit and distribute the water.						
1. Identify areas of water system losses;						
2. Replacement of pipes;						

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
	3. Replacement of inefficient pumps with high efficiency pumps.					
	Estimated outcomes and estimated emission reductions					
	Increased energy efficiency in the water sector; reduction of emissions in the water sector.					
	Methodologies and assumptions					
	- replacement of existing inefficient pumps with high efficiency pumps and reducing leakage through repair and replacement of pipes and through pressure modulation - reduction in system water losses from as high as 56% to less than 20% - Approximately 393 million imperial gallons of water are delivered to customers by WASCO annually.					
	General description of progress indicators					
	% Reduction water system losses					

Table 53: Mitigation Action 10 - Reduction of transmission and distribution losses to 5% 2030

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Reduction of transmission and distribution losses to 5% 2030	Ongoing	St. Lucia Electricity Services Limited/National Utility Regulatory Commission	2019-2025	Energy, Electricity Generation	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To increase the energy efficiency of the transmission and distribution system by reducing losses.					
	Brief description and activities planned under the mitigation action					
	Reducing transmission and distribution losses, reduces the amount of electricity to meet demand. Capital investments are required in transmission equipment and meters. Necessary upgrades to transmission and distributions systems completed to encourage further energy efficient measures.					
	Estimated outcomes and estimated emission reductions					
	<i>Improved energy efficiency for transmission and distribution system</i>					
	Methodologies and assumptions					
	- reduce system losses to 5% by 2030. - technical Losses were 9.67% in 2010, 8.85% in 2013, and 6.54% in 2019					
	General description of progress indicators					
	% reduction in transmission and distribution losses					

Table 54: Mitigation Action 11 - Installed renewable energy of 54MW solar, 18MW wind by 2030 and 15MW geothermal by 2035

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Installed renewable energy of 54MW solar, 18MW wind by 2030 and 15MW geothermal by 2035	Ongoing	Renewable Energy Division/ National utility Regulatory Commission	2019-2035	Energy, Electricity Generation	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To increase the penetration of renewable by 50% by 2030						
Brief description and activities planned under the mitigation action						
Saint Lucia's energy mix is current dominated by fossil fuels. A move to renewables will significantly assist in achieving emission reduction. 1. Projects to be identified to increase solar and wind penetration						
Estimated outcomes and estimated emission reductions						
Increase renewable energy penetration						
Methodologies and assumptions						
Assumption are that the grid can handle these increase renewables based on actions provided in the National Energy Transition Strategy. Mitigation action 13 and 14 are incorporated in this action.						
General description of progress indicators						
# kW of installed solar, wind and geothermal systems						

Table 55: Mitigation Action 12 - 20MWh of storage installed by 2030

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
20MWh of storage installed by 2030	Ongoing	Renewable Energy Division/ National utility Regulatory Commission	2019-2030	Energy, Electricity Generation	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To install 20MWh of storage to assist with output from variable renewables						
Brief description and activities planned under the mitigation action						

	To help achieve high penetration of variable renewables, it is important to include storage in the mix. Battery storage stores excess electricity that can be released when renewables output is low. 1. Projects to be identified for storage development
	Estimated outcomes and estimated emission reductions
	Increase storage for electricity; Increase penetration potential of variable renewables
	Methodologies and assumptions
	As storage increases, it enhances to ability of the national grid to increase penetration of variable renewables
	General description of progress indicators
	#MWh of storage installed

Table 56: Mitigation Action 13 - At least 13MW of distributed generation included in the 54MW of solar

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
At least 13MW of distributed generation included in the 54MW of solar	Ongoing	Renewable Energy Division/ National utility Regulatory Commission	2019-2030	Energy, Electricity Generation	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To increase distributed generation installed systems by 13MW by 2030. To increase penetration of renewables by 50% by 2030					
	Brief description and activities planned under the mitigation action					
	Saint Lucia's energy mix is current dominated by fossil fuels. A move to renewables will significantly assist in achieving emission reduction. This is specific solar penetration for distribution generation for commercial and residential systems. 1. Revised system to allow for greater penetration of commercial systems					
	Estimated outcomes and estimated emission reductions					
	Increase renewable energy penetration					
	Methodologies and assumptions					
	The 13MW is allocated to distributed generation from the 54MW of solar.					
	General description of progress indicators					
	#kW of distributed solar system installed					

Table 57: Mitigation Action 14 - 400kW of installed PV systems on schools representing about 10kW in 40 schools

