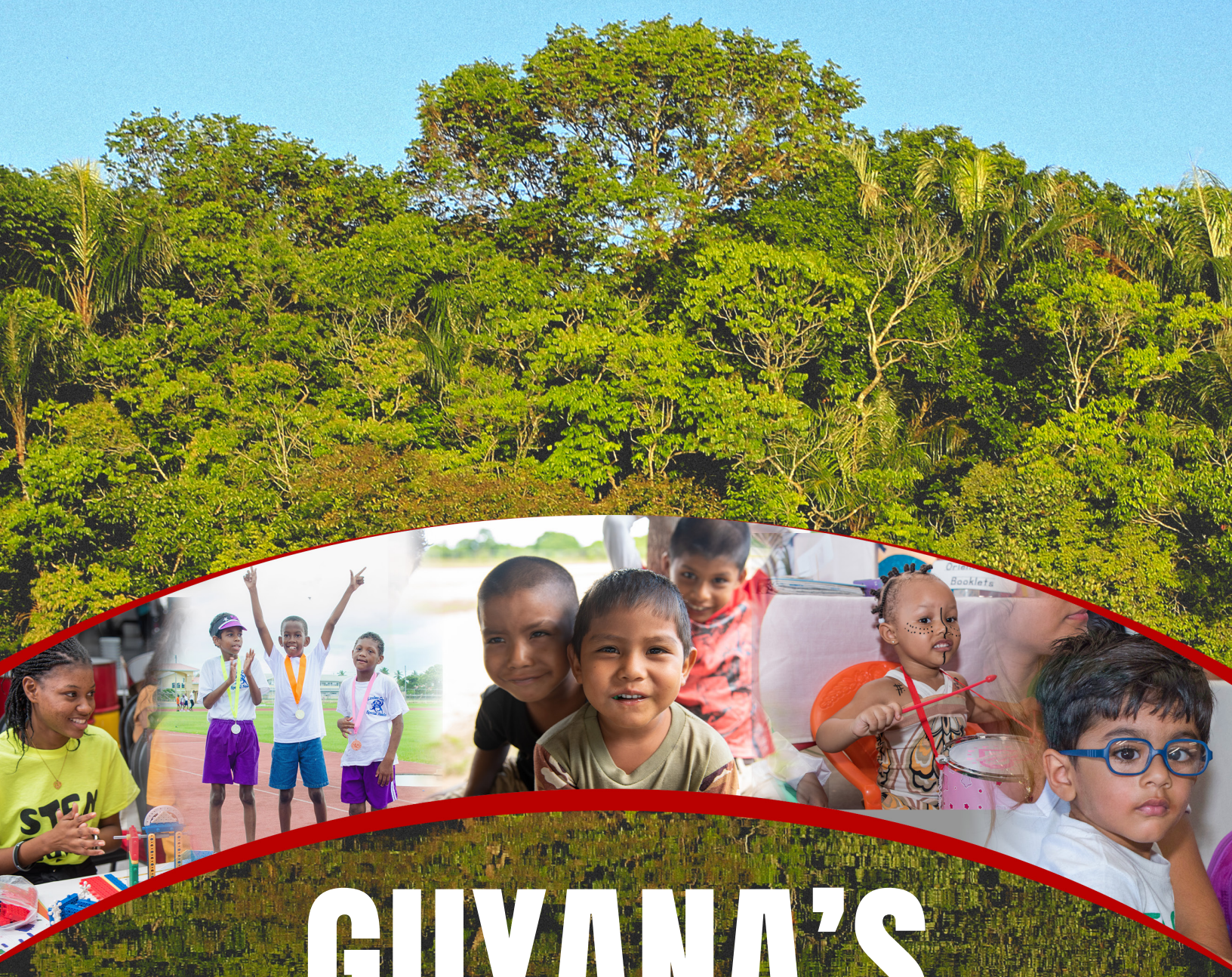


GUYANA'S LOW CARBON DEVELOPMENT STRATEGY 2030

JULY 2022

View at www.lcds.gov.gy

KANUKU MOUNTAIN RANGE

FOREWORD FROM THE PRESIDENT OF THE COOPERATIVE REPUBLIC OF GUYANA, H.E. DR. MOHAMED IRFAAN ALI

We live at an exciting time for our country. A fair, inclusive, sustainable, and prosperous Guyana is within reach. Yet, such a future is not guaranteed or pre-determined – it will only become real through hard work and the choices we make as a country, working together as "one Guyana".

This Low Carbon Development Strategy – the LCDS 2030 – sets out a vision for rising to the challenge. It was put together after a seven-month national consultation, involving Guyanese citizens, businesses, and organisations from all parts of our country.

I thank the thousands of people who participated in the consultation and contributed ideas and opinions to make the LCDS 2030 better.

The strategy that has resulted is not a static document – but rather a vision that will live for years to come. It sets a direction of travel that I believe will catalyse innovation and new ideas as its various elements move to implementation.

I hope that as this implementation pathway evolves, our national conversation and consultation about its important measures will continue. I want everyone in the country to have the chance to forge opinions about sustainable development. I was pleased to see

how during the national consultation, many diverse - and at times contradicting - views were expressed about how we can create a modern, sustainable economy and country. It is precisely this debate and contestation of ideas which will create the sustainable economy of which the contours are set out in this LCDS 2030.

I also look forward to Guyana continuing to be seen as a place where global models can be created to address global problems, and a place where superficial slogans are shunned in favour of the hard work needed to forge solutions.

We can show the world that countries like ours can lead the response to the complex challenges the world faces in the years ahead - challenges like finding the right balance between energy security, food security, and climate security; challenges like building national support from different sectors of society for long-term planning; challenges like ensuring that the world starts to build a global economy that values nature including forests, water, and oceans.

My Government will not be found lacking in taking forward the critical elements of this LCDS 2030. We will lead the way on one of the most ambitious energy transitions in the world – delivering cheaper, cleaner energy for all our people. We will support the creation of thousands of jobs in low carbon sectors across the country. We will support our indigenous peoples and hinterland communities when they choose their own priorities for development. We will ensure unprecedented investment in the infrastructure required to protect against climate change and biodiversity loss. We will also play our part in grasping new opportunities – for example, in creating a circular economy; delivering modern standards of urban planning and rural land use planning; continually enhancing the long-term sustainability of our forestry and mining sectors; and being a responsible participant in the global challenge to align global oil and gas demand with the need to address climate change and meet the goals of the Paris Climate Agreement.

The LCDS 2030 continues to propel Guyana on a pathway started in 2009, when we were the world's first developing country to publish a Low Carbon Development Strategy. All Guyanese should take pride in the scale of vision we set out then and reflect on the significant progress that was made since, as outlined in this document.

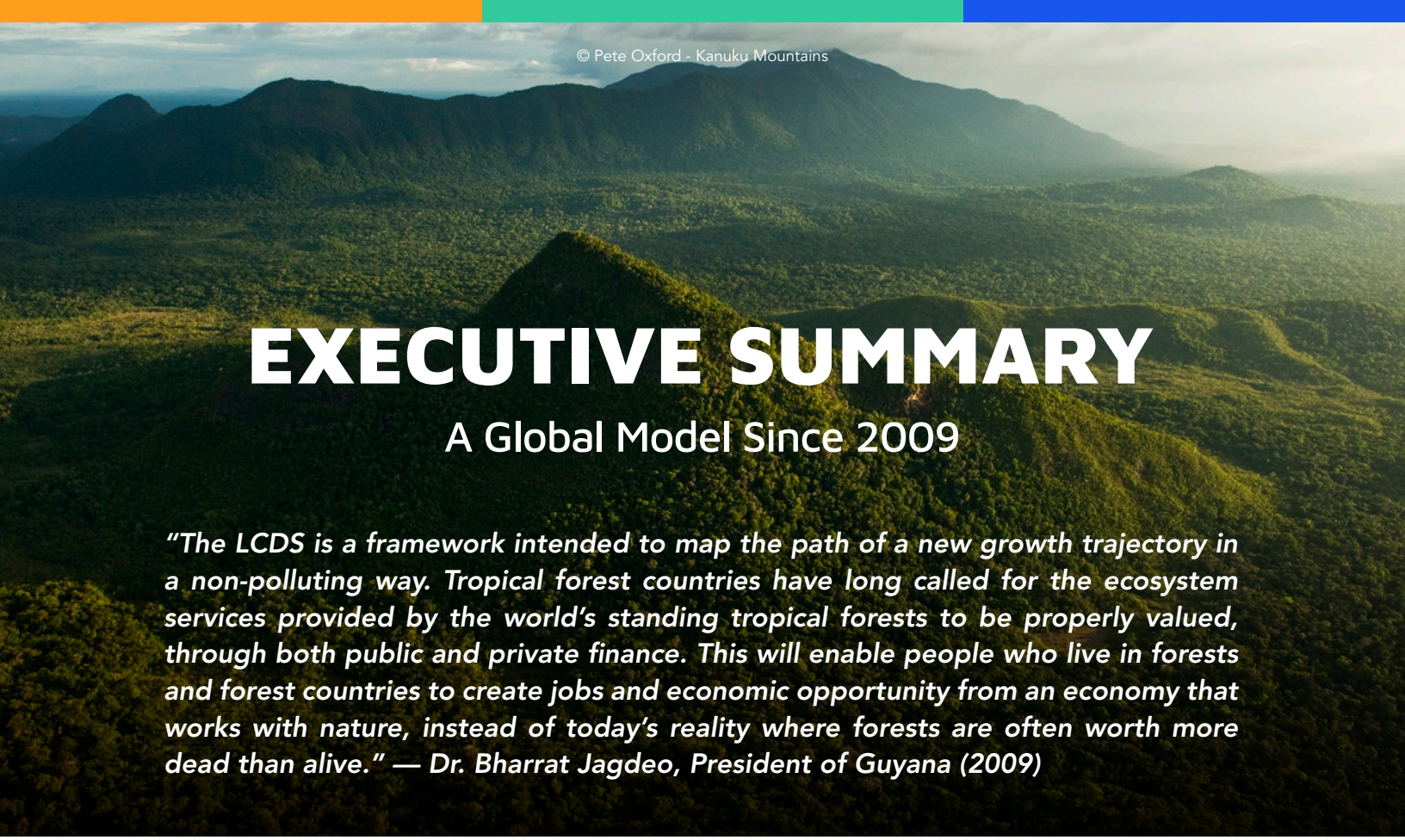
As we now move to the next stage - which includes expansion of the work we started in 2009 on creating a global model for valuing forests – I hope that individuals, businesses, and organisations, in Guyana and across the world, will stay engaged. I also hope that all politicians in the National Assembly will recognise that the long-term ambitions contained in this LCDS 2030 are ambitions for all Guyana, so deserve support and continued engagement.

Because if we work together, we can advance development for all our people. We can also demonstrate to the world – but perhaps more importantly to ourselves - that our "one Guyana" is more than up to the task of achieving big things and creating a better future for all.

List of Acronyms

ADF	Amerindian Development Fund
AFHP	Amalia Falls Hydropower Project
ALT	Amerindian Land Titling
ART-TREES	Architecture for REDD+ Transaction (ART)
BOOT	Build, Own, Operate and Transfer
CCUS	Carbon Capture Utilisation and Storage
CDM	Clean Development Mechanism
CDO	Community Development Officers
CDP	Community Development Plan
CMTS	Community Management Teams
COP	Conference of the Parties
CRSAP	Climate Resilient Strategy and Action Plan
CSI	Commercially Sensitive Information
DBIS	Demerara Berbice Interconnected System
EDWC	East Demerara Water Conservancy
EEZ	Exclusive Economic Zone
EITI	Extractive Industries Transparency Initiative
ER	Emissions Reduction
ERPAs	Emission Reductions Purchase Agreements
EPC	Engineering, Procurement and Construction
EU FLEGT	European Union Forest Law, Enforcement, Governance and Trade
LCDS	Low Carbon Development Strategy
FPIC	Free Prior and Informed Consent
GCCI	Georgetown Chambers of Commerce Inc.
GDP	Gross Domestic Product
GEA	Guyana Energy Agency
GFC	Guyana Forestry Commission
GGMC	Guyana Geology and Mines Commission
GIS	Geographic Information System
GLDA	Guyana Livestock Development Authority
GoG	Government of Guyana
GHG	Greenhouse Gas
GMCS	Guyana Marine Conservation Society
GPL	Guyana Power and Light Inc.
GRM	Grievance Redress Mechanism
GTA	Guyana Tourism Authority
GTI	Government Technical Institute
GYEITI	Guyana Extractive Industries Transparency Initiative
GW	Gigawatt
GWLI	Guyana Women's Leadership Institute
HECI	Hinterland Electrification Company Inc.
HFLD	High Forest Low Deforestation
HFO	Heavy Fuel Oil
IDB	Inter-American Development Bank

ICT	Information and Communications Technology
IEA	International Energy Agency
IFL	Intact Forest Landscape
IWRM	Integrated Water Resource Management
JCN	Joint Concept Note
KP	Kyoto Protocol
IPLC	Indigenous Peoples and Local Communities
MOAA	Ministry of Amerindian Affairs
MRVS	Monitoring Reporting and Verification System
MPAs	Marine Protected Areas
MSSC	Multi Stakeholder Steering Committee
MW	Megawatts
NAREI	National Agricultural Research and Extension Institute
NCCAP	National Climate Change Action Plan
NCERD	National Centre for Educational Resource Development
NDIA	National Drainage and Irrigation Authority
NG	Natural Gas
NGMC	New Guyana Marketing Corporation
OCC	Office of Climate Change
OECD	Organisation for Economic Co-operation and Development
PA	Protected Areas
PAS	Protected Areas System
PEFC	Programme for Endorsement of Forest Certification
PMO	Project Management Office
PPP	Public Private Partnership
PV	Solar Photovoltaic
RDC	Regional Democratic Council
R&D	Research and Development
REDD+	Reducing Emissions from Deforestation and Forest Degradatio plus Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks
SBB	Small Business Bureau
SIS	Safeguard Information System
TREES	The REDD+ Environmental Excellence Standard
UNCBD	United Nations Convention on Biological Diversity
UNCLOS	United Nations Convention on the Law of the Sea
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNFCCC	United Nations Framework Convention on Climate Change
UNCTAD	United Nations Conference on Trade and Development
UG	University of Guyana
VCM	Voluntary Carbon Market
VPA	Voluntary Partnership Agreement
VVB	Validation and Verification Body
WIIN	Women's Innovation and Investment Network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EXECUTIVE SUMMARY

A Global Model Since 2009

"The LCDS is a framework intended to map the path of a new growth trajectory in a non-polluting way. Tropical forest countries have long called for the ecosystem services provided by the world's standing tropical forests to be properly valued, through both public and private finance. This will enable people who live in forests and forest countries to create jobs and economic opportunity from an economy that works with nature, instead of today's reality where forests are often worth more dead than alive." — Dr. Bharrat Jagdeo, President of Guyana (2009)

In 2009, Guyana launched the first Low Carbon Development Strategy (LCDS) from a developing country, setting out a vision for inclusive, sustainable development - while simultaneously maintaining the country's forests, about 85% of the country's territory, to help meet some of the most urgent challenges the world faces.

Since then, the country has gained a greater understanding of the outsized contribution that Guyana's ecosystems make to the world's health and economy, as well as its role as one of the world's most important countries for biodiversity conservation:

- Guyana has maintained the second highest percentage of forest cover on earth, with more than 99% of the forest's 18 million hectares remaining.
- The forest stores 19.5 billion tons of carbon dioxide equivalent - the measure used for the greenhouse gas emissions which cause climate change (the world emits about 50 billion tons a year).
- Deforestation rates are among the lowest in the world and Guyana is one of only four countries in the world (and one of only two in the Amazon Basin) verified to have sustained a High Forest Low Deforestation (HFLD) state.
- Guyana is one of six countries which host the Guiana Shield, one of the most pristine rainforest landscapes in the world. The Guiana Shield stores around 18% of the world's tropical forest carbon and 20% of the world's fresh water[1].

1 https://www.amazonteam.org/maps/guiana-shield/

- The country has extremely high levels of biological diversity and endemism. It is home to approximately four percent of known animal species, including the following iconic Amazonian species: jaguar, giant river otter, harpy eagle, tapir, giant anteater, and giant armadillo. Guyana also maintains a percentage of littoral forest in the coastal area.

- Guyana's ocean area - more than half the area of Guyana's terrestrial area - offers a new frontier for sustainable development through the expansion of the Ocean/ Blue Economy.

Estimates of the economic value that Guyana's eco-system services provide to the world are considerable. Guyana's forests alone provide value that is estimated to range from US$40-US$54 billion annually.

Yet, this value is not recognised in monetary terms. By contrast, jobs and economic value can be generated by clearing forests for agriculture, mining, infrastructure, and other uses. In short, the world's tropical forests are worth more dead than alive. This is one of the reasons that forest areas that are the size of Greece disappear each year across the world, causing about 16% of global greenhouse gas emissions.

As one of nine countries/territories in the Amazon Basin - the world's biggest expanse of tropical forest - Guyana, since 2009, has sought to create a global model for avoiding the deforestation-led development path followed by countries all over the world, while at the same time creating opportunities for prosperous, inclusive development.

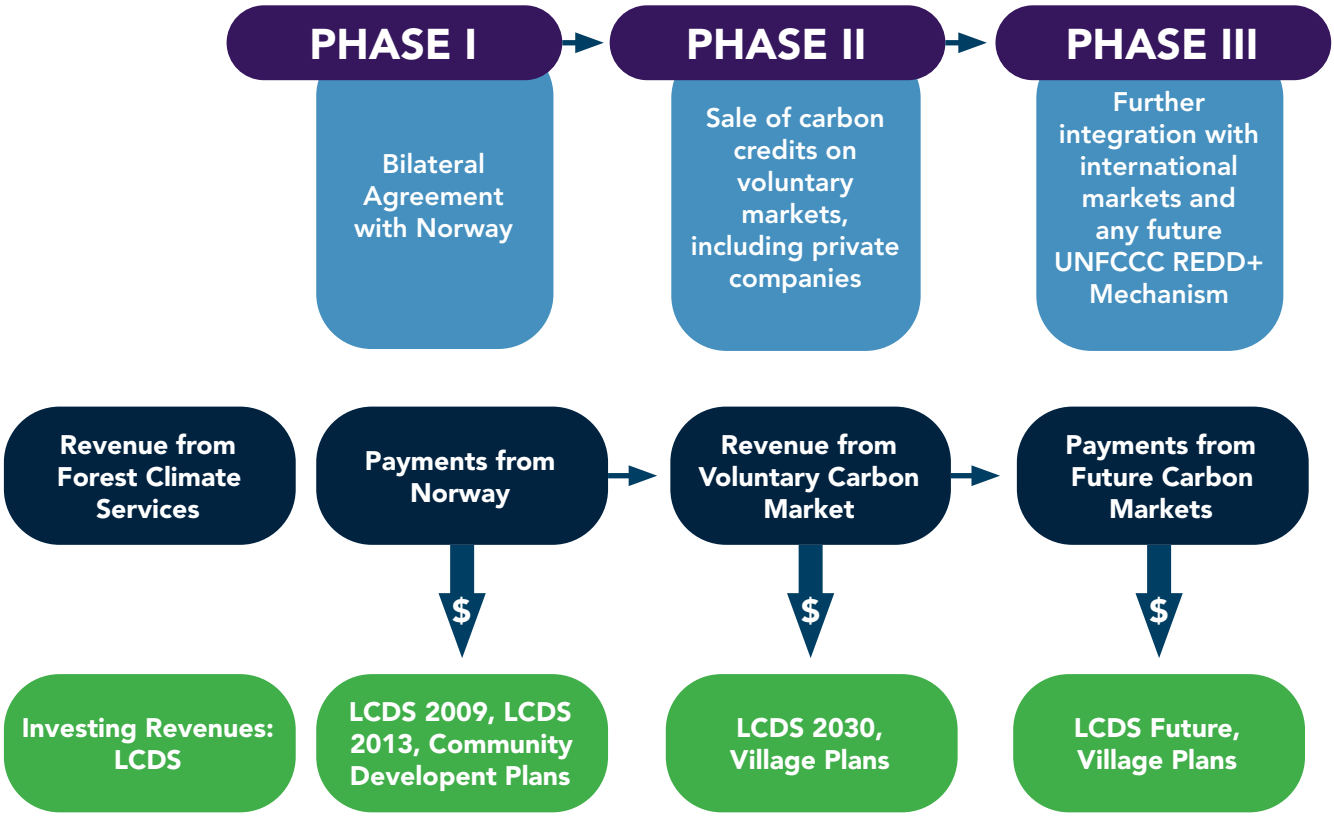
In 2009, the then President of Guyana, Dr. Bharrat Jagdeo, set out a vision for the first LCDS and called for international partners to work on the creation of new economic incentives on how to make forests worth more alive than dead - through providing a global model for REDD+, the United Nations Framework Convention on Climate Change (UNFCCC) mechanism for addressing climate change from forests.

This vision was given life through the 2009 LCDS, which set out a three-phase plan whereby Guyana would earn money for forest climate services and invest these in a Low Carbon Development Strategy:

- Phase I - a bilateral agreement with a partner which shared Guyana's vision
- Phase II - available market-based mechanisms
- Phase III - a fully-fledged UNFCCC REDD+ mechanism

As the payment mechanism evolved through the phases, revenues would be invested in the LCDS as outlined below.

PHASED APPROACH TO GUYANA'S FOREST CLIMATE SERVICES AND LCDS



This LCDS 2030 has been produced after a seven month national consultation on an initial draft, and sets out how Guyana can stay true to the vision set out in 2009. The country can create a model for avoiding deforestation and maintaining forests, while at the same time growing the economy five-fold over 10 years and keeping energy emissions flat; investing in urban, rural and Amerindian development; protecting the coast and hinterland from climate change; creating jobs in a suite of low carbon sectors; aligning the education and health sectors with low carbon development, and integrating Guyana's economy with its neighbours.

The LCDS 2030 sets out four inter-linked objectives for Guyana, the first three of which were the basic objectives of the LCDS since 2009 and the fourth of which was added to reflect new local and global realities:

- Value Ecosystem Services
- Invest in Clean Energy and Stimulate Low Carbon Growth
- Protect Against Climate Change and Biodiversity Loss
- Align with Global Climate and Biodiversity Goals

LCDS 2030 Objective 1: Value Ecosystem Services

Over time, Guyana aims to integrate with global mechanisms that value the country's globally significant ecosystem services including biodiversity, water management and ocean or marine resources. In the immediate term, Guyana's efforts will focus mainly on forest climate services, and the value Guyana provides the world in the fight against climate change, continuing with the three-phase approach first set out in 2009.

Phase I: The Guyana-Norway Partnership

The first phase of Guyana's low carbon vision, where payments for forest climate services were to come from a bilateral partner, saw Guyana entering the Guyana-Norway Partnerhip in 2009.

During the period 2009 to 2015, Guyana earned US$212.6 million dollars in payments for forest climate services from Norway, which reached US$220.8 million when investment income was included. These revenues were invested in renewable energy, protection against climate change, land titling, job creation and other priorities in the original LCDS. Crucially, Phase I saw Guyana building a world-class Monitoring, Reporting and Verification System (MRVS) for forest carbon, which now enables Guyana to move to Phase II for selling forest climate services in voluntary carbon markets.

The period 2016 to 2021 saw no payments for forest climate services under the Guyana-Norway Agreement but Guyana's MRVS continued to operate, allowing the generation of carbon credits for that period. These can be sold if a market can be accessed in Phase II.

Phase II – Voluntary Carbon Markets

The long-term future of forest carbon markets is expected to be underpinned through the UNFCCC's rules and corresponding international agreements. Towards this end, progress on REDD+ was made at, and since, the 2015 Paris Climate Agreement under the UNFCCC.

In 2021, at the Glasgow Conference of the Parties (known as COP26) of the UNFCCC, Guyana joined with other forest countries and the international community to pursue the enshrinement of a workable market mechanism within the UNFCCC. Progress was made at COP26 on the rules for market mechanisms, specifically towards the operationalisation of Articles 6.2 and 6.4 of the Paris Climate Agreement which address markets.

As a result of this work at the global level, coupled with the continued operation of Guyana's MRVS for over a decade, Guyana now can move to Phase II of the vision set out in 2009, and seek to access market-based mechanisms for forest carbon. From 2022, there is a strong possibility that Guyana's sale of forest climate services can be structured around high-quality voluntary markets that could include private, as well as international public sector, financing.

Guyana assessed various market standards that could underpin such an integration with global carbon markets, and the ART-TREES mechanism is the best match for Guyana's objectives – given that it values Guyana's contribution to maintaining globally significant forests and provides the means to access new revenues to boost both national programmes and community-led initiatives.

LCDS 2030 Objective 2: Invest in Clean Energy and Stimulate Low Carbon Growth

Revenues from carbon (and potentially other ecosystem services) markets, along with other national resources will be invested in:

- **National Low Carbon Priorities.** These are set out in the LCDS and an accompanying LCDS Investment Plan
- **Community-produced Village Sustainability Plans (VSPs)**. A dedicated 15% of carbon market revenues will be available for community-led programmes for indigenous peoples and local communities (IPLCs). These will be set out in Village Sustainability Plans or equivalent, put together by communities themselves.

Overall, this investment will see Guyana undergo one of the world's most ambitious energy transitions and grow the economy up to five-fold, while keeping greenhouse gas emissions from energy generation at around 2019 levels. This can be done through the replacement of expensive, polluting, heavy fuel oil with natural gas as a bridge to an energy system built mainly from hydropower, solar and wind power.

Alongside the national low-carbon energy transition, targeted investments can be made in the underlying infrastructure of a broader, low carbon economy to create jobs all over the country and enhance livelihoods. This includes investment to create a circular economy in Guyana where waste is avoided and better managed; better digital and transportation infrastructure; improved urban planning in Georgetown and its environs as well as in the other towns; sector-specific work across the country's economic sectors - including tourism, sustainable forestry, mining, business services, agriculture and fisheries; support for climate-smart health and education facilities; as well as laying the basis for new initiatives in areas such as fishing, shipping, ocean biodiversity and mangroves.

LCDS Objective 3: Protect against climate change and biodiversity loss

Global wellbeing continues to be damaged by climate change, including in Guyana where extreme weather events are destroying livelihoods and damaging the economy. In early 2021, floods saw the declaration of a National Disaster after the country experienced the second highest level of rainfall since 1981. Unlike in 2005, when floods affected close to 37% of the population and caused economic damage equivalent to 60% of GDP, the 2021 floods impacted all regions of the country and was declared a national disaster.. Over 130,000 acres (52,609 ha) of farmland were affected and approximately 1.3 million animals were lost.

In 2015, Guyana concluded a comprehensive Climate Resilience Strategy and Action Plan (CRSAP). However, this was not updated since then, so some of its recommendations need further analysis. Based on the outcomes of this analysis, Guyana will start a new set of priority investments in drainage and irrigation, sea defences, mangrove restoration, flood and drought measures to address the potential harm to households and businesses from climate change.

LCDS Objective 4: Align with global climate goals

Implementing the LCDS will advance progress towards the UN Sustainable Development Goals, as well as a a series of mulilateral, regional and bilateral agreements. Moreover, since the production of the 2009 LCDS, Guyana has discovered oil and gas, which has transformed the country's development prospects. Guyana will act strategically and responsibly as the sector develops, supporting global energy security while diversifying and decarbonising Guyana's domestic economy and investing in development priorities for all Guyanese, including health, education and low-carbon opportunities. At the same time, the Government will advocate internationally for a strong global carbon price and the removal of subsidies on fossil fuel to incentivise the lowest carbon, most cost-effective oil and gas in the global marketplace in line with the goals of the Paris Climate Agreement - under which there will be demand for decades to come. In parallel, Guyana will advance progressive policy to exceed recognised global standards for flaring and mandate the use of best technology in the Oil and Gas sector to limit its environmental impact.

In this Strategy:

- **Chapters One and Two** address the first objective of the LCDS 2030 - Value Ecosystem Services:
    - **Chapter One** looks at the expanded vision for the new low-carbon economy: forest climate services as envisaged since the early days of the LCDS being augmented by a vision for biodiversity, water management and the Ocean Economy.
    - **Chapter Two** outlines how forest climate services can be evolved because of the capabilities Guyana has built, and the potential of integrating with the emerging voluntary carbon markets from 2022. It sets out the process by which Guyana chose a global market standard to align with, and the potential for significant revenues to be invested nationally and at the level of IPLCs in accordance with community priorities set by the communities themselves.
- **Chapters Three and Four** address the second objective of the LCDS 2030 - Invest in Clean Energy and Stimulate Low Carbon Growth:
    - **Chapter Three** focuses on Guyana's plan for a low-carbon energy transition where it will achieve one of the biggest decoupling of greenhouse gases and economic growth in the world.
    - **Chapter Four** summarises other key elements of the low carbon development vision including plans for a circular economy, urban planning, village sustainability, and plans for economic sectors including tourism, agriculture and the other sectors of the economy.
- **Chapter Five** addresses the third objective of the LCDS 2030 - Protect Against Climate Change and Biodiversity Loss..
- **Chapters Six and Seven** address the fourth objective of the LCDS 2030 - Align with Global Climate and Biodiveristy Goals:
    - **Chapter Six** addresses sustainable management of the oil and gas industry.
    - **Chapter Seven** addresses the international treaties and conventions that Guyana is a party to in the area of climate, biodiversity and ecosystem services.
- **Chapter Eight** sets out how this LCDS was created through an extensive national consultation, oversight by the Multi-Stakeholder Steering Committee, and how it is being tabled in the National Assembly.
- **The LCDS Conclusion chapter** sets out how the LCDS Investment Programme will act as the main vehicle for articulating how the LCDS 2030 will be advanced in the years ahead. As the LCDS 2030 moves to implementation, more detailed consultation will take place on its individual elements, including national programmes as well as village-led consultations on their own plans.
- **Appendix One** provides background on the definition and valuation of Guyana's forests.
- **Appendix Two** summarises ART-TREES.
- **Appendix Three** highlights the achievements under the Guyana-Norway Partnership.

GUYANA'S LOW-CARBON DEVELOPMENT STRATEGY 2030

Create New Incentives for a Low-Carbon Economy

Sustainability Planning
- Forestry
- Biodiversity
- Water Resources
- Ocean/Marine Resources

Protect against Climate Change and Biodiversity Loss

Climate Adaptation and Resilience
- Climate Resilient Agriculture
- Climate Risk Assessment & Insurance
- Coastal Infrastructure
- Mangroves Restoration and Expansion
- Drought and Flood Management

Stimulate Future Growth: Clean Energy and Low-carbon Development

Green Jobs and Sustainable Livelihoods
- Clean and Renewable Energy
- Ocean Economy Opportunities
- Digital Infrastructure
- Low-carbon Transportation

Align with Global Climate and Biodiversity Goals

- UN Sustainable Development Goals
- Nationally Determined Contributions
- Aichi Targets on Protected Areas
- Leaders Pledge for Nature
- UN: Net Zero by 2050

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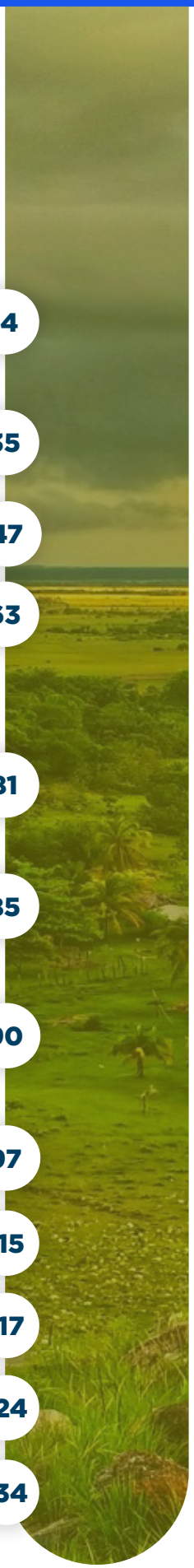

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CHAPTER ONE:
TOWARDS 2030 – A NEW ECOSYSTEM SERVICES ECONOMY

In 2009, Guyana launched the first Low Carbon Development Strategy (LCDS) from a developing country. The 2009 LCDS, and its 2013 update, highlighted the opportunity for Guyana to create a world-leading model for maintaining forests, receiving payments for globally significant forest climate services, and investing those payments in a low carbon economy.

This LCDS 2030 outlines the country's plans to continue advancing Guyana's payment for forest climate services model and investing new revenues in its low carbon economy - while at the same expanding the vision to include Guyana's other globally significant ecosystem services. As with the original vision, the expanded vision seeks to combine sustainable and equitable development in Guyana with enabling the country to play an outsize role in protecting globally vital ecosystems.

Towards that goal, Guyana is now working to create an ecosystems economy which achieves the right balance between potentially competing developmental models. This is one of the core challenges faced by the country, and to meet it, in the coming years, Guyana will advance: **low-impact mining** and forestry to enhance employment and income generation opportunities; **forest climate services** through which the value provided by Guyana's forests to the world is recognised; Guyana's next generation of **ecosystem services** such as water management, and biodiversity protection.

Further, as part of this vision, Guyana's **Protected Areas** will be expanded, partners will be sought for the **International Centre for Biodiversity Research**, and a sustainable **Ocean Economy** will be nurtured to ensure high-quality, long-term management of the country's rich ocean resources.

The LCDS Investment Programme – summarised in the LCDS 2030 Conclusion – will progress priority elements of this vision, alongside programmes outlined in other chapters of this LCDS 2030.

SUSTAINABLE FORESTRY AND LOW-IMPACT MINING	FOREST CLIMATE SERVICES	ECOSYSTEM SERVICES
• Finalise and Implement Voluntary Partnership Agreement under EU-FLEGT	• Sustain Monitoring, Reporting and Verification System (MRVS) for REDD+ and ART-TREES	• Expansion and protection of Guyana's mangrove forests
• Implement Programme for Endorsement of Forest Certification (PEFC)	• Implement Safeguard Information System for REDD+ and ART-TREES	• Maintain Intact Forest Landscapes
• Expand local value chain for wood products	• Create Policy and Legal Framework for project-level climate services, including framework for private sector-led reclamation and reforestation programmes	•Biodiversity Conservation and Protection
• Improved planning and recovery in mining areas		•Watershed Management
• Implement Mineral Mapping		• Examine green-grey solutions (engineered infrastructure/mangroves)
		• Strengthen and expand Guyana's Protected Area System
		• International Center for Biodiversity Research

Figure 1.1 Sustainably Growing the Forestry and Extractive Sectors

SUSTAINABLE FORESTRY AND LOW IMPACT MINING

Guyana's forests are vital assets in the global fight against climate change – and the country has one of the lowest, if not the lowest, deforestation rates in the world. However, the forests also serve a multitude of other functions, including generating employment and income through the forestry, agriculture, and mining sectors. Further, the forests — along with other parts of Guyana's territory — have many significant ecosystem services beyond carbon/climate. However, historically only the extractive activities generate employment and economic value - both forestry and mining are vital sectors to Guyana's economy:

- **Forestry** - Guyana's forestry sector accounts for approximately US$40 million to US$60 million in export value annually and employs over 20,000 persons. There are 17 large concessions in Guyana and 580 small concessions, all of which are leased to and operated by community forest operators and private individuals/ companies. The State holds no equity or other management interest in any forest concession. The Government, through the Guyana Forestry Commission, monitors and regulates the activities of forest concessions to ensure that strict sustainable forest management rules and guidelines are implemented, and that forest legislation is implemented effectively by operators.

- **Mining** - Guyana has a long history and tradition of mining (at small, medium and large scales). The mining sector contributed 16% of Guyana's GDP and 56.4% (US$1,017.1 million) of Guyana's export earnings. Along with the quarrying sector, the mining sector employs an estimated 12,000 - 18,000 Guyanese (approximately 4% – 6% of Guyana's total workforce). In 2019, the value of output from the mining sector was approximately G$211.1 billion, with exploration focusing mainly on gold, diamond, bauxite, loam, manganese, oil and sand. Guyana has maintained low levels of deforestation throughout mining extraction activity over the years. With decades of extraction in the mining sector to date, Guyana has maintained over 99% of its forest cover.

To strengthen efforts to achieve the needed balance between enhancing the employment and economic benefits created by the forestry and mining sectors, while also advancing efforts to safeguard Guyana's ecosystem services, the country is pursuing policies to (i) integrate planning and management of the mining and forestry sectors; (ii) continually improve sustainable forest management; (iii) advance low-impact mining.

Integrated Planning and Management of the Mining and Forest Sectors

Further work will take place to enable greater integration between the forestry and mining sectors, to ensure that economic returns are aligned with adhering to high social and environmental standards. While some work will take place at the sectoral level, and is covered below, other priorities will be cross-cutting, including:

- **Enhancing the Guyana Forestry Commission and Guyana Geology and Mines Commission Codes of Practice.** These are designed to take into account the various pieces of legislation that are directly related to forest management. They provide guidelines for best practices in order to ensure that continuing economic returns can be obtained over the long term, while simultaneously fostering overall sustainable utilisation and management of Guyana's forest and mining resources. They are designed to balance commercial and environmental considerations with social values through implementation. The GFC's integrated management system will support this evolution of Codes of Practice - through improved efficiency and addressing environmental, quality, and occupational safety and health areas. The Government intends to advance work which has already started on Codes of Practice for the Mining Sector, which will be done through close collaboration between the GFC and GGMC.

- **Advancing Transparency through Guyana Extractive Industries Transparency Initiative (GYEITI).** The Extractive Industries Transparency Initiative (EITI) is a global standard to promote open and accountable management of natural resources and seeks to strengthen government and company systems, inform public debates, and enhance trust. Guyana first engaged the EITI on 4th May, 2010 when the Prime Minister of Guyana expressed the country's interest in implementing EITI. In August 2017, Guyana submitted its applications to the EITI International Secretariat and received official acceptance as an EITI implementing country on 25th October, 2017. Guyana published its first EITI Report in 2019, covering the fiscal year 2017. This was followed by its second report in April 2021, covering fiscal year 2018. These reports disclosed figures related to mineral productions as well as exploration activities in the hydrocarbon sector.

Sustainable Forest Management

Guyana has one of the best managed systems of sustainable forestry in the world with exemplary Codes of Practice for timber harvesting, implementation of Reduced Impact Logging techniques, strong practices of forest governance and legality, and careful planning pre and post harvesting, all of which result in predominantly deforestation free supply chain for timber produced in Guyana. Levels of harvest are consistently below annual maximum levels established from forest inventory information. Sustainable forest management, including forest monitoring and enforcement, along with the continual

improvement of the accompanying codes of practices, are necessary to ensure the efficient management of forest resources. Legality and the activities that accompany attaining same are critical to achieving good governance in the forest sector. The LCDS Investment Programme will increase support for:

- **Finalising and implementing the Voluntary Partnership Agreement (VPA) under EU-FLEGT:** The European Union's Forest Law Enforcement Governance and Trade (EU-FLEGT) programme seeks to support forest governance through strengthening sustainable and legal forest management and promoting trade in legally produced timber. The VPA, when concluded, will be a bilateral trade agreement between the EU and Guyana, and will enable Guyana to export legally sourced and verifiable wood products to EU markets. In pursuing this process, Guyana aims to formulate, through negotiations with the EU, a pragmatic VPA which captures the parameters of strong forest governance, sound environmental principles, legality, and wide stakeholder input. At the end of 2018, following 6 years of negotiation, Guyana and the EU agreed in principle to the agreement and have initialled the VPA. It is intended that a period of preparedness will then follow for 3-5 years to enable Guyana to effectively implement the VPA under EU-FLEGT by the issuance of FLEGT licences.
- **Implementation of Programme for Endorsement of Forest Certification (PEFC):** The development of a national forest certification scheme for Guyana is a natural extension of the current FLEGT and REDD+ initiatives, with the Programme for the Endorsement of Forest Certification (PEFC) system in particular providing strong linkages with existing government policies and processes. In supporting the national implementation of Programme for Endorsement of Forest Certification (PEFC), Guyana will seek to build the capacities of national stakeholders to manage and audit PEFC-certified areas. Guyana will also develop the framework to implement the national process for PEFC. The LCDS Investment Programme will support marketing efforts for boosting local and international trade of certified forestry products. The LCDS Investment Programme will also support efforts of other certification schemes at company level, including FSC.
- **Improving added-value activities for forest products locally:** Expanding the value chain beyond primary production is integral to minimising the pressure on forest by finding the most suitable and economic use for the forest resources. Forest carbon is stored in a more stable state for longer periods of time without being emitted into the atmosphere the further advanced the wood products value change is. This makes wood products from Guyana a standout, sustainably sourced material for a range of application including for building purposes. Market research and promotion are integral to finding the most suitable and economic use for the forest resources. The LCDS Investment Programme will focus on the development of technical skills and techniques, supporting technology transfer and enabling more marketing and promotion of local products. Focus will be placed on developing the skills, products and techniques for value-added activities while supporting technology transfer within the sector and developing added value marketing capability to expand the value chain.

Low Impact Mining

While Guyana's deforestation rate is among the world's lowest, a significant portion of the deforestation that does take place results from forest clearing for mining that does not generate a profit.

Low impact mining refers to mining practices that limit impact on the environment by employing feasible technology, implementing effective planning, and improving human capacities. This will enhance employment and income generation opportunities through domestic regulation and linking with global market standards, and at the same time, protect the environment. Work has started on Codes of Practice for the Mining Sector as outlined above. The Government will also prioritise:

- **Mineral Mapping.** The implementation of mineral mapping in the mining districts will identify economically exploitable deposits as a means of improving productivity within the mining sector while slowing deforestation. Such prior planning efforts serve to limit areas deforested and advance efforts to reduce roadbuilding. This will significantly reduce deforestation by avoiding clearing of forest cover from lands which contain only marginal mineral deposits. The information will allow the Guyana Geology and Mines Commission (GGMC) to update its geological maps and be better able to use this information to more efficiently identify and plan for extraction of gold or other mineral deposits.