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
400kW of installed PV systems on schools representing about 10kW in 40 schools	Ongoing	Ministry of Education/Renewable Energy Division	2019-2030	Energy, Electricity Generation	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To install 400kW of PV systems in schools						
Brief description and activities planned under the mitigation action						
Saint Lucia's energy mix is current dominated by fossil fuels. A move to renewables will significantly assist in achieving emission reduction. This is specific solar penetration for distribution generation for schools as part of the NAMA project. The system is included in 13MW for distributed generation. Further project identification for full implementation of the NAMA						
Estimated outcomes and estimated emission reductions						
Increase renewable energy penetration. Estimated that emission reduction will be 345,640 kgCO ₂						
Methodologies and assumptions						
It assumed that measures for schools will be absorbed by the commercial sector and therefore It would be difficult to model exact measures for schools separately; Green schools NAMA assumed a reduction in emission 0.6648 tCO ₂ /MWh.						
General description of progress indicators						
#kW of solar system installed in schools						

Table 58: Mitigation Action 15 - New Electricity Bill is enacted by 2022

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
New Electricity Bill is enacted by 2022	Ongoing	Public Utilities Division/National Utilities Regulatory Commission	2019-2022	Energy, Electricity Generation	National	NA
Objective of the mitigation action						
To enact the new electricity bill						
Brief description and activities planned under the mitigation action						
The New electricity Act is essential to facilitate the installation of renewable energy on island. 1. Final review of draft bill with regulations completed; 2. Bill is review by Attorney General; 3. Bill is endorsed by cabinet; 4. Bill is sent to Parliament and Senators for debate and final enactment						

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Estimated outcomes and estimated emission reductions						
Enabling environment for renewable systems created						
Methodologies and assumptions						
It is assumed that the New electricity Act will allow for the necessary interventions in renewables to occur						
General description of progress indicators						
Electricity bill enacted. #regulations passed						

Table 59: Mitigation Action 16 - Energy Efficiency Bill is enacted by 2022

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Energy Efficiency Bill is enacted by 2022	Ongoing	Public Utilities Division/National Utilities Regulatory Commission	2019-2022	Energy, Electricity Generation	National	NA
Objective of the mitigation action						
To enact energy efficiency bill						
Brief description and activities planned under the mitigation action						
Energy efficiency bill is essential to assisting in the reduction in consumption and behavioural change 1. Final review of draft bill with regulations completed; 2. Bill is review by Attorney General; 3. Bill is endorsed by cabinet; 4. Bill is sent to Parliament and Senators for debate and final enactment						
Estimated outcomes and estimated emission reductions						
Enabling environment for deeper energy efficiency created						
Methodologies and assumptions						
It is assumed that energy efficiency bill will allow for greater energy efficiency measures						
General description of progress indicators						
Energy efficiency bill enacted. #regulations passed						

Table 60: Mitigation Action 17 - 33% sale of vehicles (including Government) are electric by 2030

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
33% sale of vehicles (including Government) are electric by 2030	Ongoing	Transport Division/ Public Utilities/Renewable Energy Division	2019-2030	Energy, Transport	National	Carbon dioxide (CO ₂), Methane (CH ₄),

						Nitrous Oxide N ₂ O
Objective of the mitigation action						
To increase sale of electric vehicles by 30% by 2030; To increase energy efficiency in the transport system; To reduce emissions in the transport system						
Brief description and activities planned under the mitigation action						
Adoption of electric vehicles simultaneous with the transition to renewables will help reduce fossil fuel consumption in the transport sector. 1. Installation of charging infrastructure 2. Increase Public Awareness on electric vehicles; 3. Encourage sale by retailers						
Estimated outcomes and estimated emission reductions						
Reduction in emissions in the transport sector through increase sales of electric vehicles						
Methodologies and assumptions						
Assumed that increase sale of private and government vehicles are all electric vehicles. The assumptions can be found in Table 23						
General description of progress indicators						
% of vehicles sales are electric vehicles						

Table 61: Mitigation Action 18 - Replacement of 30% of Government fleet by 2030 to electric vehicles, which is equal to the replacement of approximately 144 ICE vehicles to electric vehicles based on 2018 Government fleet transition study and 50% by 2050

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Replacement of 30% of Government fleet by 2030 to electric vehicles, which is equal to the replacement of approximately 144 ICE vehicles to electric vehicles based on 2018 Government fleet transition study and 50% by 2050	Ongoing	Transport Division/ Public Utilities/Renewable Energy Division	2019-2050	Energy, Transport	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To increase penetration of electric vehicles in government fleet by 30% by 2030; To increase energy efficiency in the transport system; To reduce emissions in the transport system						

	Brief description and activities planned under the mitigation action
	Adoption of electric vehicles simultaneous with the transition to renewables will help reduce fossil fuel consumption in the transport sector 1. Procurement plan for transition to electric vehicles
	Estimated outcomes and estimated emission reductions
	Reduction in emissions in the transport sector through increase electric vehicles; Reduction energy demand for government fleet
	Methodologies and assumptions
	Included in the increase sale of electric vehicles. The methodology and assumption can be found in Table 22 and Table 23.
	General description of progress indicators
	# government ICE vehicles transitioned to electric vehicles