- **Exploring options for land reclamation and reforestation of mined areas.** Mine-site reclamation and closure are legal requirements for all mining operations and are critical to ecosystem restoration or re-establishment. To date, approximately 200,000 hectares of forest areas are available for rehabilitation/reforestation. Whilst some areas may see new vegetation, most of these areas will require rehabilitation activities. The Government will support these activities. These activities offer possibilities for carbon accumulation in new growth forest areas and are addressed further in Chapter 2.

ECOSYSTEM SERVICES

As set out in the first LCDS in 2009, Guyana's initial focus on ecosystem services was on forest climate services. These are discussed in Chapter 2 of this LCDS 2030. Since 2009, Guyana has done further work on other aspects of Guyana's ecosystem services.

Ecosystem function is essential for the full suite of services provided by the natural environment that are vital to human health and livelihoods. These services are the basis for the supply of food, drinking water and, in some cases, protection against the effects of natural disasters. Ecosystem services are impacted by increasing global populations, changes in technology and rapid economic growth. This is apparent globally - in the growing scarcity of access to clean drinking water, increasing environmental pollution and land-use change, all of which are affecting economic security and impacting the global climate.

While the opportunities presented by Guyana's enormous forest carbon stocks and sequestration capacity may be close to recognition by global markets, Guyana has many other significant nature-based and ecosystems services – including abundant fresh water and biodiversity.

The Government has recognised the importance of Guyana's rich biodiversity and myriad of ecosystem services. Biodiversity and ecosystem services underpin economic growth, sustainable development and human well-being. Guyana's rich biodiversity and ecosystem services, wealth of traditional and indigenous knowledge are strategic assets, and Guyana's diverse ecosystems provide goods and services that support livelihoods, including food, energy, and health.

The Government has set out to ensure that these resources are valued, conserved, managed, and appropriately leveraged for social, economic, and environmental benefits at the national level whilst meeting international obligations. This is addressed through the following sections which cover (i) Forest-Based Ecosystem Services, (ii) Biodiversity Conservation and Protection, (iii) Water Resources and (iv) the Ocean/Marine Economy.

Forest Ecosystems

As well as carbon storage and sequestration, covered in Chapter 2, Guyana's forest provides multiple other benefits, including biodiversity and water protection. To expand from an ecosystem services focus on forest climate services, the Government will also prioritise:

- **Expansion and restoration of Guyana's mangrove forests and ecosystems.** Mangroves provide several important services to Guyana that range from the protection of the country's coastal plain, to supporting biodiversity habitats, to provision of livelihoods to communities. Coastal ecosystems, specifically mangroves, provide an important function in sequestering significant amounts of carbon, designated 'Blue Carbon'. Remarkable for their ability to sequester carbon and mitigate climate change, mangroves store as much as four times the carbon of an equal area of inland rainforest and most of it is in the soil, held fast by their roots. At a global level, despite covering 0.7% of total land area, mangrove deforestation accounts for an estimated 10% of emissions globally. It is estimated that mangroves are worth at least US$1.6 billion annually in ecosystem services. Blue Carbon ecosystems are therefore an important resource to be protected, expanded and / or restored. Guyana has made significant strides in the protection of mangroves through its Guyana Mangrove Restoration Project. This project allowed for the establishment of national administrative capacity to manage mangroves in Guyana and focused efforts on mangrove restoration, community-based mangrove management as well as public awareness. Guyana will intensify efforts at mangrove restoration and management in coming years. The LCDS seeks to further explore Blue Carbon potential in Guyana, focusing on Guyana's mangroves in the initial stages. The expansion and restoration of mangrove forests in Guyana is the intended outcome.

- **Examination of Green-Grey Solutions (Engineered Infrastructure-Mangroves) utilising mangroves in Guyana's coastal protection.** Mangroves, highly adapted to the challenging and dynamic juncture between land and sea, form a resilient green infrastructure that serves as the foundation of an entire, highly productive ecosystem. Their role in consolidating soil is crucial in the process that created Guyana's coastal plain. Mangroves grow quickly (2m/yr) when the conditions are right. While their unique roots capture and consolidate soil, they become critical nurseries for commercially and ecologically important marine life, and their tangles of branches provide vital habitats for thousands of other species. Bulwarks of coastal resiliency, mangroves provide crucial protection from storm-surges, flooding, and erosion. The Government will advance through a process of assessment of current structures and framework, the design and implementation of a comprehensive framework of Green-Grey Solutions as a component within the mechanism addressing sea and river defence.

- **Maintenance of intact forest landscapes.** The LCDS will advance efforts to maintain intact forests, protect biodiversity corridors. Guyana has been reporting on Intact

Forest Landscapes (IFL) since 2010, because this is integral to Guyana's reporting on forest change and biodiversity protection, stemming from the concept that degradation of intact forest through human activities will produce a net loss of carbon and is often the precursor to further processes causing long-term decreases in carbon stocks. Furthermore, preserving intact forests will contribute to the protection of biodiversity. IFL continues to be an area that is underscored for its broader alignment to non-carbon aspects of ecosystem services and for this reason, it is a central area of the LCDS.

- **Watershed Protection:** Water can serve both a source and a sink function. In comparison to agricultural regions, forested ecosystems regulate storm surges, reduce sediment loading in rivers/ streams, and promote sustained water flow. This is an example of how both forested and agricultural ecosystems regulate water, serving as source functions, yet forested ecosystems provide greater climate mitigation potential. Reducing sedimentation can also reduce potential for damages and loss of infrastructure and communities from flooding (particularly climate-driven intensity of precipitation events). Water flow, water quality, transportation provided by waterways, and habitat provided for fishes and marine life are the most common watershed ecosystem services. The Government will seek to protect key watersheds and protect the ecosystems which they serve. Headwater protection will be addressed as a priority recognizing the integral role to the maintenance of river health.

Biodiversity Conservation and Protection

Biodiversity or biological diversity is defined as the number, variety, and variability of living organisms in a given terrestrial, aquatic, marine ecosystem. Biodiversity is a key characteristic and the foundation of ecosystems from local to global levels. Biodiversity influences human wellbeing through the services they provide. Such services include provisioning of food, fresh water, water purification, fuel, climate regulation, recreation, nutrient cycling and many more. Many people benefit from the exploitation of biodiversity, and as a result, biodiversity and ecosystem services underpin the global economy.

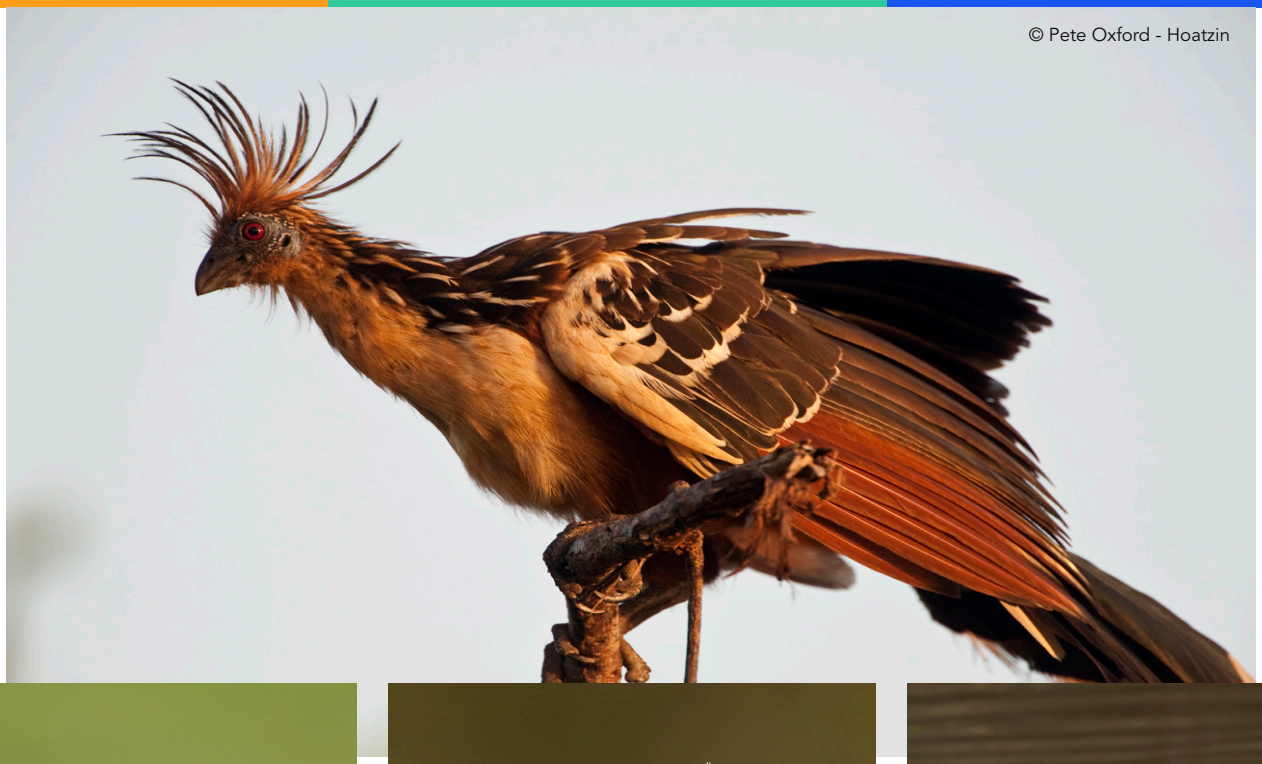
Biodiversity and related resources have contribute tremendously to Guyana's economy, particularly the forestry, fisheries, and wildlife sectors. In addition to these and other traditional development activities and sectors, Guyana can develop and promote entrepreneurship based around a range of other biodiversity related products and services. This can include strengthening of wildlife and eco-tourism products; bioprospecting; product innovation and development; intellectual property rights; and business incubation and market research. This will also include promoting enterprises by women and young people and scaling up traditional and indigenous biodiversity-based livelihoods. From an internal perspective, strengthening domestic markets for sustainable fishing, non-timber forest products, marketing support for tourism and improving air infrastructure are other areas that will be advanced.

Research and Development and capacity building

Biodiversity data and documentation are vital to understanding the assets that Guyana possesses. There is a paucity of data resulting from poor or lack of standardised data collection, storage and management. Where databases exist, there is no consolidated system for sharing and exchange. Strengthening and consolidating existing databases and biodiversity-related information systems — including establishing systematic ways to collect, store, analyse and share data — is paramount. The focus is on strengthening research within agencies and especially the University of Guyana, including the Centre for Biodiversity as a centre for excellence. Regulatory agencies, such as the Wildlife Conservation and Management Commission, the Environmental Protection Agency and Protected Areas Commission, will collaborate and develop research programmes to inform decision making, planning and management of biodiversity respectively. Extensive research capability of the Iwokrama International Centre will be optimised in advancing work in this area.

Leveraging biodiversity through the LCDS will be supported by up-to-date knowledge and skills. This requires:

- Capacity-building of professionals with management and regulatory responsibilities.
- Capacity-building of advisory services and technical support related to the Convention on Biological Diversity and the two protocols thereto (the Cartagena and Nagoya protocols) so that representatives are optimally prepared to articulate Guyana's positions and priorities and negotiate effectively at CoP and other meetings of parties.
- Promotion and investment in modern, cutting-edge technologies that are environmentally sound and suitable for Guyana's context, through technology support and transfer.
- Provision of appropriate technology and resource management including monitoring and enforcement. The role of information and communications technology should be emphasised in biodiversity conservation, management, sustainable use.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© Pete Oxford - Moth Caterpillar


© Pete Oxford - Giant Otter Eating Fish

STATUS OF BIODIVERSITY IN GUYANA – WHAT IS KNOWN

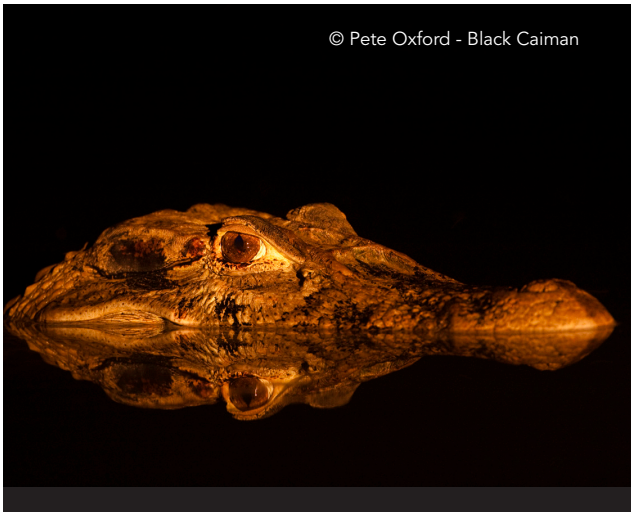
Guyana is situated in two of the world's most biodiversity rich zones: The Amazon region and the Guiana Shield. Guyana's ecosystems are largely intact and functional, with a very low rate of destruction/degradation and conversion. Guyana is situated in the northern boundary of the Guiana Shield. This unique region extends to Suriname, French Guiana and parts of Venezuela and small parts of northern Brazil and Colombia. Studies indicate that this region's geographical formation is more than two billion years old and spans 270 million hectares. As a result, it has been recognised as having regional and global significance related to biological diversity. Contributing to this would be the many ecosystems found across the country's landscape including our forests, savannahs, rivers and wetlands. Collectively, these ecosystems provide habitat for hundreds of species of flora and fauna. Guyana's Sixth National Report to the Convention on Biodiversity Diversity (CBD) indicated that current estimates for the major group of biodiversity.

Inclusive of other groups such as Arthropods, Fungi, Nematodes and Algae. The total estimated numbers of species found in Guyana is 13,229 species.

Despite its modest size, Guyana boasts globally extraordinary levels of biodiversity. The country is home to more than 900 species of birds, 625 strictly freshwater fishes, 250 mammals, 250 amphibians, and 210 reptiles, for a grand total of at least 2,285 vertebrates. In maps of global species diversity, Guyana occupies global hotspots for birds, mammals, and amphibians, as well as for freshwater organisms (mammals, amphibians, reptiles, fishes, crabs, and crayfish. Marine vertebrate diversity is typical of the Caribbean region, and scores modestly at the global scale. Guyana is home to more than 7,000 vascular plant species, the great majority of them native to the country. The Guyanese flora accounts for more than 85% of all vascular plant species known from the three countries of the Guiana Shield. More than 100,000 invertebrate species are expected to occur in Guyana (insects, arachnids, crustaceans, myriapods, mollusks, annelids, sponges, cnidarians, and others). A more precise accounting of these groups, and of Guyana's significant fungal and non-vascular plant diversity (lichens, liverworts, algae, etc.), is not possible at present due to incomplete sampling and incomplete species description. All of the numbers in this section are fluid since exploration of Guyana's rich biodiversity is ongoing and new species of plants and animals are described from Guyana every year. In 2021 alone, newly described species for Guyana include multiple fishes, plants, beetles butterflies, and a bat.

Nearly 100 of the vertebrate species known from Guyana occur nowhere else on Earth. These include:

- 75 endemic fish species, such as the armored catfish - Ancistrus Kellerae - known only from the Kuribrong River below Kaieteur Falls;
- 19 endemic amphibian species, such as the globally-endangered Kaei Rock Frog, known only from the Maringma Tepui; and
- Four endemic reptile species, such as the lizard Pantepuisaurus Rodriguesi, likewise known only from the Maringma Tepui.


© Pete Oxford - Black Caiman


© Pete Oxford - Dragonfly

Integrated Water Resources Management (IWRM)

The Government recognises that planning and managing water resources necessitate a complete and integrated study of all relevant hydrological, topographical, socio-cultural, economic, political, environmental and institutional factors across all related water-using sectors in Guyana. Further, the intricate nature of Guyana's drainage systems requires that activities for planning and management of the nation's river systems are conducted within the context of hydrological regions: delineated by hydrological boundaries created by Guyana's major river systems. Thus, the Government of Guyana will:

1. Develop and update, as necessary, Water Management Plans for each administrative region (depending on the factors mentioned earlier); adopting a cross-sectoral approach to ensure integration, stakeholder participation and representation of interests at all levels of society; and,
2. Undertake periodic assessments of both surface and ground water resources.

These actions will address:

- **Water Rights and Allocation.** The ownership of water is vested in the State. The Government of Guyana will therefore allocate water in a manner that will ensure equitable access and distribution among users, and promote effective and efficient development and use of water to help achieve the United Nations Sustainable Development Goals (SDGs) and to address poverty. During periods of droughts and floods, other natural and human-induced disasters, such as the contamination of groundwater aquifers that can threaten the health of the citizens of Guyana and the ecological integrity, the Government will foster cooperation among national institutions on matters pertaining to the re-directing of the use of water resources.

  Allocation, customary and conflict-resolution rules will be the formal mechanisms for deciding who gets water, for what purpose(s), how much, at what time, for how long, and under what circumstances water use may be restricted. The Government will recognise basic human development needs as a priority in any water-allocation plan. Additionally, special attention will be given to efficient use of water resources that harmonises greater economic and social benefits within the contexts of national needs and priorities, as well as on hydrological boundaries.

  Importantly, the Government, through national institutions will: (i) review water allocation periodically; (ii) revise allocations accordingly in view of socioeconomic development plans, especially pertinent to water resources, and subjected to strategic environmental assessments and sustainability appraisals of significant developments; and (iii) enforce efficient use of water resources that harmonizes greater economic and social benefits within the contexts of national needs and priorities, as well as on hydrological boundaries.

- **Water Supply and Sanitation.** The Government through national, regional and local bodies, will adopt all possible measures to safeguard the health and well-being of the people of Guyana, and protect the ecological integrity of aquatic systems by:
    1. Facilitating improved access and availability of safe and affordable drinking water supplies.
    2. Promoting rainwater harvesting and conservation techniques.
    3. Protecting watersheds from environmental degradation.
    4. Financing water research to determine sustainable use of both surface and groundwater resources while identifying and evaluating threats to all freshwater sources.
    5. Improving the current capacity of public water and sewerage institutions to provide necessary drainage and sanitation, including treatment of domestic wastewater in the interest of public health.
    6. Empowering institutions to undertake their responsibilities for regulating the use of water to avoid wastage and control pollution by environmentally harmful human actions
    7. Empowering local governments, community groups and associations to enhance awareness among the people of Guyana, as well as improve monitoring sources of pollution and wastage at the local levels
    8. Implement a comprehensive public awareness and education programme on water conservation in light of the threats posed by global climate change.

- **Water for the Environment.** The Government will consider as a priority environmental protection; restoration and enhancement measures consistent with the National Environmental Action Plan (2005); as well as the Water Management Plans that will be developed in response to specific conditions in the main hydrological regions. The Government of Guyana will give special attention to:

    1. Maintaining the integrity of the aquatic ecosystems.
    2. Preserving the quantity at levels compatible with demand and supply with regard for multiple uses.
    3. Managing surface run-off contribution to stream flow.
    4. Restoring the environment through reforestation and green infrastructure.
    5. Reducing sediment load from upland sources; improving riparian vegetation, and limiting livestock access to stabilise stream banks.
    6. Reducing land degradation.
    7. Protecting, enhancing, managing and restoring aquatic and terrestrial species and biological communities.
    8. Preserving the water quality of source waters within the watershed.
    9. Minimising or mitigating non-point source pollution of both surface and groundwater in the watershed.
    10. Conserving and protecting critical habitats within the watershed.
    11. Enforcing the "polluter pays" principle in the development of regulatory guidelines for all regulatory actions designed to protect public health and the environment.

12. Regulating exploitation of ground water resources to ensure that discharge rates do not exceed the recharging possibilities.

- **Water and Agriculture.** In recognition of the critical role of water resources management in agricultural and, more importantly, food and nutrition security, greater consideration will be given to:
    1. The role of drainage and irrigation in the context of Guyana's entire hydraulic system and its impact on the water balance of the country.
    2. The need for an increased role of local communities in the management of secondary drainage and irrigation systems.
    3. The establishment of surface water storage facilities for agricultural, domestic and other uses to inform efficient allocation during times of scarcity.
    4. Strengthening the Hydrometeorological Service both in terms of institutional infrastructure and personnel capacity building.
    5. Supporting and encouraging the formation of associations of farmers with responsibility for the operation and maintenance of secondary drainage and irrigation systems in their various localities.

- **Water for Energy.** The Government of Guyana through the Guyana Energy Agency will facilitate the planning and development of hydropower. As practicable as possible, these hydropower projects will be planned and developed as multipurpose projects, with the basin as the unit of planning. Specifically, the Government will:
    1. Ensure that the development of the country's hydropower potential is an integral part of the multipurpose uses of water.
    2. Ensure that hydropower development is affordable.
    3. Promote technical capacity building for local professionals, consultants and contractors involved in hydropower development to ensure sustainability of operations.
    4. Ensure hydropower development schemes are subject to sustainability appraisals as well as stakeholder considerations

- **Wastewater Management.** Management of wastewater particularly in Georgetown and other urban areas in Guyana is critical to safeguarding the health of citizens of Guyana, as well as the bio-physical environment. Moreover, as a requirement of the Cartagena Convention and Land-Based Sources of Pollution Protocol, the Government of Guyana will increase investments and human capital in the following areas:
    1. Institutional/technical capacity building.
    2. Revision of current policies, laws or other regulatory frameworks on wastewater management to reduce the extent of water pollution.
    3. Implementation of public education about waste water management.
    4. Monitoring of wastewater.
    5. Treatment of polluted water through appropriate technologies and techniques for the reuse and recycling of water.
    6. Expansion of the sewerage system.

- **Water Governance.** The Government will give effect to integrated planning, development, and management of the water resources by facilitating and promoting a multi-sectoral, multi-disciplinary and participatory approach, primarily through the relevant national body comprising technicians who represent stakeholder institutions involved in water resources management. This body will oversee/coordinate all functions of IWRM, meaning not only Water Resources Management, but also water quality regulation, water and wastewater services and water service regulation. The latter will be done in collaboration with Public Utilities Commission.

  The roles and functions of water-related agencies will be reviewed and where appropriate, existing institutions will be restructured or strengthened to ensure that sector plans are implemented efficiently. Additionally, special attention will be given to the (i) establishment of mechanisms to foster greater institutional collaboration at the national, regional and community levels through the issuance of specific directives; and (ii) separation of policy, planning, and regulatory functions from implementation and operational functions related to water resources in Guyana.

- **Public and Private Partnerships.** The Government recognises the importance of all stakeholders in IWRM: public and private sectors; communities and local groups; women; Indigenous communities; special needs and individuals. In this respect, all relevant stakeholders will have an important role to play in ensuring the sustainable management of Guyana's water resources. In an effort to give credence to the importance of the governance structures for water resources management, the Government will delineate the roles and responsibilities of stakeholders based on clearly defined principles.

  Participation of the private sector will be encouraged in planning, development and management of water resources projects for diverse uses, wherever feasible. Further, policies and programmes of public and private sectors and agencies involving water resources will be coordinated with other public and private sector organisations to create synergies and reduce conflicts, and actions to promote corporate social responsibility will be incentivised. The Government will create the enabling environment (including capacity building programmes) for stakeholders to perform their roles effectively. In particular, public-private partnerships will be fostered to improve the quality and distribution of water and water-related services to all people of Guyana.

PROTECTED AREAS

Guyana's current National Protected Areas System (NPAS) protects some of the country's most spectacular natural assets.

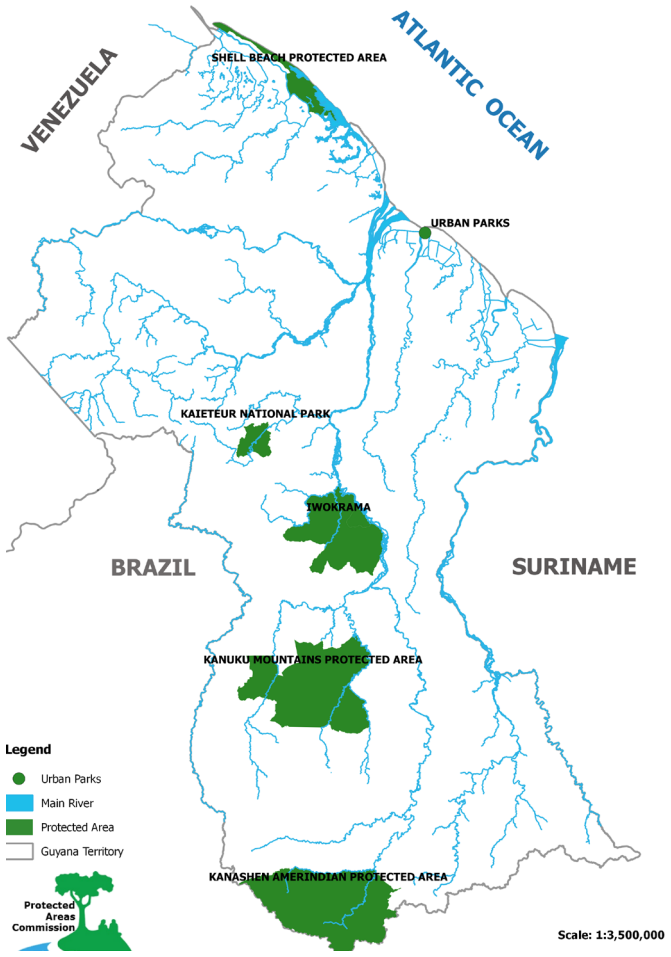
The NPAS, which currently encompasses approximately 8.4% of Guyana's land area, comprises a mix of urban and hinterland protected areas. These protected areas include the Iwokrama forest, Shell Beach Protected Area, Kanuku Mountains Protected Area, Kaieteur National Park and the Kanashen Community-owned Conservation Area; the urban parks include the National Park, Botanical Gardens, Zoological Park and Joe Viera Park. Guyana has not established marine protected areas to date.

The rationale for a significant expansion is clear. An expanded system is needed to safeguard currently unprotected ecosystems like wetlands and savannas; to conserve vulnerable species, like the greater than 100 vertebrates that occur in no other country on Earth; to preserve crucial ecosystem services for Guyanese citizens, like an abundant supply of clean drinking water; to ensure the long-term connectivity of Guyana's rivers and forests; to scale up promising new economic activities like eco-tourism; and to offset the impacts of extractive industries. Expanding the NPAS will also help Guyana meet global biodiversity targets while showcasing the country's success to date in preserving the country's globally important forests.

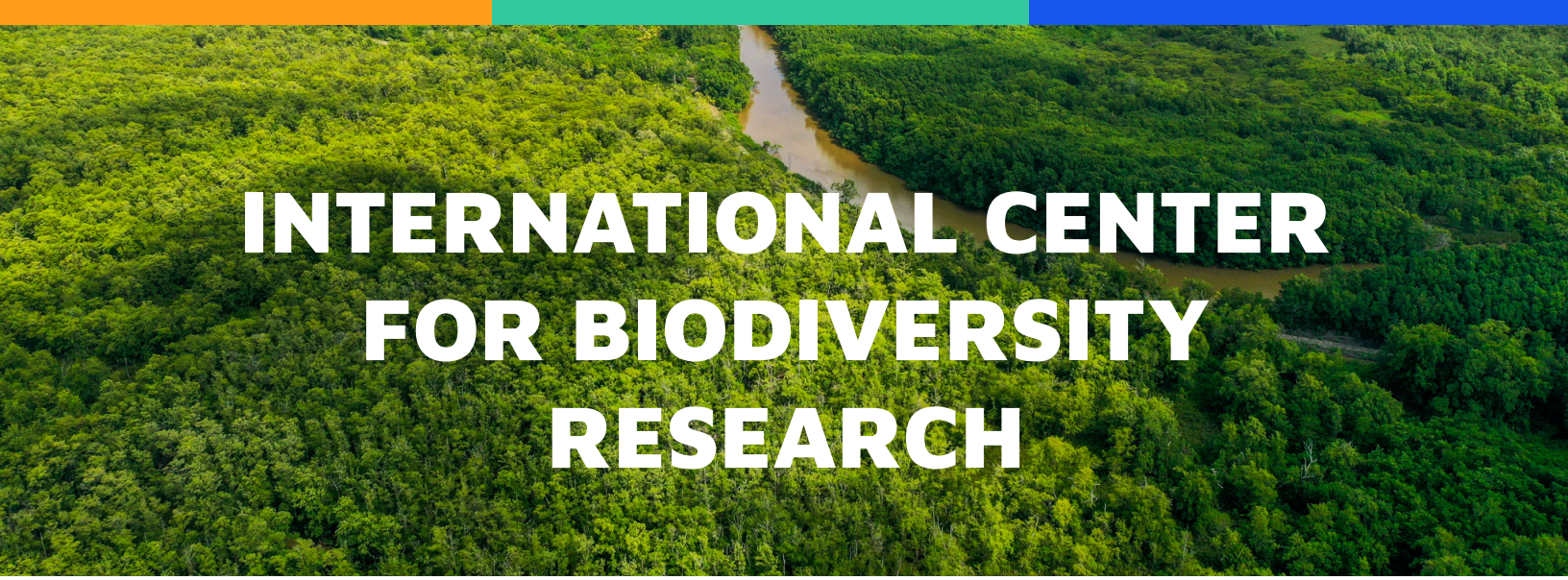
The Protected Areas Commission (PAC), established in 2012 following the passage of the Protected Areas Act in 2011, has oversight of management of Guyana's National Protected Areas System (NPAS), with responsibility for further expansion of the NPAS.
In recent years Guyana has laid the foundations for an efficient, science-based expansion of the NPAS. Three large-scale scientific analyses of the country's biodiversity (terrestrial, freshwater, and marine) have helped generate a map of priority areas for conservation. The PAC has prepared a detailed plan for expansion and strengthened partnerships with national and international institutions that can help advance that plan.

With these preparations, Guyana is committed to expanding the protected areas, initially to 17% and progressively to 30% by 2030, comprising of terrestrial and marine protection, framed by international biodiversity targets like the Aichi Biodiversity Targets and the Leaders Pledge for Nature. To achieve these goals the Government will:

- coordinate a transparent, multi-stakeholder process to establish new protected areas in Guyana's terrestrial and marine territory;
- establish equitable protected areas that benefit local communities and involve them in management;
- establish science-based protected areas that protect a representative sample of the country's natural treasures;
- establish effective protected areas that are well-staffed, well-equipped, and well-funded;
- establish integrated protected areas that advance multiple other goals of the LCDS;
- complement the NPAS with Other Effective Conservation Measures, to protect priority areas via conservation mosaics that balance strict protection of core areas with sustainable resource use in adjacent areas;
- diversify Guyana's protected areas portfolio with a range of categories and governance types (with special focus on areas that are managed by local peoples and areas that are co-managed with local peoples);
- leverage Guyana's legacy as the "Land of Many Waters" to assume global leadership in pioneering freshwater conservation areas and mechanisms.
- establish Key Biodiversity Areas (KBAs) as part of the ongoing porgramme of expanding the Protected Areas System.



Map Showing Protected Areas in Guyana (2022)



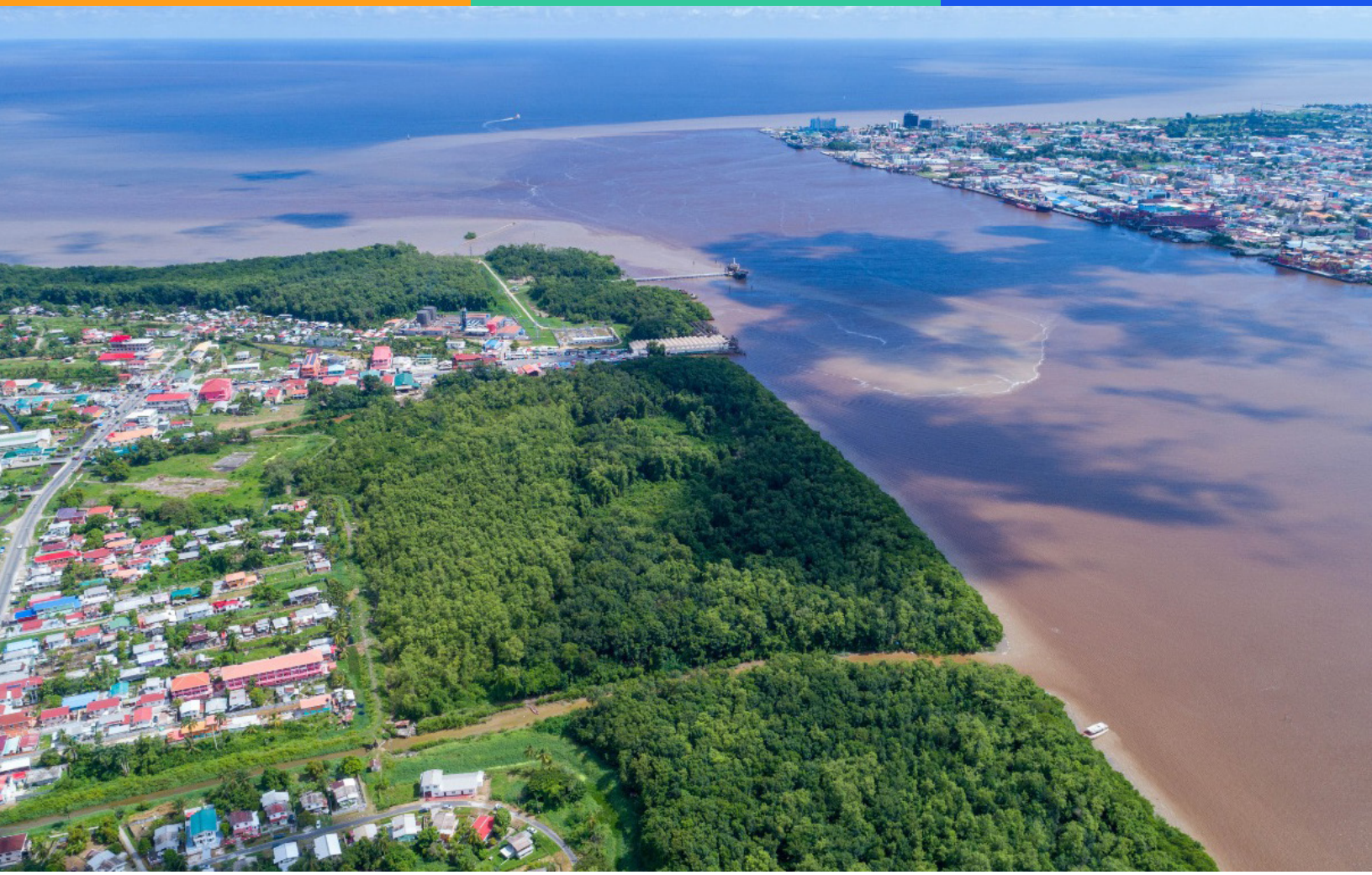
INTERNATIONAL CENTER FOR BIODIVERSITY RESEARCH

Working with local and international partners, including the University of Guyana, the Government will support the establishment of an International Centre for Biodiversity Research. This Centre will connect research work at national and local levels and provide networking facilitation.

The Centre will seek to lead major national and international research activities, and support programmes involving Government, civil society, private sector, and Indigenous Peoples and local communities in advancing research and development in ecosystem services and functions.

This will include at scale R&D work as well as localised community level development. Academic institutions at national level (such as the University of Guyana, Cyril Potter College of Education, Iwokrama, and the National Centre for Educational Resource Development) and local level (such as the Bina Hill Institute) and will be engaged. The programme will be developed and expanded to fully reflect the new and emerging thrust of the LCDS priorities and to holistically expand R&D throughout the academic and vocational pursuits of formal and informal education.

The Centre will liase with the Ministry of Education to advance the aspects of low carbon development discussed as part of the Education sector in Chapter 4.



THE OCEAN ECONOMY

Guyana, being a coastal state, also has under its jurisdiction as afforded via the ratification of the United Nations Convention on the Law of the Sea (UNCLOS), a significant ocean area which equates to more than half of Guyana's terrestrial area. Traditionally, Guyana has largely harnessed from its ocean, the fisheries resources, with its other major use being maritime transit. However, since 2015, with the confirmation of significant petroleum reserves, oil and gas are added to this matrix. In addition, there is an emerging opportunity to enhance these traditional ocean activities, and equally to develop other resources which hold potential for future growth.

Guyana recognises that if its resources are collectively harnessed, the ocean offers a new frontier for economic development for the benefit of the citizens. Equally, it also provides many intangible services that are vital to human wellbeing. Therefore, the development of a Blue or Ocean Economy is a priority, from which some elements offer an opportunity to bridge the land-ocean nexus via low-carbon growth. The emphasis will be on sustainability and exploring new opportunities that will include tourism; expanding carbon sequestration and ecosystem opportunities in mangroves; sustainably managing fisheries stock; expanding the shipping and logistics sector and exploring greater sovereignty via connectivity.

Guyana will develop an Ocean Policy, Integrated Marine Management for Land-Based Pollution, and Marine Spatial Plan (MSP) and promote the establishment of Marine Protected Areas (MPAs). It will also work with the Commonwealth-coordinated Marine Economies Programme. Priorities will include:

- **Biotechnology – Genetic Resources.** The coast and deep-sea portions of Guyana's marine ecosystem are not as extensively studied as terrestrial ones. Notwithstanding, it is well established that the marine ecosystems of the Guianas (Suriname, French Guiana, and Guyana), are very productive and show great species richness and biodiversity and by extension diverse marine genetic resources. The various genetic resources have multiple values including ecological, pharmaceutical, cosmetic and commercial values.
- **Ecosystem Services.** A mapping of the current and potential services provided by the ocean in Guyana's jurisdiction is beneficial and is recognised as critical information management in assisting the sustainability of the living resources.
- **Fisheries and Mariculture**. With an Exclusive Economic Zone (EEZ) of approximately 136,000 km2, most of the fishery activities are concentrated on the continental shelf area and, to a small extent, the continental slope. Guyana has a very productive fisheries sector, with the shelf area unexploited. Fishing may be considered the second most important economic activity along the Atlantic coast. Exclusively, Guyanese fisherfolk dominate the subsistence and artisanal sectors, which are primarily conducted in the near-shore regions along the coast. Seafood is one of Guyana's commodity exports, with marine fish and crustaceans having the highest tonnage exported over the last 20 years. Approximately 4,500 local artisanal fishers operate in the sector, 1,000 of whom are boat owners. A significant number of women are employed in this sector as well.
- **Tourism.** Guyana is best known as an eco-tourism destination which is centred on activities mainly in the Hinterland regions. However, the ocean provides some niche options, one such being angling tourism. Angling — that is, recreational fishing with rod and line and charter boat fishing — constitutes a high-value and sustainable touristic activity in coastal regions. Its activities contribute income to coastal communities and is a subset of the the required assets to potentially grow this activity into a feasible income generation scheme. Other ocean-based activities can also be part of the tourism appeal such as bird-watching in the mangroves, or tours. When these are added to some of the coastal attractions, it can drive a subset of Guyana's tourism appeal. A non-invasive tourism model would be based in the empowerment of the locals, who would receive support and training so that they benefit from potential revenues, for example by offering homestay, bird-watching, research, and wilderness experiences.

The LCDS will support existing Governmental and Non-Governmental efforts (such as GMCS) that are aimed at protecting and restoring marine life and coastal ecosystems in partnership with coastal communities.

CHAPTER TWO
MOVING TO A MARKET MECHANISM FOR FOREST CLIMATE SERVICES

Chapter One outlined how, over time, Guyana intends to integrate with emerging international markets that value the country's globally significant ecosystem services. Carbon markets are the immediate priority because they are the most mature ecosystem services market.

Carbon markets are a mechanism by which emitters of greenhouse gas emissions (for example, individuals or companies) compensate for their emissions by buying certified carbon credits to pay either for emissions reductions or sequestration (storage).

While the use of carbon credits is a wide and complex field, the two main areas where carbon markets are increasingly used as a policy tool are to create incentives to: (i) start fixing the market failure where the world's tropical forests are not valued for the climate services they provide; (ii) accelerate the deployment of renewable energy.

Guyana will pursue progressive integration with global markets that address these and other areas. This includes relevant *voluntary* markets (where companies choose to pay for carbon credits to deliver on their corporate strategies to contribute to greenhouse gas emissions reductions and sequestration) and *compliance* markets (where companies and governments are required by law or regulation to pay for reductions and sequestration). Priority efforts on forest climate services are outlined below, with opportunities for renewable energy in Guyana's hinterland outlined in Chapter 3.