Table 62: Mitigation Action 19 - 30% expansion of public transit, this would increase access to public transport and reduce the use of private vehicles

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
30% expansion of public transit, this would increase access to public transport and reduce the use of private vehicles	Proposed	Transport Division/ Public Utilities/Renewable Energy Division	2019-2030	Energy, Transport	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To increase the use of public transport; To increase energy efficiency in the transport sector; To help reduce commute times by reducing the number of private vehicles on the road					
	Brief description and activities planned under the mitigation action					
	Increase access to the public transport and increase reliability would help reduce the use of private vehicles, causing a modal shift and thereby reducing the fossil fuel consumption in the transport sector and assisting in traffic management. Managing travel demand for different areas and increase planning in the public transport system 1. Development of comprehensive public transport strategy to expand routes; 2. Incentives to encourage public transport drivers to expand routes; 3. Public education and awareness to encourage use of public transport					
	Estimated outcomes and estimated emission reductions					
	Increase use of public transport; reduced commute time; reduced emissions for transport sector					
	Methodologies and assumptions					
	- Increase the number of trips that Saint Lucians make by public transit and reduce the number they make in their private vehicles.					

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
	- shift of demand from private passenger vehicles to public transit vehicles. This demand is represented by the passenger vehicle km travelled metric - Target of a 30% expansion in public transit demand by 2030. This shift would decrease private car passenger km by 65 million passenger km travelled by 2030 and increase public transit ridership by the same amount. This requires an increase in 271 minibuses and a decrease in 4250 private vehicles by 2030. To reach the above, the model considers a change in total annual sales as follows: 24 more minibuses sold per year; 420 fewer private vehicles sold per year					
	General description of progress indicators					
	# new areas with public transport access, # minutes of reduced commute times, # reduced private vehicles on the road during peak hours					

Table 63: Mitigation Action 20 - Development and adoption of the Transport Policy by 2025

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Development and adoption of the Transport Policy by 2025	Planned	Transport Division	2019-2025	Energy, Transport	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To develop and adopt the transport policy					
	Brief description and activities planned under the mitigation action					
	Development and Adoption of the transport policy will assist in the changes necessary in transport sector to allow for the shift to more efficient technology. 1. Terms of Reference for transport policy developed; 2. Transport policy developed 3. Review of transport policy 4. Policy sent to cabinet for review and adoption					
	Estimated outcomes and estimated emission reductions					
	Enabling environment for enhance efficiency in the transport sector developed					
	Methodologies and assumptions					
	Transport policy will overall improve efficiency in the transport sector and enhance planning.					
	General description of progress indicators					
	transport policy adopted					

Table 64: Mitigation Action 21 - 10% sales of vehicles in public transport and taxi vehicle fleet are of electric vehicles by 2030.

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
10% sales of vehicles in public transport and taxi vehicle fleet are of electric vehicles by 2030.	Planned	Transport Division/ Public Utilities/Renewable Energy Division	2019-2030	Energy, Transport	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To increase penetration of electric vehicles in the public transport system; To increase energy efficiency in the transport system; To reduce emissions in the transport system						
Brief description and activities planned under the mitigation action						
Adoption of electric vehicles simultaneous with the transition to renewables will help reduce fossil fuel consumption in the transport sector. 1. Projects developed for transition; 2. Incentives for public transport owners to make the shift; 3. Public education and Awareness outreach.						
Estimated outcomes and estimated emission reductions						
Reduction in emissions in the transport sector through increase electric vehicles; Reduction energy demand for public transport fleet						
Methodologies and assumptions						
In the scenarios modelled, for the baseline, electric vehicles account for 5% of sales of public mini-buses and 5% of commercial vehicles (commercial taxis-buses) in 2030. This results in 1.2% and 1.3% of electric vehicles in the total stock of public and commercial vehicles, respectively. In the mitigation scenario, electric vehicles represent 10% of sales of public vehicles, and 10% of commercial vehicles in 2030. This results in 3.1% and 2.6% of electric vehicles in the total stock of public and commercial vehicles respectively. The assumptions are shown in Table 24						
General description of progress indicators						
# of public transport and taxis transitioned to electric vehicles						

Table 65: Mitigation Action 22 - Improved incentives for electric vehicles

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Improved incentives for electric vehicles	Planned	Renewable Energy/Public Utilities Division	2019-2030	Energy, Transport	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To introduce revised and improved incentives for electric vehicles						
Brief description and activities planned under the mitigation action						

	Improved incentives for electric vehicles will make it more attractive for the public and increase the purchase of electric vehicles. 1. Incentives revised and proposed changes made; 2. Cabinet approval of additional incentives.
	Estimated outcomes and estimated emission reductions
	Increase uptake of electric vehicles
	Methodologies and assumptions
	Revised incentives will assist in the increased uptake of electric vehicles which will be captured in the other actions
	General description of progress indicators
	additional incentives for electric vehicles approved