Carbon Markets for Forest Climate Services

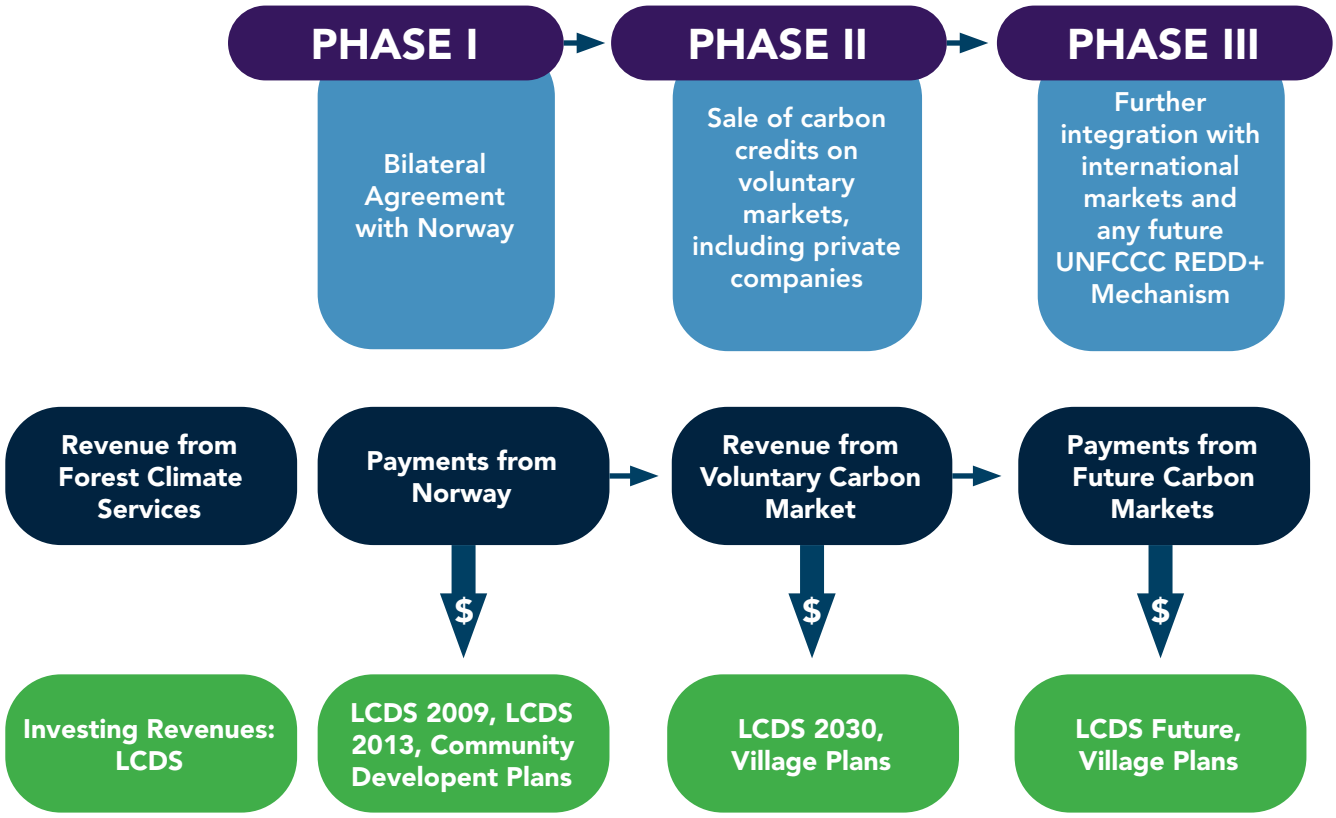
For many years, Guyana, along with most countries, has advocated for the inclusion of forest climate services in carbon markets. This is now part of the United Nations Framework Convention on Climate Change (UNFCCC), through a mechanism known as REDD+.

The 2009 LCDS outlined how Guyana intended to start building a mechanism for REDD+, through a three-phase process:

- Phase I - a bilateral agreement with a partner which shared Guyana's vision
- Phase II – available market-based mechanisms
- Phase III - a fully-fledged UNFCCC REDD+ mechanism.

As the payment mechanism evolved through the phases, revenues would be invested in the LCDS – as outlined in Figure 2.1.

FIGURE 3.1 PHASED APPROACH TO GUYANA'S FOREST CLIMATE SERVICES AND LCDS



For Phase I, Guyana entered the Guyana-Norway Partnership in 2009 and among other successes built a world-class Monitoring, Reporting and Verification System (MRVS) for forest carbon, which now enables Guyana to move to Phase II for selling forest climate services in voluntary carbon markets.

Phase I: The Guyana-Norway Agreement

In the absence of a UNFCCC REDD+ mechanism, Guyana and Norway sought to create a globally replicable model for a likely REDD+ mechanism. When it was agreed, the Guyana-Norway Agreement was the second-largest Interim REDD+ arrangement in the world.

During the period 2009 to 2015, Guyana earned US$212.6 million dollars in payments for forest climate services from Norway, which reached US$220.8 million when investment income was included – the revenues were invested in renewable energy, protection against climate change, land titling, job creation and other priorities from the original LCDS. These are summarised in Appendix 3.

The period 2016 to 2021 saw no payments for forest climate services under the Guyana-Norway Agreement but Guyana's MRVS continued to operate, allowing the generation of carbon credits for that period. These can be sold if a market can be accessed in Phase II.

Phase II: Moving to a Carbon Market Mechanism

The long-term future of forest carbon markets is expected to be underpinned through the UNFCCC's rules and corresponding international agreements. Towards this end, progress on REDD+ was made at, and since, the 2015 Paris Climate Agreement. In 2021, at the Glasgow Conference of the Parties (known as COP26) of the UNFCCC, Guyana joined with other forest countries and the international community to pursue the enshrinement of a workable market mechanism within the UNFCCC. Progress was made at COP26 on the rules for market mechanisms – specifically towards the operationalisation of Articles 6.2 and 6.4 of the Paris Climate Agreement which address markets.

As a result of this work at the global level, coupled with the continued operation of Guyana's MRVS for over a decade, Guyana now can move to Phase II of the vision set out in 2009, and seek to access market-based mechanisms for forest carbon. From 2022, there is a strong possibility that Guyana's sale of forest climate services can be structured around high-quality voluntary markets that could include private, as well as international public sector, financing.

Guyana will generate credits to be traded in these voluntary carbon marketplaces, with independent verification of the quality of those credits and their adherence to UNFCCC rules for REDD+. These rules include science-based criteria and a set of social and rights-based safeguards, known as the Cancun Safeguards.

To benefit from this opportunity, Guyana is conducting a five-step process to:

I. **Confirm Guyana's objectives:** determine what a market mechanism needs to provide to be valuable for Guyana and the world

II. **Choose a Standard:** assess whether there is a global carbon market standard that sufficiently matches Guyana's objectives
III. **Engage with the chosen market standard:** start the process of generating certified credits
IV. **Sell Guyana's credits:** earn revenues and invest them in the LCDS 2030
V. **Ensure a fair sharing of revenues:** design a revenue/benefit sharing mechanism so that all revenues are invested in priorities identified through the national consultation on LCDS 2030, with a dedicated focus on indigenous peoples and local communities (IPLCs). A major focus of the national consultation on the draft LCDS involved receiving input and ideas from communities, individuals, non-governmental organisations and others – with the resulting revenue sharing mechanism set out under Step Five below.

During the seven-month national consultation on the draft LCDS, preparatory work took place on each of these steps. However, in line with the commitment set out by President Ali in October 2021, no binding deals would be concluded until the national consultation on the draft LCDS 2030 has taken place.

Step One: Confirm Guyana's Objectives for Forest Carbon Credits

There is broad consensus that a market mechanism is needed in Guyana and globally that is: *jurisdiction-wide* (national-scale or in the case of very large countries, at the level of states); *high quality*, demonstrating additionality, permanence and high environmental integrity and community development co-benefits; *holistic* to incentivise all elements of REDD+. This is the only way to provide the full suite of incentives for all the world's tropical forest countries to reduce deforestation and maintaing standing forest.

Therefore, as set out in Figure 3.2 Guyana's proposed forest carbon mechanism – outlined in Appendix 2 - has four modules for incentive creation:

- **Reduce Deforestation** - to incentivise reducing deforestation; albeit that in Guyana's case deforestation is already the lowest, or close to the lowest, in the world

- **Restore Forests** - to incentivise restoring forests where deforestation has already taken place; in Guyana's case there are 200,000 hectares where this could happen as a priority

- **Remove Carbon** - to recognise the value that standing forests continue to provide by removing carbon dioxide from the atmosphere; Guyana's forests remove about 154 million tons of CO2e every year, about the same as annual greenhouse gas emissions from Norway, Sweden, Finland and Denmark combined

- **Conserve Carbon** - to recognise the value that standing forests provide to the world by storing carbon sequestered over hundreds of years, in Guyana's case 19.5Gt of stored carbon.

Guyana Forest Carbon Credits

CONSERVE

Guyana's 18 million hectares of forest store over 19.5Gt of Co2. Guyana aims to maintain 99% of this forest as a global asset.

REMOVE

Every year, Guyana's forests remove 154 million tons of Co2 from the earth's atmosphere.

REDUCE

Guyana aims to keep deforestation rates at 90% below the global average.

RESTORE

Guyana aims to regrow about 200,000 hectares of forest as a priority.

Step Two: Choose a Market Standard

From mid-2021 to the end of June 2022, the Government carried out an assessment of potential voluntary market standards against Guyana's objectives. During 2022, members of the Multi-Stakeholder Steering Committee (MSSC) which oversees the LCDS 2030 were also invited to identify potential alternative market standards.

In assessing the available standards, it became clear that across the world, there are many small-scale, project-based standards for forest climate services. There are also many potential global markets for small-scale interventions (for example, markets that only focus on spot reductions in deforestation).

Only the ART-TREES standard, supported by several governments across the world, comes close to Guyana's criteria.

REDD+ under the UNFCCC is designed as a national system, which means that Emissions Reductions (ERs) will be accounted under a national reference level (RL). This is also the case for the ART-TREES methodology. National systems have the premier level of environmental integrity, unlike project-scale systems where action in the project area could potentially displace deforestation or biodiversity loss to another area within the same jurisdiction.

The ART-TREES standard also recognises Guyana's forest climate services for the period 2016-2021, which would allow no gap in payments. With ART-TREES, Guyana can deliver on the second phase of its vision for forest climate services where Norway paid in Phase I for credits from 2009-2015, with ART-TREES credits being available from 2016 to enable the start of Phase 2.

Step Three: Engage with ART-TREES

The operational details of the ART-TREES mechanism are set out in Appendix 2– but in summary:

- Every year, Guyana submits:
  - a report from its Monitoring, Reporting and Verification System (MRVS).
  - a Summary of Information on REDD+ Safeguards (SOI) highlighting continued adherence to UNFCCC social and environmental safeguards.
- Guyana's submission is then audited by independent auditors who are registered with the ART-TREES secretariat.
- The audit outcomes are available to the public and reviewed by the ART Board. If Guyana passes through the process successfully, the credits are certified.
- Once the credits are certified, the ART-TREES Secretariat will record this on the publicly accessible ART Registry, from which point they will be available for purchase.

Credits can be purchased by buyers who recognise the ART-TREES standard – and sales will take place in accordance with both the UNFCCC rules on carbon markets and the rules of the countries where carbon trading takes place.

ART-TREES, in common with most carbon market mechanisms, operates through commitment periods. In the case of ART-TREES, these are five-year commitment periods: 2016-2020, 2021-2025, 2026-2030, etc. As part of its engagement with ART-TREES, a country (or sub-national jurisdiction) commits to engage for one or more commitment periods.

Figure 2.2 shows the projected number of ART-TREES credits to be generated by Guyana for the historical commitment period (2016-2020), as well as the current commitment period (2021 onwards).

Year / Period	Number of Credits
2016-2021	44,000,000
2022	8,000,000
2023	8,000,000
2024	8,000,000
2025	8,000,000

Figure 2.2 Anticipated ART-TREES Credits

Step Four: Selling Credits

Once the credits are available for sale, these can be sold on carbon markets, either directly by the jurisdiction selling the credits (e.g. Guyana), or through brokers. The agreements which set out the terms under which credits are sold are known as Emission Reductions Purchase Agreements (ERPAs). Prices for credits will be based on global demand for ART-TREES credits.

Buyers of credits could be sovereign governments (for example, the Government of Norway) or private companies with voluntary commitments to support the maintenance of the world's forests or to act on climate. For example, as announced at the Climate Summit convened by the President of the United States, some of the world's major companies (led by Amazon.com), along with leading sovereigns such as Norway, the US and the UK, anticipate adopting ART-TREES as a standard by which they will meet some of their climate pledges. They will pay for these credits through several channels, including the LEAF Coalition.

President Ali made a commitment that no deals for selling Guyana's credits would be concluded before the end of the national consultation. To prepare for this, in the first quarter of 2022 the Government ran a Request for Proposal (RfP) process where proposals were sought from potential buyers of Guyana's credits.

After the seven-month consultation has been completed, Guyana will enter into agreements for the sale of ART-TREES credits with the best candidate(s) from this RfP process.

Any agreements reached will be published on a Government of Guyana website, and its terms will be independently audited in accordance with accepted international standards.

Step Five: Investing Payments and Sharing Benefits / Revenues

Once Guyana has taken the steps above and has integrated with global carbon markets, new revenue streams for Guyana's forest climate services will start to flow.

The jurisdiction-scale approach and high level of integrity embedded within the ART-TREES standard gives Guyana the opportunity to maximise potential benefits across the country in contrast with progressing with one or more smaller projects, whose overall impact would be significantly less.

All revenues will be transparently administered via the Consolidated Fund, enabling them to be scrutinised and approved by the National Assembly via the National Budget process.

To prepare for these new revenue flows, the first draft of the LCDS 2030 proposed that all revenues would be invested through a combination of:

- national programmes outlined in the draft LCDS 2030 (e.g., renewable energy as described in Chapter 3, land titling as described in Chapter 4, repairing canals, and protecting against climate change as outlined in Chapter 5), and
- community/village-led programmes for indigenous peoples and local communities (IPLCs) as set out in Village Sustainability Plans or equivalent, put together by communities themselves.

The first draft of the LCDS 2030 proposed a revenue-sharing ratio across these two pathways. These funds will be available to Amerindian Villages to support development initiatives. This would be supplementary to the significant investment in villages from the national programme pathway.

Significant feedback was received back on the proposed revenue sharing approach, and the resulting opt in mechanism is anticipated to start in July 2022. The National Tosahos's Council, the constitutional body representing Indigenous Villages in Guyana, and represented by Village Toshaos, passed a resolution at the July 2022 Conference, endorsing this approach.

Opting Into the ART-TREES Revenue Sharing Mechanism

Guyana has 218 Amerindian and other hinterland villages/communities away from the country's main urban areas, with a population of about 98,000 people or 13% of Guyana's population – these are all considered local communities for the purpose of Guyana's ART-TREES jurisdiction-scale approach.

Each village has an elected Toshao or Village Captain and elected Councillors who act as the executive body of the village. The Amerindian Act sets out how the powers of the villagers are exercised through decisions made in a village general meeting, which must be held by law at least once a quarter.

Given their unique role in the stewardship of forests and other landscapes, Amerindian and other local communities will have the opportunity to engage with both pathways for ART-TREES revenues. The dedicated revenue stream will be shared equally with villages and communities, including those that are covered with forest as well as those with non-forest ecosystems. Communities are free to opt in to this dedicated mechanism for local communities. No deadline will be set for opting in.

As part of the structure of the mechanism:

- the Ministry of Finance will allocate 15% of all revenues to be used by villages for their own Village Sustainability Plans (VSPs).

- by the end of 2022, village councils in all communities will be invited to produce an Outline Village Sustainability Plan (VSP), created in consultation with their village, in line with the process outlined overleaf. This should cover the period up to 2025 (or longer if the village choses). The Government will provide assistance to village if this is requested, and it is anticipated that several non-governmental organisations will also be willing to provide assistance.

PROPOSED PROCESS FOR OPTING IN

A decision to opt into the ART-TREES revenue sharing mechanism will enable a village to access benefits from the sale of ART-TREES credits. For the previous and current ART-TREES commitment periods (covering revenues for the period 2016-2025), the village leadership (the Village Council) will be invited to consult with members of the community to agree to:

- produce an Outline Village Sustainability Plan by the end of 2022
- finalise the Village Sustainability Plan by the end of June 2023

Based on existing village-led decision-making processes, principles of FPIC, and feedback received during the national consultation on the draft LCDS 2030, the following process is recommended for producing Village Sustainability Plans (VSPs):

- The village council will call a village meeting, to which all villagers will be invited and where all adults will be entitled to vote.
- In advance of the meeting, the village council (with the support of government and/or non-governmental organisations, if requested) will provide villages with clear information on the potential revenue for the village as well as the requirement to invest revenues in a Village Sustainability Plan, which will be put together by villagers themselves.
- Communities will produce a Village Sustainability Plan to basic standards of financial transparency and accountability.
- A vote by two-thirds of those present will be recognised as the decision of the village.
- The village Toshao will communicate the village's decision to the ART-TREES national focal point (the Guyana Forestry Commission).
- The ART-TREES focal point will ensure a record of all village decisions is publicly available (including through a website).

The process above draws on input from long standing good practice on FPIC, as well as the National Toshao's Council Policy Statement of 2019 which outlined key pillars of FPIC. These principles of FPIC form the guidelines to be applied for village level planning and decision making in shaping investment plans for forest climate financing to ensure village ownership, and longevity in project implementation.

- Right to say "Yes" or "No" to development, benefit or opportunity
- Timely and full information-sharing through appropriate communication methods in order to create clear understanding.
- Full financial disclosures from prospective partners and business investors.
- Right to make own informed decisions
- All decisions based on FPIC must respect the rights, interests and special connections of Indigenous peoples to the lands and waters of villages/ communities.
- For any decision taken the people and villagers must have full participation.
- There must be a feedback mechanism for transparency and accountability.

VILLAGE SUSTAINABILITY PLANS (VSPs)

Because they will be led by villages, the specific format and content of VSPs will vary, but previous experience suggests villages will likely run a set of workshops to identify priorities, determine an action plan and produce information such as:

- A vision statement for where the community sees itself in 2030
- Identified priority areas to deliver on the vision up to 2030, likely to include areas such as:
  - Community Infrastructure and Communications
    - Clean Energy
    - Information and Communications Technology (ICT)
  - Livelihood Opportunities such as
    - Tourism opportunities for jobs and economic activities
    - Agricultural opportunities to ensure food security and income generation within villages
  - Nature and Environment: how can they be sustainably maintained
  - Education, for example:
    - Ensuring equal access to education facilities that are local
    - Adult Education for literacy and numeracy
    - Scholarship programmes for local students
  - Health
    - Safe and Affordable Drinking Water
    - Access to adequate and equitable sanitation and hygiene for all
    - Access to sexual and reproductive health care services

Nesting: REDD+ Projects

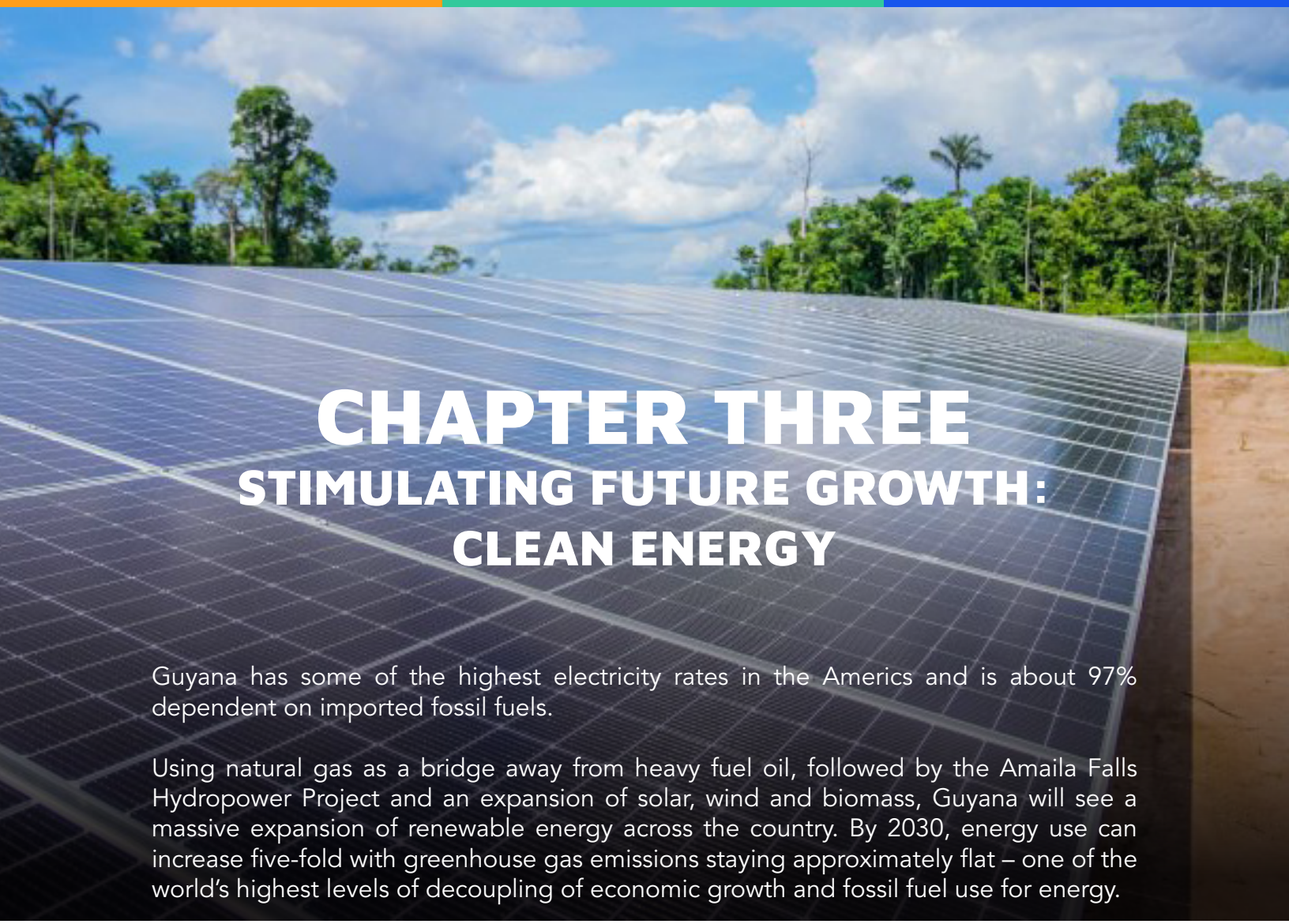
As outlined in the earlier parts of this chapter, ART-TREES will be the centrepiece of Phase II of the national scheme for forest climate services and a major source of economic opportunity for local communities and the country overall. Moreover, once ART-TREES credits are being issued in Guyana, this will enable the integration of compatible REDD+ projects in a number of areas of the country. This is likely to be of most immediate relevance for:

- **Restoration projects.** Mine-site reclamation and closure are legal requirements for all mining operations and are critical to ecosystem restoration or re-establishment. To date, approximately 200,000 hectares of forest areas are available for rehabilitation/reforestation. Whilst some areas may see new vegetation, the majority of these areas will require rehabilitation activities. A Land Reclamation Project was set up in 2014 and resulted in demonstration sites established in pilot areas that included Olive Creek, Dacoura Mines, and Thomas Island, Puruni. The project sought to encourage and promote the reclamation of mined-out areas, especially for small and medium gold-mining operations and was implemented jointly with the private sector. The findings of these pilot activities have been used to guide national decision-making on reforestation and land reclamation in small and medium mined-out areas.
- **Mangrove restoration and conservation projects.**

Once the ART-TREES mechanism has been operationalised, the Government will be open to expressions of interest for projects that are compatible with the ART-TREES national system, including integration of social safeguards and the inclusion of local communities.

This compatibility is known as "nesting" under REDD+. In a practical sense, it could lead to proposals for forest or mangrove restoration projects based on either the ART-TREES standard itself or based on other standards such as Verra or Gold Standard, in accordance with the rules for "nested projects" under ART-TREES. Such rules include the adoption of harmonised definitions, rules for baseline setting, MRV standards, and approval requirements adherence to the rules will be a prerequisite to ensure that nesting creates incentives for private investments in projects while protecting the environmental integrity of the national REDD+ system.

Towards this end, private and non-governmental organisations will be invited to submit expressions of interest on a rolling basis.



CHAPTER THREE
STIMULATING FUTURE GROWTH: CLEAN ENERGY

Guyana has some of the highest electricity rates in the Americs and is about 97% dependent on imported fossil fuels.

Using natural gas as a bridge away from heavy fuel oil, followed by the Amaila Falls Hydropower Project and an expansion of solar, wind and biomass, Guyana will see a massive expansion of renewable energy across the country. By 2030, energy use can increase five-fold with greenhouse gas emissions staying approximately flat – one of the world's highest levels of decoupling of economic growth and fossil fuel use for energy.

Without this transition away from today's energy sources, both greenhouse gas emissions and consumer costs will stay very high because of a reliance on imported Heavy Fuel Oil (HFO) and diesel for electricity generation in the 12 public grids operated by Guyana Power and Light (GPL) and Hinterland Electrification Company Inc (HECI). Expenditure on these fuels was approximately US$ 150 million in 2021.

The Demerara Berbice Interconnected System (DBIS) is the largest of the public grids and accounts for 78% of the total cost. The DBIS peak power was 135.7 Megawatts (MW) in 2021 and it is estimated that the peak load by 2025 will be 407MW. The DBIS has currently 205MW of firm capacity. However, some of that capacity is from aged generators with low reliability. It has been estimated that a new 300MW of firm capacity will be needed to cover the demand increase, the retirement of aged generators and to improve the grid's reliability.

In the original LCDS, it was foreseen that the Amaila Falls Hydropower Project would have been completed before 2020, delivering cheaper, cleaner electricity. However, its development was not progressed by the 2015-2020 Government. The Government now intends to return to a strategy of decoupling economic growth from using fossil fuels for

electricity by developing low-carbon energy resources (Solar, Hydro, Wind, Biomass, and Natural Gas) to meet rapidly rising demand and keep greenhouse gas emissions low.

This is being done through a combination of: (i) investment in transformational energy infrastructure across the generation and transmission systems; (ii) fiscal incentives and government policies to support the use of renewable energy at the level of households and businesses; (iii) investments to improve energy efficiency.

TRANSFORMATIVE INFRASTRUCTURE DEVELOPMENT

Infrastructure development will be funded by the regular national budget, private sector investment and increased revenues from forest climate services, and can be seen as three phases:

- In the period 2022 to 2028, a near tripling of electricity demand will be met mainly through a combination of natural gas and the Amaila Falls Hydropower plant on the DBIS, coupled with a major expansion of solar power for the main coastal urban areas and with batteries for off-grid areas.
- From 2028 to 2032, further increases in electricity demand will be met by continued replacement of HFO, expansion of wind and solar power and the commissioning of Guyana's second hydro plant, the site of which will be identified before 2025.
- From 2032 onwards, expansion will be determined by prevailing market conditions, but it is likely that battery and hydrogen technology will be sufficiently advanced to enable solar and wind plants to provide most new capacity increases while contributing to further downward pressure on electricity prices.

Figure 3.1 shows how renewable energy will grow to dominate Guyana's electricity supply, while Figure 3.2 shows how a ten-fold increase in electricity demand by 2041 will be see greenhouse gas emissions stay essentially at 2018 levels. This level of decoupling of economic growth and fossil fuel use for energy is among the highest in the world.
More details of how investment in transformative infrastructure will propel the energy transition are set out in the remainder of this section – showing the energy transition for:

- Demerara-Berbice Interconnected System (DBIS)
- Isolated Grids: Linden, Essequibo Coast, Bartica, Lethem, Kwakwani, Mabaruma, Port Kaituma, Mahdia, Leguan, Wakenaam, Matthews Ridge with Essequibo Coast, Linden, Leguan and Wakenaam being integrated with DBIS by 2027
- Unconnected Communities

Details are also provided for the other major investment in a modernised Transmission and Distribution (T&D) System.

Figure 3.1 Energy Mix to 2041

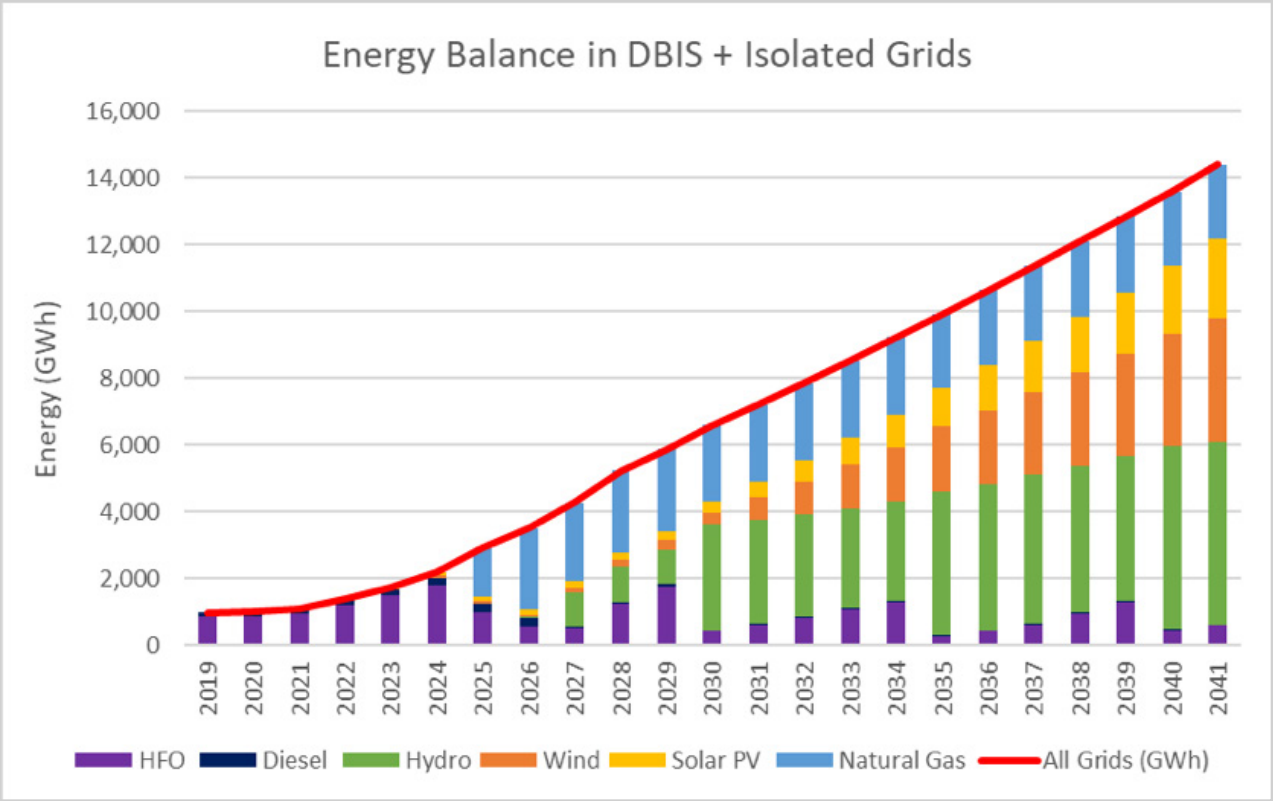
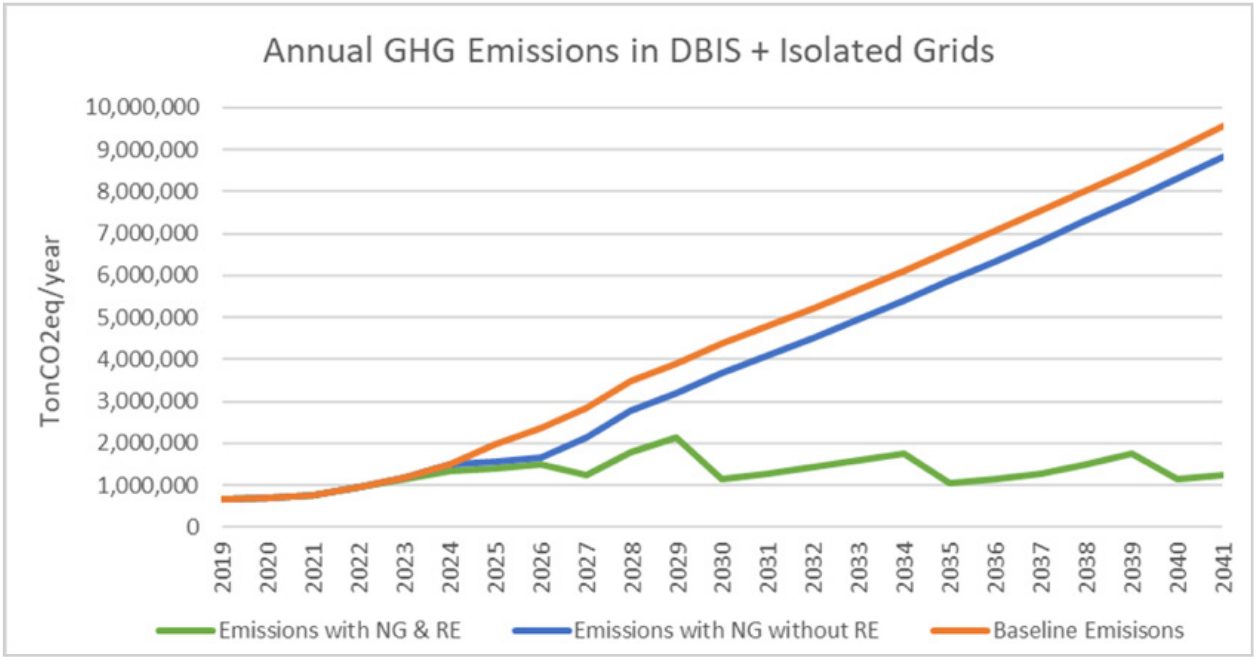


Figure 3.2 Greenhouse Gas Emissions to 2041



Demerara-Berbice Integrated System

Today, almost 100 percent of the power supplied by GPL on the DBIS comes from Heavy Fuel Oil and diesel. In the short term, these sources will be largely displaced by natural gas which will provide the needed firm capacity at a significantly lower generation cost compared to the other indigenous renewable energy options available in Guyana.

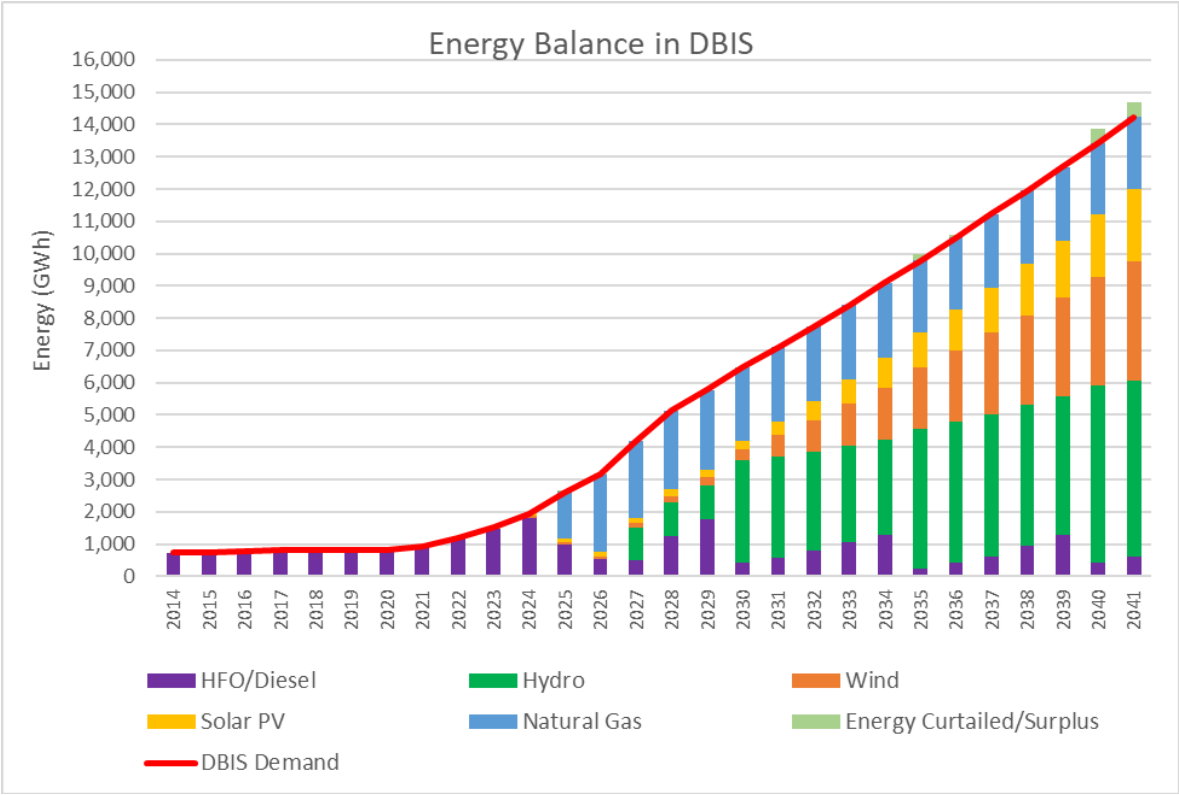
With natural gas providing the means to achieve the early stages of the energy transition in Guyana, over the medium and long term, the most sustainable and resilient energy mix in Guyana will see natural gas augmented by solar, wind, hydro and biomass power plants. Within the renewable energy resources available in Guyana, hydro will be important to provide firm capacity and short-term energy storage to compensate for daily and weekly fluctuations form solar and wind. Hydro will also provide, in the long-term, a cheaper solution than any other technology, due to its long lifespan.

In Guyana, solar energy, wind and hydropower are good complementary resources. Solar energy is available during daylight hours, peaking at noon, while wind is stronger during evening hours and at nights. Wind is lower during the wet seasons, while hydropower is fully available. Through this combined approach utilising complementary lower carbon and renewable energy systems, the DBIS will see the emergence of lower electricity prices and very significant greenhouse gas emissions savings. This is summarised in Figures 3.3 and 3.4, with greater detail about each energy source on the following pages.

Year	Peal Load (MW)	Back-up HFO/Diesel (MW)	Natural Gas (MW)	Solar (MW)	Wind (MW)	Hydro (MW)	HFO Share (%)	Natural Gas Share (%)	RE share (%)	Emissions saved (tonCO2eq/ year)
2021	139	202	0	7	0	0	99	0	1	5,448
2022	186	205	0	7	0	0	99	0	1	7,518
2023	236	236	0	20	0	0	98	0	2	21,683
2024	289	251	0	40	25	0	92	0	8	97,366
2025	407	238	300	60	25	0	68	25	7	537,483
2026	478	235	300	80	25	0	17	76	6	828,663
2027	585	230	300	100	45	165	12	56	31	1,543,301
2028	725	225	300	120	65	165	24	48	28	1,657,172
2029	814	220	300	140	85	165	30	43	27	1,730,675
2030	913	215	300	160	105	515	6	35	59	3,158,280
2035	1,376	190	300	660	605	765	3	23	75	5,477,006
2040	1,881	165	300	1160	1105	1015	3	17	80	7,752,503

Figure 3.3 Evolution of the DBIS energy transition

Figure 3.4 Energy Mix on DBIS to 2041



Natural Gas in DBIS

To use natural gas for power generation, the following investments are needed: a pipeline to bring the natural gas to shore, a processing plant to separate the Liquefied Petroleum Gas (LPG) and the natural gas, and a gas-fired power plant. Studies confirmed that the natural gas option would significantly reduce the cost of generation.

A 300MW gas-fired power plant will be constructed and in operation by 2025. Besides the natural gas-fired power plant, and to provide the necessary firm capacity, new reciprocating 46MW dual fuel (HFO/NG) engines were added to the DBIS grid in 2021. By 2025, with the addition of 300MW of new firm capacity provided with Natural Gas, the reliability of the DBIS grid will increase while the Green House Gas (GHG) emissions associated with electricity generation will be reduced by half.

As part of the Natural Gas Programme, the LPG consumed in the country would be provided by the new separation plant and LPG production facility, avoiding the current importation. The planned offshore pipeline is designed to provide larger amounts of gas. In case new discoveries are made, the natural gas could be used for other industrial activities.

Utility Scale Hydropower in DBIS

Hydropower has the potential to provide Guyana with both utility-scale and small-scale capacity. Small-scale is discussed under "Isolated Grids" below.

Guyana has a potential for 8.5 Gigawatt (GW) of hydropower on 33 hydropower plants (including storage capacity and run-of-river). It is anticipated that Guyana will build two hydro plants over the next 20 years: Amaila Falls and another which is still to be identified. Of the potential 33 sites, many were assessed in the 70s and 80s, when environmental and social standards were lower. It is anticipated that the new site will be identified by 2025, with the goal of providing 350MW of capacity by 2030 and a further 250MW of capacity by 2035. In the meantime, Amaila Falls will be the focus of the hydropower programme.

Amaila Falls - Background

The Amaila Falls Hydropower Project (AFHP) was first identified in 1976 during an extensive survey of the hydroelectric power potential in Guyana, carried out by the Canadian company Montreal Engineering Company (Monenco). A total of 67 sites were identified as technically feasible solutions. From 1974 to 1976, a prefeasibility study was carried out to assess Amaila Falls, which suggested an installed capacity of 200MW. The Guyana Power Study done in 1982 included Amaila Falls as part of Guyana's power generation systems development.

In 1997, a review of the pre-feasibility study and Guyana's electricity demand was done, and it reduced the size to 165MW. Subsequently, in 1998, the Government of Guyana (GoG) signed a Memorandum of Understanding (MoU) with Synergy/Harza for the development of the Amaila Falls Hydropower Project. A feasibility study was submitted to the Government in 2001. In 2007, Sithe Global entered as a potential investor in the Project. The Government of Guyana and Sithe Global established a special purpose company, Amaila Falls Hydro Incorporated (AFHI), to develop the AFHP. The AFHI, after a competitive bidding in 2008, selected China Railway as the Engineering, Procurement and Construction (EPC) Contractor. In 2009, Synergy/Harza, the original holder of an Interim Development Licence and a subsidiary of Synergy Holdings (Guyana) and Harza International, transferred all rights and interests, obligations, and liabilities under its licence to AFHI. The Environmental and Social Impact Assessment (ESIA) was completed in 2011. A draft Power Purchase Agreement (PPA) with GPL was negotiated in 2011. Agreements with China Development Bank and the Inter-American Development Bank (IDB) for debt financing were negotiated and the project was structured as Build, Own, Operate and Transfer (BOOT), in which the asset will be transferred to GPL at zero cost after 20 years of operation.

In 2013, Opposition APNU/AFC Parliamentarians did not support the project and it did not advance.

The Engineering, Procurement, and Construction (EPC) contractor negotiated with Sithe Global and the Government of Guyana to take the role as sponsor and to purchase the shares, assets and rights in AFHI from Sithe Global. However, negotiations were interrupted after the then Government took office following elections in 2015.