Table 66: Mitigation Action 23 - Public Awareness on incentives for electric vehicles/hybrid vehicles

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Public Awareness on incentives for electric vehicles/hybrid vehicles	Ongoing	Renewable Energy/Public Utilities Division	2019-2030	Energy, Transport	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To encourage the purchase of electric and hybrid vehicles					
	Brief description and activities planned under the mitigation action					
	Public education on the concessions for electric and hybrid vehicles may help with the shift of consumers from ICE vehicles to electric vehicles. 1. Develop comprehensive education and awareness plan based on current incentives and concessions					
	Estimated outcomes and estimated emission reductions					
	Increase uptake of electric vehicles					
	Methodologies and assumptions					
	Public Awareness campaigns will assist in improving the sale of electric vehicles					
	General description of progress indicators					
	% increase in concessions processed for electric/ hybrid vehicles					

Table 67: Mitigation Action 24 - Fuel efficiency standards for vehicles and implementation of mandatory age limit on imported vehicles by 2025

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Fuel efficiency standards for vehicles and implementation of mandatory age limit on imported vehicles by 2025	Planned	Saint Lucia Bureau of Standards/ Transport Division	2019-2025	Energy, Transport	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To encourage the uptake of more fuel-efficient vehicles						
Brief description and activities planned under the mitigation action						
Improved fuel efficiency reduces the demand for fuel in vehicles and therefore reduce consumption of fossil fuels. 1. Develop fuel efficiency standard for vehicles; 2. Comprehensive assessment of the best age importation limit; 3. Development of age importation limit for approval by cabinet						
Estimated outcomes and estimated emission reductions						
Increase efficiency of vehicles						
Methodologies and assumptions						
Fuel economy improvements were considered for all gasoline and diesel vehicles (ICEs) In the baseline, new vehicles in 2025 have a fuel economy improvement of 5% compared to older vehicles. In the mitigation scenario, the fuel efficiency improvement is 15% in passenger vehicles, and 10% in freight vehicles (LDV and MDV)						
General description of progress indicators						
Fuel efficiency standard developed and implemented, # of new vehicle meeting fuel efficiency standard; age importation limit developed;						

Table 68: Mitigation Action 25 - 2500 ha of additional agricultural lands are converted to agroforestry practices by 2030.

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
2500 ha of additional agricultural lands are converted to agroforestry practices by 2030.	Ongoing	Agriculture Division/ Department of Sustainable Development	2019-2030	Agriculture	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To increase emission sinks in the agriculture sector; To improve biodiversity in the selected areas;						
Brief description and activities planned under the mitigation action						

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
	Integrating natural biodiversity, species and trees with crops and livestock will increase emission sinks from native trees, less fertiliser use, increased habitat and build resilience against one-off diseases. 1. Identify lands for conversion; 2. Undertaken conversion with farmers.					
Estimated outcomes and estimated emission reductions						
	Increased sequestration potential for emissions					
Methodologies and assumptions						
	The mitigation action modelled is that 2,500 ha of additional agricultural land is converted to agroforestry practices by 2030. It was assumed that land converted to agroforestry sequesters carbon at an average rate 15.9 tCO ₂ e per hectare per year as reported in the TNC. Each year from 2019-2030, an additional 208.3 ha of land is assumed to be converted to agroforestry, until a cumulative total of 2,500 ha is converted by 2030. From 2030 on, no further area is assumed converted to agroforestry and the total annual sequestration rate is based on the 2,500 ha of land under agroforestry each year from then on.					
General description of progress indicators						
	# Ha of agricultural lands converted to agroforestry					

Table 69: Mitigation Action 26 - 2,500ha reforested areas in degraded areas by 2030

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
2,500ha reforested areas in degraded areas by 2030	Ongoing	Forestry Division/Department of Sustainable Development	2019-2030	Land Use, Land Use Change and Forestry	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
	To increase emission sinks; to increase protected areas					
Brief description and activities planned under the mitigation action						
	Reforestation of degraded areas to improve forest sequestration. 1. Identify land for conversion; 2. Undertake conversion using sustainable techniques.					
Estimated outcomes and estimated emission reductions						
	Increased sequestration potential for emissions					
Methodologies and assumptions						
	The mitigation action modelled is that 2,500 ha of degraded land is reforested by 2030. It was assumed that reforested land sequesters carbon at an average rate of 4.9 tCO ₂ e per hectare per year as reported in the TNC. Each year from 2019-2030, an additional 208.3					

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
	ha of land is assumed reforested, until a cumulative total of 2,500 ha is reached in 2030. Then no further reforestation occurs and the annual sequestration rate remains steady each year from there on, based on the 2,500 ha of reforested land.					
	General description of progress indicators					
	# of ha of reforested areas in degraded areas					

Table 70: Mitigation Action 27 - 500ha of seagrass beds, reefs, mangroves protected and rehabilitated

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
500ha of seagrass beds, reefs, mangroves protected and rehabilitated	Ongoing	Forestry Division/Department of Sustainable Development	2019-2025	Land Use, Land Use Change and Forestry	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To increase emission sinks; to increase protected areas					
	Brief description and activities planned under the mitigation action					
	Protection of seagrass beds, reefs, mangroves and rehabilitation of areas to improve sequestration. 1. identify land for rehabilitation and protection.					
	Estimated outcomes and estimated emission reductions					
	Maintained sequestration potential for emissions					
	Methodologies and assumptions					
	Protection of the seagrass beds, mangroves and reefs will help maintain the existence of these areas, the rehabilitation efforts will improve GHG emission sinks					
	General description of progress indicators					
	# of ha of seagrass beds, reefs, mangroves protected and rehabilitated					

Table 71: Mitigation Action 28 - Watershed and flood management improvement

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Watershed and flood management improvement	Ongoing	Water Resource Management Agency/Forestry	2019-2030	Land Use, Land Use Change and Forestry	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To improve water resource management						
Brief description and activities planned under the mitigation action						
This measure would improve water resource, help with forestry practices in the areas and also increase sequestration. 1. Identify specific areas for watershed management.						
Estimated outcomes and estimated emission reductions						
Increase sequestration potential						
Methodologies and assumptions						
Improving watershed management will help improve forested areas.						
General description of progress indicators						
# watershed restored and properly managed						

Table 72: Mitigation Action 29 - 10% phase down by 2029, 30% phase down by 2035, 50% phase down by 2040 and 80% phase down by 2045.

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
10% phase down by 2029, 30% phase down by 2035, 50% phase down by 2040 and 80% phase down by 2045.	Ongoing	Department of Sustainable Development	2019-2045	Industrial Processes and Product Use	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O, HFC
Objective of the mitigation action						
To reduce use of HFC refrigerants						
Brief description and activities planned under the mitigation action						
Encouraging alternatives to HFC refrigerants through ratification of Kigali amendment and also improving energy efficiency in the sector. 1. Implementation of HFC phase down plan; 2. Public education and awareness.						

	Estimated outcomes and estimated emission reductions
	Reduced GHG emissions and increased energy efficiency sector
	Methodologies and assumptions
	The mitigation action modelled is: 10% phase down of HFC by 2029, 30% phase down by 2035, 50% phase down by 2040 and 80% phase down by 2045. The mitigation action assumes that each year, a fraction of the imported HFCs will be replaced by alternative refrigerants which have at least 90% lower global warming potential than the refrigerants used in the baseline.
	General description of progress indicators
	% reduction in importation of HFC's

Table 73: Mitigation Action 30 - Public awareness campaign for home composting systems

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Public awareness campaign for home composting systems	Planned	Solid Waste Management Authority	2019-2025	Waste	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To encourage home composting in effort to reduce waste to the landfill					
	Brief description and activities planned under the mitigation action					
	Aerobic digestion breaks down food and green waste for soil creation. 1. Develop a comprehensive education and awareness plan.					
	Estimated outcomes and estimated emission reductions					
	Reduced waste to the landfill; reduction in emissions in the waste sector					
	Methodologies and assumptions					
	Home composting methods, will reduce the amount of organic waste to the landfills					
	General description of progress indicators					
	% increase in home composting systems					

Table 74: Mitigation Action 31 - Pilot introduction for waste separation by 2023

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Pilot introduction for waste separation by 2023	Proposed	Solid Waste Management Authority	2019-2023	Waste	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To encourage behavioural change in waste sorting						
Brief description and activities planned under the mitigation action						
Improved management of solid waste will assist in recycling efforts and proper disposal. This is a precursor to recycling programs and encourage behavioural change. 1. Development of waste sorting strategy; 2. Development of waste sorting action plan; 3. Implementation of pilot project						
Estimated outcomes and estimated emission reductions						
Behavioural change to waste sorting; reduced waste to landfill						
Methodologies and assumptions						
Waste sorting will enhance behavioural change for recycling efforts and also reduce waste to landfills						
General description of progress indicators						
% increase in waste separation in commercial and residential areas						

Table 75: Mitigation Action 32 - Development strategy Re-purpose battery for electric vehicles to other use upon end of life by 2022

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Development strategy Re-purpose battery for electric vehicles to other use upon end of life by 2022	Planned	Solid Waste Management Authority	2019-2022	Waste	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To encourage recycling of batteries for electric vehicles at end-of-life						
Brief description and activities planned under the mitigation action						

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
	The use of electric vehicles is expected to increase the number of batteries in the waste stream, re-purposing these batteries will assist in re-directing waste to more useful means. 1. Identify suitable repurpose system for batteries; 2. Develop strategy for repurpose electric vehicles batteries; 3. Strategy endorsed by Cabinet.					
	Estimated outcomes and estimated emission reductions					
	Estimated reduction of electric vehicle batteries diverted to landfills					
	Methodologies and assumptions					
	With the introduction of electric vehicles, additional waste from batteries will be acquired over time. This measure will assist in the reduction of this waste to the landfill and recycling program for batteries					
	General description of progress indicators					
	Strategy developed and adopted					