In 2016, the APNU/AFC Government, with support from Norway, hired an independent consultant (Norconsult) to review the project. The report, published in December 2016, recommended the development of AFHP as the best option for Guyana to achieve affordable, low-carbon electricity.

A public procurement process is being undertaken to advance this project. The goal is for this project to come on stream in the latter part of the decade.

[2] The average lifespan of a hydropower system is 100 years, over this period, replacement of the mechanical and electrical parts is required, but those account for less than 30% of the initial cost. The lifespan of solar, wind and natural gas power plants are 25 years and after that the refurbishment will be close to 100% of the initial cost. For example, if the hydropower finance model is planned with a transfer of the asset after year 20, the generation cost after, from year 21-100 can be as low as US$20/MWh.
[3] Arco Norte Electrical Interconnection Study – Pre-feasibility study, 2016

Solar Photovoltaic (PV) – DBIS

Solar photovoltaic (PV) is close to being established as a mature technology in the country. Local prices are in-line with developed countries and local technology providers have the capacity to supply, install and operate on-grid and off-grid.

The Government has secured US$97 million in funding – including US$85 million in payments for forest climate services earned under the Guyana-Norway partnership.This will see the implementation of a 33MWp capacity of solar PV farms at eight different locations.

By 2024, GPL will have its first solar on-grid PV farm in Berbice with a total capacity of 10 megawatts-peak (MWp) financed by the Guyana-Norway Partnership.

The current distributed generation capacity is about 6.5 MWp of rooftop Solar PV. The Government will promote its expansion by implementing a net billing scheme and improving the distribution network to accommodate larger amounts of distributed generation without compromising the grid stability.

GPL will update its grid model regularly with the actual and forecasted demand growth, the actual generation capacity and the latest generation technologies, and costs to assess the amount of utility-scale solar that are technical and economically feasible.

In the current DBIS model with the base demand forecast, it is estimated that 100MWp of Solar PV capacity would be in operation by 2030. That capacity would be for Distributed Generation solar rooftops and Utility-scale solar farms.

Wind – DBIS

Wind measurements have been conducted in different locations across Guyana to assess the country's wind energy potential. A favourable wind regime was observed along the Coastland, which is exposed to the steady Northeast trade winds, with speeds averaging 7 metres per second.

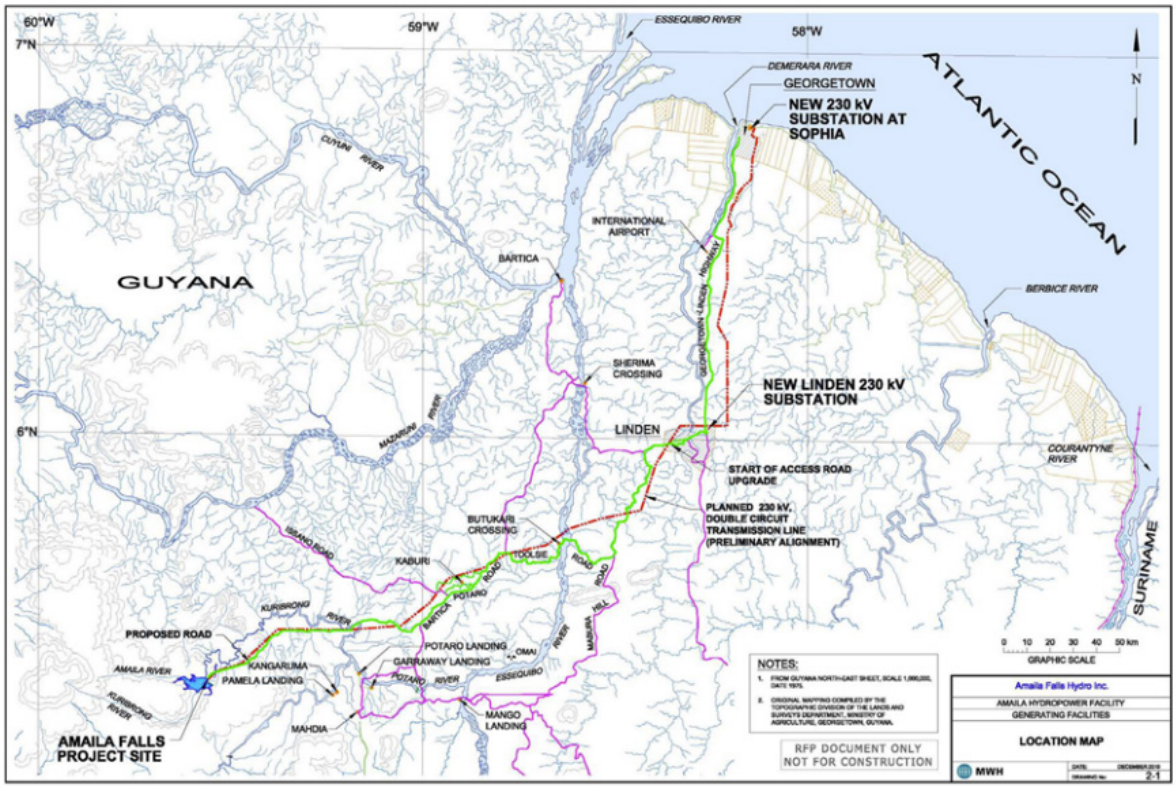
A private developer has concluded measures and studies, including the Environmental and Social Impact Assessment, for a 25MW wind farm at Hope Beach. The Government has recently conducted wind speed measurements at Onverwagt, and it is exploring other locations along the coast. The development of wind farms on Guyana's shores will mitigate GHG emissions, reduce the energy generation cost, create green jobs, and in some cases can also support adaptation to climate change by fortifying the sea defence infrastructure.

The wind speed measures taken along the coast will inform the design of the future wind programme. Based on the advances of offshore wind technology and the lowering of costs, its potential would also be explored. In the current DBIS model with the base demand forecast, it is estimated that 105MW of wind capacity would be in operation by 2030.

Biomass – DBIS

There is some practical experience in the use of biomass as an energy resource for self-consumption like rice husk in the rice mills, the use of the distillate waste to produce biomethane at Demerara Distillers Limited (DDL), or the use of bagasse for co-generation at Skeldon and Albion Sugar Estates.

The Skeldon co-generation plan for 30MW of electricity generation using bagasse from the sugar process was designed to produce excess power that would be exported to the grid. The plant is no longer working as a co-generation system due to the closure of the sugar factory. Albion co-generation plant is still in operation for self-consumption.
The Government will continue to research and encourage the utilization of waste biomass resources for energy generation when demonstrated to reduce GHG emissions.



Isolated Grids

Solar PV – Isolated Grids

By 2024, revenues earned under the Guyana-Norway partnership and other funding will see investment at 8 different sites. By then, Essequibo Coast, Linden, Bartica, Lethem, Mabaruma, Mahdia, Leguan and Wakenaam grids will have an average of 30 percent of their electricity consumed generated by solar PV.

In the second and third phases of the programme for the Isolated Grids, there is a planned increase of the Renewable Energy share to an average of 50 percent by 2027 and 70 percent by 2030. Solar PV with battery storage will be the main renewable energy resource on the regional grids.

Small Hydro – Isolated Grids

Guyana is currently implementing three small hydropower projects: a 150kW in Kato, the rehabilitation of Moco-Moco hydropower site, which would increase the capacity up to 0.7MW and a new 1.5MW hydropower plant in Kumu. Moco-Moco and Kumu hydropower projects will provide energy to Lethem grid. It is expected those two projects, in combination with an ongoing solar PV project, will provide the Lethem grid with 100% renewable energy in 2024. Other small hydro projects will be pursued to provide energy to the regional grids as well as Hinterland villages.

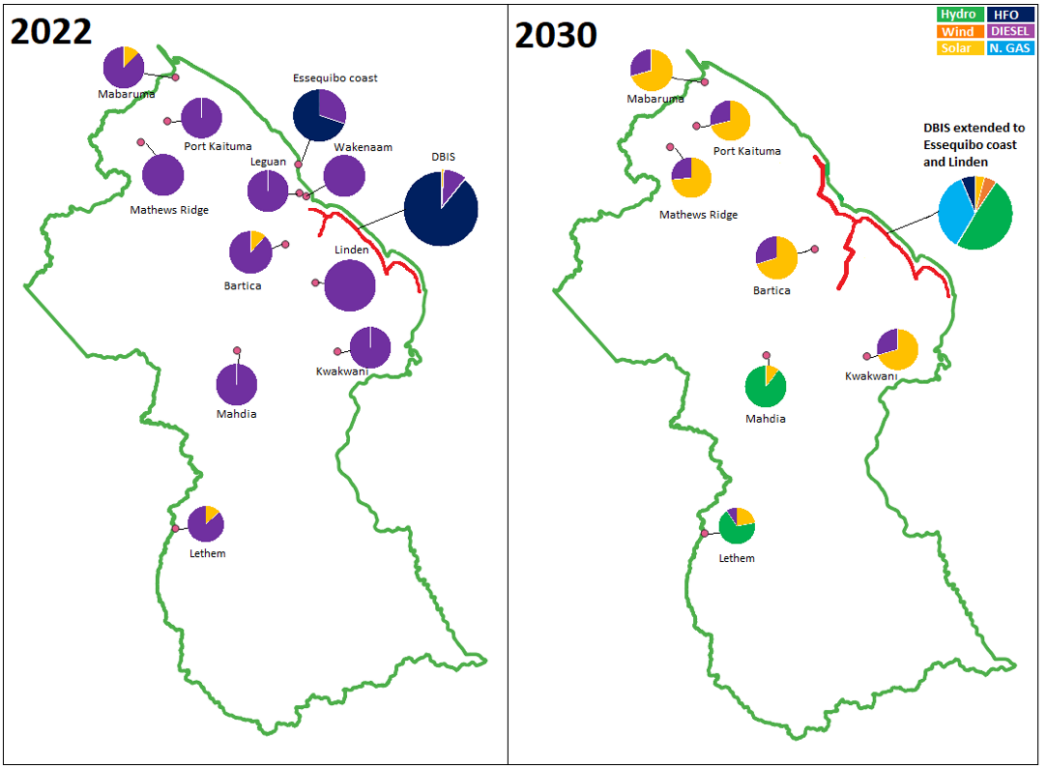


Figure 3.5 Energy Transition on Isolated Grids

Unconnected Communities

Guyana has approximately 218 Hinterland communities with a total population of 98,500 people which are off-grid (i.e., outside of the 12 public grids). Most of those villages are in remote areas, difficult to reach by road, and in many cases only accessible by boat. The cost of diesel in off-grid villages can be up to three times the cost in Georgetown.

Since 2012, through different programmes, the Government has provided Solar Home Systems for households, and small solar PV systems for schools, public buildings, and water pumps. These have included:

- The Guyana REDD+ Investment Fund (GRIF) funded project "ICT Access and E-Services For Hinterland, Poor and Remote Communities" is installing ICT Hubs in all 200+ Hinterland Villages between 2022 and 2023. The project includes the installation of an average of four-kWp solar PV system to power each ICT Hub.
- In 2020, the Guyana Energy Agency (GEA) installed a 72KW micro-grid at Moraikabai.
- A combined five kilowatts of solar PV was installed under the Rural Energy Project in Moraikobai, Powaikoru and Shulinab.
- In 2021, HECI completed the installation of 9 solar-powered mini-grids at Yarakita and Hotoquai, Region 1, Akawini, Bethany and Kabakaburi, Region 2, Chinoweng and Phillipai, Region 7, Monkey Mountain, Region 8 and Achiwib, Region 9.
- Installation of 9 Solar photovoltaic systems was completed in Region 1, during 2022, at the following locations: Arakaka Health Centre, Mabaruma Radio Station, Barima Kariabo Health Centre, Arakaka Primary School, Wauna Primary School, Red Hill Health Post, Santa Rosa Secondary School, Hobodiah Health Post and Moruca Health Centre.
- Installation of a solar PV system for the Quebenang Health Centre, Region 7 was completed in 2022 and 2 other installations at Kamwatta Primary School, Region 1 and Sand Creek Primary School, Region 9 will be completed in 2022.

Other work is in progress:

- Under the planned Solar Home System Project, with support from the Government of India, thirty thousand (30,000) 150-watt systems are expected to be installed in 2024.
- As part of the 2021 public budget, the Government approved the installation of 19 solar PV mini-grids for public and community buildings at Sebai, Karaburi, Kwebanna, Haimacabra, Baramita and Canal Bank of Region One; Wakapao, Capoey Mission, St. Monica and Tapakuma, of Region 2; Waramadong, Paruima and Jawalla of Region 7; Kurukubaru of Region 8; Annai, Karasabai, Aishalton and Kraudarnau of Region 9; and Riversview of Region 10.
- In 2021, Guyana signed a grant agreement with the International Solar Alliance for a solar demonstration project in Orealla, Region Six. This will see the installation

of a 9kWp grid-tie solar photovoltaic system at the Orealla Health Centre and will be accompanied by a battery energy storage system of 37kWh.

- 13 solar PV installations were awarded in 2022 for the following locations: Ulele Primary School, Hackney Primary School, Mashabo Health Centre in Region 2; Santa Aratack Nursery/Primary Schools, Santa Aratack Health Centre and Saxacalli Health Centre in Region 3; Karrau Primary School, Batavia Primary School in Region 7; Sand Creek Nursery School and Teacher's Quarters, Village Office and the Youth Multi-purpose Hall in Region 9; Falmouth Nursery/Primary School in Region 10.

The learnings during the implementation of those solar PV projects in the Hinterland will support the development of a larger programme to electrify all Hinterland villages. The electrification will be with the most technical and economically feasible solution (interconnection to a larger grid, solar PV and/or mini-hydro). The programme will include the enhancement of the productive usage of the energy to increase the long-term sustainability of the mini-grids.

It is estimated such a programme would cost US$313 million and could be implemented between 2023-2028. Work has now commenced on how to fund this programme including through the emerging carbon markets to support off-grid renewable energy.

Modernisation of T&D network (Smart Grid)

The Transmission and Distribution (T&D) network plays a critical role in power evacuation from power plants and delivery of electricity to customers across Guyana. The electricity service provided to Guyana Power and Light (GPL) customers does not meet the reliability and quality requirements of utilities in developed countries. The low reliability is due to the low capacity of generation, the lack of redundancy in key lines, and the low remote supervision and control of the T&D network.

The utilities have been increasing their generation capacity at the same pace as the demand has been growing, keeping a low reserve and excess capacity that is inadequate to cater for downtime in their generators. The expansion of the firm capacity that is planned in the next decade with new power plants using natural gas and renewable energy will increase the reliability and resilience to generate the electricity demanded at a much lower cost than currently; but besides that, all the public grids will need important improvements in their T&D which have been developed in a radial way and built with single lines, meaning that a failure in any of those single lines will disconnect customers connected downstream of the faulty line.

To increase reliability in the transmission network to world-class utility requirements, the new transmission lines and substations will be designed to comply with 'N+1 redundancy criteria' (with at least one backup component). The transmission network will also be expanded to form a real network, avoiding radial configurations where possible. As part of the T&D improvement programme, the existing lines and substations will be progressively upgraded to meet the new redundancy requirements.

GPL's Development and Expansion Programme estimates the need for an investment of US$600 million over the next five years to upgrade, expand and equip the power system to take off and manage the forecasted electricity demand, and provide services, and operate at the required reliability levels of a modern power utility company.

POLICIES AND INCENTIVES TO ENCOURAGE CONSUMER CHOICE

Along with investments in transformational infrastructure, Government policy is to encourage individual consumers and businesses to invest in, and use, renewable energy, through fiscal incentives and policies including:

- **Self-Generation:** Self-generation is allowed as per Guyana's legislation. Any consumer who wishes to interconnect their solar PV system into the public grids to eliminate the need for battery storage (solar PV on-grid) must submit an interconnection request and comply with the Interim Interconnection Requirements set by GPL. As part of the roof-top solar PV for Government buildings programme, about five megawatts were installed at 291 buildings across the ten Administrative Regions during the period 2012-2020.

- **Grid Feed-In Mechanism:** A grid feed-in mechanism is being advanced by GPL to establish the regulatory framework for consumers to supply excess energy to the grid, from renewable energy sources.

- **Fiscal Incentives:** Machinery and equipment imported for the purposes of generating and utilising renewable energy are eligible for Customs duty and Value-Added Tax Exemptions under existing laws. This includes solar panels, solar lamps, deep-cycle batteries, solar generators, solar water heaters, solar cookers, direct current (DC) solar refrigerators, direct current (DC) solar freezers, direct current (DC) solar air-conditioners, wind turbines, water turbines, and power inverters; and energy-efficient lighting, including compact fluorescent lamps and light-emitting diode (LED) lamps. There is also a one-off tax holiday of two years for corporation tax to importers of items for wind and solar energy investments.

ENERGY EFFICIENCY MEASURES

A significant reduction of the total energy consumed can be achieved through sustainable energy efficiency programmes and strategies. The Government will promote conservation and efficient use of energy, provide information to encourage behavioural changes for sustainable energy consumption, and encourage the use of energy-efficient technologies based on performance standards.

Since 2006, the Government has supported the replacement of incandescent bulbs with energy-saving bulbs, with special programs for hinterland households. Compact fluorescent lamps (CFLs) and light-emitting diode (LED) lamps have been fully exempted from import duties and the Value Added Tax (VAT) has been zero-rated to make energy-efficient lighting technologies more affordable and accessible.

28,390 LED lights were installed in households and commercial businesses in the Hinterland regions of Kwakwani, Lethem, Mahdia, Mabaruma, Port Kaituma and Matthew's Ridge and government buildings across Guyana. During 2022 and 2023, an additional 34,450 LED lights will be installed for residents and businesses of Bartica, Linden, Wakenaam, and Leguan.

In 2013, a program was started to improve the efficiency of the streetlights, repairing defective photocells, and replacing inefficient bulbs with LED. Energy audits in public buildings have been carried out, which resulted in reduced energy bills by installing LED bulbs, occupancy sensors, and inverter-type A/C units.

A Regional Energy Efficiency Building Code (REEBC) was adopted as a national standard to foster energy-efficient building designs to reduce energy consumption in the built environment. The codes focus on the building's envelope, cooling system, ventilation, pumping, lighting, and the service water heating systems in buildings. Several other standards have been adopted, including energy labelling standards for CFLs and LEDs (GYS 577 – 2021) and Air Conditioners (GYS 578 – 2021) and a standard for energy management systems (GYS 503: 2019) all to promote energy efficiency and conservation of energy.

The incorporation of Energy Efficiency measures will be improved and enhanced to:

- Continue with the program to replace inefficient bulbs with LEDs for households and streetlights.
- Promote Energy Labelling standards for appliances.
- Adopt low carbon building codes for the residential and commercial sectors, which will include the designing and testing of solutions adapted for the local environment accompanied by capacity building for building designers, material

and equipment suppliers, contractors, surveyors and regulators. The codes would promote the incorporation of passive and active systems which are used for optimizing energy and water consumption as well as occupant comfort. Initially, the code would be voluntary for the residential sector, but consideration will be given to making it mandatory for commercial buildings.

- promote the use of energy efficiency and climate-friendly cooling equipment for the residential, commercial and industrial sectors, including the development of a plan to phase-down the use of hydrofluorocarbons (HFCs) gases in refrigeration equipment.

CHAPTER FOUR
STIMULATING GROWTH: LOW-CARBON DEVELOPMENT

Chapters Two and Three outlined two of the critical elements for the new economy – new revenue streams from Guyana's nature-based ecosystem services and affordable, clean energy. These are being advanced as immediate priorities because they are essential building blocks for achieving Guyana's objectives for LCDS 2030.

At the same time, work will progress on advancing the other critical elements of the low carbon economy, with an increased emphasis on these sectors from 2022. Drawing on experience since the launch of the original LCDS in 2009, coupled with inputs received throughout the seven-month consultation on the LCDS 2030, the following inter-linked elements of low carbon development are identified for advancement in the years to 2030:

- Preventing and Managing Waste: Creating a Circular Economy
- Sustainable Homes and Communities:
    - In the Hinterland: Village Sustainability Planning
    - In the Cities and Towns: Improved Urban Planning and Design
- Expanded, Sustainable Economic Sectors:
    - Agriculture and Fisheries
    - Forestry
    - Mining
    - Tourism
    - Manufacturing and Services
- Low Carbon Infrastructure
    - Digital Infrastructure
    - Financial Infrastructure
    - Road, Water and Air Transportation Infrastructure
- Climate-Compatible Social Services
    - Health
    - Education
- Protection from Climate Change and Biodiversity Loss

Each is summarised below (except the final element, Protection from Climate Change and Biodiversity Loss, which is addressed in Chapter Five). As plans to advance each of these elements are further developed, many stakeholders will be involved in identifying priorities, providing education, and building capacity - including the private sector, Guyanese and international educational and research institutions, civil society, and individual Guyanese citizens.

Preventing and Managing Waste: Creating a Circular Economy

In a circular economy, resources are kept in use for as long as possible, the maximum value is extracted from them and then, at the end of their life cycle, they are recovered to regenerate new products and materials.