Table 76: Mitigation Action 33 - Feasibility study to undertake Industrial-scale composting of organics from residents for production of biogas to use in waste collection vehicles

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Feasibility study to undertake Industrial-scale composting of organics from residents for production of biogas to use in waste collection vehicles	Proposed	Solid Waste Management Authority	2019-2025	Waste	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
	Objective of the mitigation action					
	To assess the level of biogas production available from organic waste and to re-purpose for use in vehicles					
	Brief description and activities planned under the mitigation action					

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Anaerobic digestion of organic matter will produce biogas. A study of the amount of biogas production available from the organic waste in the landfills, taking into consideration the efforts to reduce organic waste through composting.						
1. Develop terms of reference for study; 2. Undertake study for repurposing of organic waste in landfill.						
Estimated outcomes and estimated emission reductions						
Biogas potential identified						
Methodologies and assumptions						
The repurposing of organic waste from the landfill to produce biogas will help reduce overall waste and emissions from landfills and in addition reduce fossil fuel in the transport sector for the waste system						
General description of progress indicators						
Study on biogas potential completed						

Table 77: Mitigation Action 34 - Assessment of energy utilized for waste management

Name of the mitigation action	Status	Implementing institution	Duration (20XX-20YY)	Sector and subsector	Scope	GHGs covered
Assessment of energy utilized for waste management	Proposed	Solid Waste Management Authority	2019-2025	Waste	National	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide N ₂ O
Objective of the mitigation action						
To conduct energy audits for the complete waste management						
Brief description and activities planned under the mitigation action						
This is an energy audit of the complete waste system to identify energy efficiency measures in all aspects of the waste system.						
1. Develop terms of reference for audit; 2. Undertake audit of waste management.						
Estimated outcomes and estimated emission reductions						
Mitigation measures identified for waste management						
Methodologies and assumptions						
The audit is a precursor to actual implementations of action and would identify suitable energy efficiency measures for the waste management system						
General description of progress indicators						
audit of waste management system completed						

ANNEX III- GHG Inventory Summary Sheets (Table 1)

Table 78: 2018 Inventory Summary Table

Inventory Year: 2018

Categories	Emissions (Gg)			Emissions CO2 Equivalents (Gg)				Emissions (Gg)				
	Net CO2 (1)(2)	CH4	N2O	HFCs	PFCs	SF6	Other halogenated gases with CO2 equivalent conversion factors (3)	Other halogenated gases without CO2 equivalent conversion factors (4)	NOx	CO	NMVOCS	SO2
Total National Emissions and Removals	319.7778	4.1135	0.0948	72.4334	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8180	0.0000
1 - Energy	546.0191	0.4131	0.0293	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A - Fuel Combustion Activities	546.0191	0.2687	0.0290	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1 - Energy Industries	249.3453	0.0172	0.0030						0.0000	0.0000	0.0000	0.0000
1.A.2 - Manufacturing Industries and Construction	11.4929	0.0009	0.0002						0.0000	0.0000	0.0000	0.0000
1.A.3 - Transport	253.7734	0.0639	0.0235						0.0000	0.0000	0.0000	0.0000
1.A.4 - Other Sectors	31.4075	0.1866	0.0024						0.0000	0.0000	0.0000	0.0000
1.A.5 - Non-Specified	NO	NO	NO						0.0000	0.0000	0.0000	0.0000
1.B - Fugitive emissions from fuels	0.0000	0.1445	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1 - Solid Fuels		0.1445	0.0003						0.0000	0.0000	0.0000	0.0000
1.B.2 - Oil and Natural Gas		NO	NO						0.0000	0.0000	0.0000	0.0000
1.B.3 - Other emissions from Energy Production		NO	NO						0.0000	0.0000	0.0000	0.0000
1.C - Carbon dioxide Transport and Storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.C.1 - Transport of CO2	NO								0.0000	0.0000	0.0000	0.0000
1.C.2 - Injection and Storage	NO								0.0000	0.0000	0.0000	0.0000
1.C.3 - Other	NO								0.0000	0.0000	0.0000	0.0000
2 - Industrial Processes and Product Use	0.3833	0.0000	0.0074	72.4334	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8180	0.0000
2.A - Mineral Industry	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.A.1 - Cement production	NO								0.0000	0.0000	0.0000	0.0000

Inventory Year: 2018

Categories	Emissions (Gg)			Emissions CO2 Equivalents (Gg)				Emissions (Gg)				
	Net CO2 (1)(2)	CH4	N2O	HFCs	PFCs	SF6	Other halogenated gases with CO2 equivalent conversion factors (3)	Other halogenated gases without CO2 equivalent conversion factors (4)	NOx	CO	NMVOCS	SO2
2.A.2 - Lime production	NO								0.0000	0.0000	0.0000	0.0000
2.A.3 - Glass Production	NO								0.0000	0.0000	0.0000	0.0000
2.A.4 - Other Process Uses of Carbonates	NE								0.0000	0.0000	0.0000	0.0000
2.A.5 - Other (please specify)	NO	NO	NO						0.0000	0.0000	0.0000	0.0000
2.B - Chemical Industry	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.1 - Ammonia Production	NO								0.0000	0.0000	0.0000	0.0000
2.B.2 - Nitric Acid Production			NO						0.0000	0.0000	0.0000	0.0000
2.B.3 - Adipic Acid Production			NO						0.0000	0.0000	0.0000	0.0000
2.B.4 - Caprolactam, Glyoxal and Glyoxylic Acid Production			NO						0.0000	0.0000	0.0000	0.0000
2.B.5 - Carbide Production	NO	NO							0.0000	0.0000	0.0000	0.0000
2.B.6 - Titanium Dioxide Production	NO								0.0000	0.0000	0.0000	0.0000
2.B.7 - Soda Ash Production	NO								0.0000	0.0000	0.0000	0.0000
2.B.8 - Petrochemical and Carbon Black Production	NO	NO							0.0000	0.0000	0.0000	0.0000
2.B.9 - Fluorochemical Production				NO	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.10 - Other (Please specify)	NO	NO	NO	NO	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.C - Metal Industry	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.C.1 - Iron and Steel Production	NO	NO							0.0000	0.0000	0.0000	0.0000
2.C.2 - Ferroalloys Production	NO	NO							0.0000	0.0000	0.0000	0.0000
2.C.3 - Aluminium production	NO				0.0000			0.0000	0.0000	0.0000	0.0000	0.0000
2.C.4 - Magnesium production	NO					0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
2.C.5 - Lead Production	NO								0.0000	0.0000	0.0000	0.0000
2.C.6 - Zinc Production	NO								0.0000	0.0000	0.0000	0.0000
2.C.7 - Other (please specify)	NO	NO	NO	NO	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Inventory Year: 2018

Categories	Emissions (Gg)			Emissions CO2 Equivalents (Gg)				Emissions (Gg)				
	Net CO2 (1)(2)	CH4	N2O	HFCs	PFCs	SF6	Other halogenated gases with CO2 equivalent conversion factors (3)	Other halogenated gases without CO2 equivalent conversion factors (4)	NOx	CO	NMVOCS	SO2
2.D - Non-Energy Products from Fuels and Solvent Use	0.3833	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6000	0.0000
2.D.1 - Lubricant Use	0.3833								0.0000	0.0000	0.0000	0.0000
2.D.2 - Paraffin Wax Use	NE								0.0000	0.0000	0.0000	0.0000
2.D.3 a- Solvent Use									0.0000	0.0000	0.2144	0.0000
2.D.3 b- Road paving with asphalt												
2.D.3 d- Coating Applications											0.3833	
2.D.3 e- Degreasing											NO	
2.D.3 f- Dry cleaning											NE	
2.D.3 g- Chemical Products											NE	
2.D.3 h- Printing											NO	
2.D.3 i- 2G Solvent and product use											NE	
2.D.4 - Other (please specify)	NO	NO	NO						0.0000	0.0000	0.0023	0.0000
2.E - Electronics Industry	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor				0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics					0.0000			0.0000	0.0000	0.0000	0.0000	0.0000
2.E.4 - Heat Transfer Fluid					0.0000			0.0000	0.0000	0.0000	0.0000	0.0000
2.E.5 - Other (please specify)	NO	NO	NO	NO	NO	NO	NO	0.0000	0.0000	0.0000	0.0000	0.0000
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0.0000	0.0000	0.0000	72.4334	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1 - Refrigeration and Air Conditioning				54.7522				0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1 - Mobile Air Conditioning				17.6812								
2.F.2 - Foam Blowing Agents				NO				0.0000	0.0000	0.0000	0.0000	0.0000
2.F.3 - Fire Protection				NO	NO			0.0000	0.0000	0.0000	0.0000	0.0000

Inventory Year: 2018

Categories	Emissions (Gg)			Emissions CO2 Equivalents (Gg)				Emissions (Gg)				
	Net CO2 (1)(2)	CH4	N2O	HFCs	PFCs	SF6	Other halogenated gases with CO2 equivalent conversion factors (3)	Other halogenated gases without CO2 equivalent conversion factors (4)	NOx	CO	NMVOCS	SO2
2.F.4 - Aerosols				NO				0.0000	0.0000	0.0000	0.0000	0.0000
2.F.5 - Solvents				NO	NO			0.0000	0.0000	0.0000	0.0000	0.0000
2.F.6 - Other Applications (please specify)				NO	NO			0.0000	0.0000	0.0000	0.0000	0.0000
2.G - Other Product Manufacture and Use	0.0000	0.0000	0.0074	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1a - Manufacture of Electrical Equipment					NO	NO		0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1b - Use of Electrical Equipment					NE	NE						
2.G.1c - Disposal of Electrical Equipment					NO	NO						
2.G.2 - SF6 and PFCs from Other Product Uses					NO	NO		0.0000	0.0000	0.0000	0.0000	0.0000
2.G.3a - Medical Applications			0.0074						0.0000	0.0000	0.0000	0.0000
2.G.4 - Other (Please specify)	NO	NO	NO	NO	NO	NO	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.H - Other	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2179	0.0000
2.H.1 - Pulp and Paper Industry	NO	NO							0.0000	0.0000	0.0000	0.0000
2.H.2 - Food and Beverages Industry	NO	NO							0.0000	0.0000	0.2179	0.0000
2.H.3 - Other (please specify)	NO	NO	NO						0.0000	0.0000	0.0000	0.0000
3 - Agriculture, Forestry, and Other Land Use	-226.6246	0.4188	0.0582	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.A - Livestock	0.0000	0.4188	0.0318	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.A.1 - Enteric Fermentation		0.3531							0.0000	0.0000	0.0000	0.0000
3.A.2 - Manure Management		0.0657	0.0318						0.0000	0.0000	0.0000	0.0000
3.B - Land	-226.6290	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.1 - Forest land	-223.3765								0.0000	0.0000	0.0000	0.0000
3.B.2 - Cropland	-2.0055								0.0000	0.0000	0.0000	0.0000
3.B.3 - Grassland	NO								0.0000	0.0000	0.0000	0.0000

Inventory Year: 2018

Categories	Emissions (Gg)			Emissions CO2 Equivalents (Gg)				Emissions (Gg)				
	Net CO2 (1)(2)	CH4	N2O	HFCs	PFCs	SF6	Other halogenated gases with CO2 equivalent conversion factors (3)	Other halogenated gases without CO2 equivalent conversion factors (4)	NOx	CO	NMVOCS	SO2
3.B.4 - Wetlands	NO		NO						0.0000	0.0000	0.0000	0.0000
3.B.5 - Settlements	-1.2470								0.0000	0.0000	0.0000	0.0000
3.B.6 - Other Land	NO								0.0000	0.0000	0.0000	0.0000
3.C - Aggregate sources and non-CO2 emissions sources on land	0.0044	0.0000	0.0264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.1 - Emissions from biomass burning		NO	NO						0.0000	0.0000	0.0000	0.0000
3.C.2 - Liming	0.0044								0.0000	0.0000	0.0000	0.0000
3.C.3 - Urea application	NE								0.0000	0.0000	0.0000	0.0000
3.C.4 - Direct N2O Emissions from managed soils			0.0173						0.0000	0.0000	0.0000	0.0000
3.C.5 - Indirect N2O Emissions from managed soils			0.0054						0.0000	0.0000	0.0000	0.0000
3.C.6 - Indirect N2O Emissions from manure management			0.0037						0.0000	0.0000	0.0000	0.0000
3.C.7 - Rice cultivation		NO							0.0000	0.0000	0.0000	0.0000
3.C.8 - Other (please specify)		NO	NO						0.0000	0.0000	0.0000	0.0000
3.D - Other	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.D.1 - Harvested Wood Products	NE								0.0000	0.0000	0.0000	0.0000
3.D.2 - Other (please specify)	NO	NO	NO						0.0000	0.0000	0.0000	0.0000
4 - Waste		3.2816	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.A - Solid Waste Disposal		3.2636	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.B - Biological Treatment of Solid Waste		0.000008	0.00000048	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.C - Incineration and Open Burning of Waste				0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.D - Wastewater Treatment and Discharge		0.0180	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.E - Other (please specify)		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5 - Other	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Inventory Year: 2018

Categories	Emissions (Gg)			Emissions CO2 Equivalents (Gg)				Emissions (Gg)				
	Net CO2 (1)(2)	CH4	N2O	HFCs	PFCs	SF6	Other halogenated gases with CO2 equivalent conversion factors (3)	Other halogenated gases without CO2 equivalent conversion factors (4)	NOx	CO	NMVOCS	SO2
5.A - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.B - Other (please specify)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Memo Items (5)												
International Bunkers	99.8239	0.0010	0.0028	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.3.a.i - International Aviation (International Bunkers)	96.2026	0.0006	0.0027						0.0000	0.0000	0.0000	0.0000
1.A.3.d.i - International water-borne navigation (International bunkers)	3.6214	0.0003	0.0001						0.0000	0.0000	0.0000	0.0000
CO2 emissions from biomass	105.0724											