Some progress has been made towards better waste management in Guyana in recent years. In 2021, US$5 million was invested to improve solid waste management across the country while US$7 million is being invested in 2022 for the upgrade of existing disposal facilities.

However, much more work needs to be done if Guyana is to achieve a circular economy by 2030. This will require significant government and private sector investment over many years, but also behavioural change by citizens and businesses so that waste is prevented, and not just better managed.

From 2023, work will begin to create a circular economy in Guyana, with the conclusion of a strategy in 2023 and implementation to take place over many years, beginning in 2023. This will cover:

- Roll out of a national recycling system.
- New measures to minimise, and where possible eliminate, single-use plastic, batteries, and other specific sources of pollution.
- Incentives for improved design of products and services to prevent waste
- Identification of support measures for more efficient and sustainable use of steel and cement.
- Enabling the public sector to act as a leader in pursuing and demonstrating circular economy practices.
- Promotion of education measures on avoiding littering and maximising recycling.
- Incentives for use of Guyana's timber products in building, construction and manufacturing, recognising that these materials come from sustainably managed forests.

In time, all households, businesses and public institutions should have access to segregated waste services (as in many countries, this will likely involve different bins for recycling, food and other compostable substances, and waste). Improved measures will be in place to tackle illegal dumping. Individuals, businesses, and communities will have a greater understanding of the circular economy and pursue specific measures to prevent waste where possible.

Development of the Circular Economy Strategy will draw on existing work done in Guyana and elsewhere including the University of Guyana and several non-governmental organisations.

Sustainable Homes and Communities

There are many commonalities between sustainable homes and communities in rural areas, towns and cities, for example, some principles around "green buildings" are universal However, there are also significant differences. As a result, work will be organised around (i) sustainable homes in the hinterland, with a priority focus on village sustainability planning and Amerindian Land Titling; (ii) improved urban planning in cities and towns.

Hinterland – Village Sustainability Planning

Guyana has approximately 218 hinterland communities with a total population of 98,500 people which are off grid (outside of the 12 public electricity grids). Most of those villages are in remote areas, difficult to reach by road and in many cases only accessible by boat. The main occupation is subsistence farming, small wood-processing workshops and handicraft or trade shops, while a few villages are benefiting from tourism in eco-lodges. The cost of diesel in off-grid villages can be up to three times the cost in Georgetown.
As outlined in Chapter Two, hinterland communities can identify their needs through Village Sustainability Plans (VSPs). The VSPs will be produced by villages or communities themselves, with support, if requested from Government and non-governmental organisations. Examples of the kinds of information contained in VSPs are set out in Chapter Two including education, health, and economic development. VSP implementation can draw on national resources, plus finance from the dedicated 15% of revenues from the sale of ART-TREES credits as set out in Chapter Two.

Hinterland - Amerindian Land Titling Project

Legal ownership of land and its autonomous management are essential factors in the sustained long-term socio-economic and cultural development of people. Supporting the securing of land tenure for Amerindians, Guyana's Indigenous population and the first inhabitants of the country, continues to be a priority. The Amerindian Land Titling

(ALT) Project, funded by payments for forest climate services from Norway and executed by the Ministry of Amerindian Affairs will continue. The project addresses requests for titling of land and subsequent extensions following necessary investigations.

By 2020, the Amerindian Land Titling project had fallen behind its original objective. In 2021, a new workplan was finalised to return the project to a path where it can meet its objective of processing all outstanding requests for land titling, demarcation, and extensions. Having previously completed 21 demarcations and issued 19 Certificates of Title, along with 13 Absolute Grants, the ALT project now aims to address the outstanding requests for the issuance of 32 Absolute Grants, 47 demarcations and 49 Certificates of Title.

The important functions of the 'Grievance Redress Mechanism' formulated under the ALT Project will also continue to address grievances related to the land titling process and provide an alternative course of dispute resolution outside of legal redress. A robust communication strategy will be rolled out to complement all aspects of the ALT Project.

Sustainable Cities and Towns

Urban areas in Guyana are embarking on one of the biggest infrastructure transformations in the country's history. In the largest urban area-centred around Georgetown, but also including East and West Coast Demerara, East and West Bank Demerara, and Silica City-work has started on an interlinked network of four lane highways, which will join the East Coast Highway and Eugene Correia Airport in Ogle with the Cheddi Jagan International Airport in Timehri. Preparatory work for the four-lane high span over the Demerara River has begun, interventions are being made to upgrade the drainage and irrigation system across the capital, and major public and private sector investments are being made in new building stock across the area. This new infrastructure will help to boost the economy, create jobs and boost revenues for both local and national government.

As this economic expansion intensifies, it will be necessary to deal with challenges such as improper solid waste disposal, flooding, low-density expansion, inefficient modes of transit and excessive car dependency-all of which could blunt economic development while threatening sustainability and inclusive growth. To mitigate the challenges without blunting the progress being achieved through programmes and activities already in train, Guyana will move into a new phase of urban development to develop liveable, clean, affordable cities and towns.

Working closely with local administrations, the Government will support development plans for Guyana's urban areas, including Georgetown, Silica City, and their environs, and the eight additional towns of the country; Anna Regina, Bartica, Corriverton, Linden, New Amsterdam, Rose Hall, Lethem and Mabaruma. The urban development plans will incorporate infrastructure work already in progress including transportation, housing, water, construction and drainage and irrigation networks and ensure that future developments complement these earlier investments while aligning with a modern, long-term sustainability vision for Guyana's towns and cities. As plans are developed,

expertise will be drawn from the University of Guyana, other educational and technical institutions, and the private sector. Principles for low carbon buildings will be identified, and perhaps standards for green design and construction.

As part of improved urban planning, improvements to the aesthetics and cultural aspects of all towns will be priority, with an increased focus on preserving cultural assets such as the many heritage buildings to be found across the country. The National Trust, National Museum, Museum of African Heritage, and other public and private cultural institutions will be invited to participate in the development of new visions for Guyana's urban areas.

To help provide a framing for urban planning in Guyana's biggest urban area, an international architectural and urban planning competition may take place for the Georgetown urban area and Silica City. This would be done in cooperation with local authorities as well as research institutions, the private sector, and others. It would be managed by a global architectural institution, and it is hoped that it would attract interest from some of the world's leading master-planning organisations.

Expanded Sustainable Economic Sectors

Guyana's economy is growing fast and faces an ongoing challenge to ensure that all sectors, across all parts of the country, contribute to this growth and share its rewards. Realising national and international opportunities presented by the low carbon economy requires investment and new business practices by the private sector. The Government will continue to play its part across all major economic sectors. Details of how this will be done will be developed through the relevant sectoral strategies, but key points relating to LCDS 2030 are summarised below.

Sustainable Agriculture and Fisheries

Guyana is committed to the CARICOM 25 by 25 initiative which aims to cut the extra-regional food import bill by 25% by 2025. Guyana has responsibility for the agriculture sector in the CARICOM quasi-Cabinet and is uniquely poised to take advantage of production and trade opportunities in sustainable agriculture.

As a result, Government agricultural policy will be targeted to ramping up domestic production as well as sustainable agro-processing capabilities, working with the region to remove all historical barriers and impediments to intra-regional trade and promoting more widely agribusiness and complete transformation of regional food systems. On the domestic front, focus will be placed on both traditional crops as well as new and emerging ones. Efforts will target the cultivation of high-value produce, providing support for inputs for climate smart cultivation and pursuing applicable research to improve farmer profitability and enable them to become more competitive. This will include measures to enhance low carbon development including:

- Climate smart agricultural practices, such as drip irrigation, greenhouse cultivation, crop rotation and diversification

- The new Agriculture and Innovation Entrepreneurship Programme which will see the construction of 300 shade houses to enhance high-value crops.
- Dealing with saline intrusion into estuaries, NARIE has commenced work on varietal development for rice
- Strengthening the Hydromet Office to support farmers with access to short, medium and long-term weather and climate forecasts that aid the farming community in making decisions
- Equipping Sophia, Parika and Mabaruma agro-processing and packing facilities
- Helping producers to meet international market protocols for products and gain access to new markets.

Fisheries, marine, inland and aquaculture employ about 15,000 people, and Government will work to support:

- Work to enhance achievement of sustainability certificates such as Marine Sustainability Council (MSC) certification, increasing access to global markets, thereby improving the industry's viability and protecting the ocean's ecosystem
- Supporting aquaculture as a major contributor to food security
- Implementing programmes that aim at advancing the maintenance and protection of sustainably managed freshwater ecosystems
- The upgrade of the greenhouse at the Satyadeow Sawh Aquaculture Station for the promotion of aquaponics, as a climate smart option for food production.
- Research in indigenous high-value species and the use of local low-cost feed ingredients into aquafeed development.

Sustainable Forestry

Chapter One set out the challenge in enhancing the employment and economic benefits created by the forestry and mining sector while also advancing efforts to safeguard Guyana's ecosystem services for the long term. As set out in Chapter One, part of meeting that challenge will involve:

- Implementing sustainable forest management to ensure the efficient management of forest resources, including Finalising and implementing the Voluntary Partnership Agreement (VPA) under EU-FLEGT; to enable Guyana to effectively trade with the EU and other markets by the issuance of FLEGT licences.

- Implementation of Programme for Endorsement of Forest Certification (PEFC); to boost local and international trade of certified forestry products. Efforts of other forest certification schemes at company level, including FSC, will also be supported.

- Improving value-added activities locally to assist in creating a higher potential for carbon storage in long-use wood products. Expanding the value chain beyond primary production is integral to minimising the pressure on its forest by finding the most suitable and economic use for the forest resources.

- Strengthening and Expanding Community forestry and the commercialization of non-timber forest products.

To maximise the value creation from each of these initiatives, government will help with:

- Exploring market opportunities for exports. Progress has been made with Barbados, Ghana and other countries, for example 120 prefab houses are being manufactured using local wood and exported to Ghana.
- Exploring wood biomass to energy projects for sawmilling operations
- Establishing a revolving fund for foresters.
- Other areas as set out in the national forest policy to help industry.

Low Impact Mining

Chapter One set out several policy measures to improve land use planning around forestry and mining, including the completion of a mineral map; so as to maximise the amount of value that can be extracted while minimising deforestation, degradation and pollution in mining areas. The implementation of mineral mapping in the mining districts will identify economically exploitable deposits as a means of improving productivity within the mining sector.

Chapter Two outlined opportunities for land reclamation and restoration of mined areas. These are underpinned by measures to advance transparency, meet commitments on the phase out of mercury and implement education and incentives for integrated planning and management of the mining and forest sectors.

The purpose of these measures is to increase the sector's ability to grow sustainably-and in particular to play a role in serving increased global demand for rare earth metals, which are essential to the global energy transition because of their use in electric vehicles, solar and other important parts. There continue to be applications for rare earth elements such as scandium. Strategic efforts will be made for the search and possible exploitation of these minerals. Small and medium miners will have free access to mineral mapping information and other support areas.

The Government will refocus efforts on capacity building through the Guyana Mining School Training Centre (GMSTC) and the partnership agreement with the GGDMA which will advance through Mercury Free Technology testing and demonstration. Large scale operators will be supported as they come fully on stream by 2024 in Karouni and Rorporau, production will be required to operate to high international standards.

Tourism

Guyana's Tourism Strategic Plan is currently being drafted, drawing on previous work and being updated to align with the LCDS 2030.

At the same time, work is progressing on opportunities that have already been identified with massive expansion in the provision of tourism infrastructure, especially hotels, in Georgetown and along the coast. Between 2022 and 2025, over 2,000 hotel rooms will be added, many of which will be operated by global brands which will increase visibility of Guyana's tourism product.

From 2022, an increased focus will take place on ensuring greater opportunities for the tourism sector across the country to improve:

- **Tourism Infrastructure:** Government has invited expressions of interest for the establishment of ecolodges and resources and anticipates that this will result in a small number of major investors working with local communities; to both increase the number of tourists visiting the interior and maximise ecotourism opportunities for existing operators with a proven track record. This will see job creation and increased household incomes in areas of the country away from the coast. To support this expanded focus on tourism away from the coast, the government will lead work to ensure the necessary coordination across other areas outlined in this LCDS 2030, including:
    - assisting local communities to access digital finance structures for selling their tourism and related products (for example, providing assistance for arts and crafts products to be paid for via debit/credit cards)
    - identifying ecotourism zones within existing and new protected areas and conservancies.
    - digitising process for the tourist, business visitor or returning diaspora member (e.g. visa applications and immigration) and for participants in the sector (e.g. application for licenses etc)
- **Improved Community Capacities:** The Guyana Tourism Authority (GTA) has a model to develop community led and owned tourism enterprises which was drafted from the successes of communities such as Surama, Rewa and Yupukari which have won industry rewards for their successes. Further marketing and capacity building is required to scale up tourism enterprises across the country, and plans are in place to work with ten other communities on similar models, starting with Warapoka (Region One) and Lake Capoey (Region Two).
- **Expanded Sub-sectors:** Over the past 10-15 years, Guyana has seen remarkable success, which flowed from studies done in 2006, to identify promising sectors for ecotourism. The studies identified two particular niches: Wildlife Spotting and Birding and Sports Fishing. Over the years to 2030, work will progress to add to the success in these sectors with an increased focus on other areas of ecotourism where Guyana has the potential for competitive offerings including:
    - Heritage Tourism, National Trust of Guyana
    - Entertainment and Events
    - Sports Tourism
    - Agritourism and Culinary Tourism
    - Diaspora and Domestic Tourism
    - Dual Destination Tourism, for example working with Barbados to create Beach / Rainforest combination holidays for the increasing number of tourists looking for distinctive offerings.

Manufacturing and Services

Government will engage with the major producer groups and private sector organisations to determine new opportunities for the manufacturing and services sectors to access increased opportunities in the low carbon sectors, through strengthening and expansion of valued-added and manufacturing capabilities.

Training will be improved in fields necessary for the low carbon transition, this is covered below under Education.

The Government will support work to help small businesses, as outlined under Financial Infrastructure.

The Government will also continue to facilitate the continued growth of the BPO industry. This is a key low carbon growth pole identified in the original LCDS. Over 1,100 jobs were created between August 2020 and the end of 2021 including a re-opened call centre in Linden. Government will continue to work with the private sector to support the expansion of call centres, potentially creating over 1,500 jobs by the end of 2023.

Low Carbon Infrastructure

Transport Infrastructure

By 2030, Guyana aims to have made significant progress on the transition from a transportation system largely built around petroleum and diesel vehicles, to one which introduces other affordable and competitive transportation options including electric and lower-carbon public and private transportation. This goal includes land, water, and air-based travel.

To achieve such an ambitious target, global supply chains (across many areas, including electric vehicles and lower carbon aviation fuel) need to evolve to a point where large-scale low carbon transportation is feasible in countries like Guyana.

In the meantime, further work is needed to prepare for opportunities that may arise, and to specify potential options that are workable in Guyana to determine strategies to frame long-term public and private transportation choices. These options will be a centrepiece of the urban development plans outlined above. Similarly, if communities choose to prioritise clean transportation, they will likely also feature in Village Sustainability Plans. While work advances to identify options and priorities for a more sustainable transportation system in the future, the government continues to lay foundations, including:

- **Electric Vehicles:** Today, electric vehicles are significantly more expensive than comparable fossil fuel-powered vehicles available in Guyana, this is compounded by expensive electricity supply and a lack of charging infrastructure. International experience suggests that rapid reduction in vehicle pricing to a level that would be affordable in Guyana could happen from 2028 or shortly thereafter. With that in

mind, the Government is putting in place some of the basic foundations needed for electric vehicles; these policies and initiatives will be refined as Guyana's urban and rural transportation plans evolve, and as international markets for electric vehicles create more affordable choices for Guyanese homes and businesses:

  - **Cheaper, Cleaner Electricity:** Chapter 3 outlined how one of the main impediments to the use of electric vehicles will start to be removed in the coming years, as affordable, reliable, clean electricity is rolled out across Guyana.
  - **Charging Infrastructure:** With 2022 budget support, GEA and GPL have partnered to install 6 public electric vehicle charging stations across the country as part of a pilot project to support the nascent electric-mobility sector. Moreover, private providers who wish to establish charging infrastructure are encouraged to do so. The Government has removed Customs duty for the set-up of electric vehicle charging stations.
  - **Affordability of electric vehicles:** The Government has removed Customs duties and excise tax for electric vehicles. Electric vehicles less than 4 years old only pay 14% VAT while vehicles between 4 to 8 years old pay no taxes. The Government has approved a policy to promote the procurement of electric vehicles for Government Ministries and Agencies where appropriate.

- **Lower Carbon Fossil Fuel Vehicles:** Recognising that it will take time before large scale deployment of electric vehicles will be feasible, the Government is encouraging other lower carbon forms of transportation. Taxes have been lowered for LPG vehicles up to 2000CC, less than 4 years old (45% Duty and 14% VAT) with duty exemptions for LPG conversion kits. Taxes have also been lowered for Hybrid vehicles up to 2000CC: less than 4 years old pay only 45% duty and 14% VAT.

- **Water Transportation:** With much of the population of Guyana in the coastal zone, and few road connections to neighbouring countries, river and maritime transport are critical for many of Guyana's citizens and buinsses. Shipping is the number one connection that Guyana has to the world. Guyana's shipping services largely comprise three main groups: (i) Inter-island transport, which is often undertaken by small "tramp" vessels, serving the larger islands.; (ii) Short-sea shipping, which connects Guyana with the other Caribbean and North American transhipment centres. (iii) Deep-sea shipping, which uses larger vessels. The trends emerging in this sector, are multi-growth areas such as increased port calls, larger vessel size, and increased container demand. With the high growth forecast for the economy, the importance of having modernised ports are even more critical to Guyana's development.
- **Air Transport:** Hinterland air connectivity forms an integral part of the development of Guyana. Domestic operators are encouraged to establish and implement policies that reduce CO2 emissions from its activities. However,

Guyana's priority is aligning its international aviation commitments with those of the International Civil Aviation Authority (ICAO); a specialised agency of the United Nations which serves as the global forum for its Member States, inclusive of Guyana, on matters of international civil aviation. ICAO's vision is to achieve the sustainable growth of the global aviation sector. Guyana's Civil Aviation Authority (GCAA) is the compliance authority for ICAO and supports the achievement of collective global goals for aviation to achieve (i) 2% annual fuel efficiency improvements through 2050; (ii) holding the global net CO2 emissions from international aviation at a constant level from 2020. Guyana supports ICAO Member States' efforts to achieve these goals through the adoption of the Carbon Offsetting and Reduction Scheme for International Aviation - more commonly known as CORSIA - as a global market-based measure for aviation emissions. CORSIA is a global offsetting scheme, where airlines and other operators will offset any growth in CO2 emissions above 2019 levels (previously set at 2020 levels but adjusted because of the undue impact of the COVID-19 pandemic on air transport operations) through the acquisition and cancellation of eligible emissions units. CORSIA only applies to international flights.

Digital Infrastructure

The 2013 version of the LCDS highlighted the importance of digital infrastructure to Guyana's overall development as well as to the low-carbon vision that gave rise to the LCDS. Several initiatives were set out then, which have since been completed including the expansion of Guyana's fibre optic capability, targeted support for call centres and Business Process Outsourcing (BPOs), and the completion of telecommunications liberalisation. Other initiatives are in progress, including through the 200 Information and Communications Technology (ICT) hubs in the Hinterland digital access project described in Chapter Two.

Since 2013, major progress has also been made on the digital components (such as satellite monitoring) of Guyana's Forest Monitoring, Reporting and Verification System (MRVS) which is now recognised as one of the best of its type in the world. Chapter Two outlined how this success is enabling Guyana to integrate its forest climate services with global carbon markets. However, it can also enable a wider suite of applications.

Building on these foundations will enable a new phase of work to improve the country's digital infrastructure. Much of this will be led by the now-liberalised private operators in the telecommunications sector, while Government will focus on key strategic areas, including:

- **Digital and Spatial Infrastructure:** Under the SLDM project, funded by payments for forest climate services under the Guyana-Norway Agreement, Guyana carried out preparatory work for the establishment of the country's National Spatial Data Infrastructure (NDSI) and geospatial platform. The NDSI will enable the housing of all satellite and lidar images of Guyana to minimise expensive image duplication from foreign vendors. GFC and GLSC staff will be trained and work with the

various ministries to process satellite images combined with other geospatial data to improve geological mapping for mineral exploration, detect illegal mining, routinely monitor oil spills, deforestation and mangrove regeneration and sea defence as well as REDD+ programmes and the means to participate in ART-TREES and other (nested) market standards. This will enhance the accessibility, communication and use of geospatial and satellite data to support a wide varied of evidence-based decisions at all levels to support sustainable land management in Guyana. The expertise developed in Guyana can be used in CARICOM and other countries, including other forest countries, to improve their geospatial infrastructure.

- **Access and Connectivity:** Access to digital technology in urban areas has improved enormously, largely through the provision of services by private sector operators in the liberalised marketplace. However, there is still a need to bridge the digital divide between coastal and hinterland communities, so work will intensify on expansion of the satellite network which provides part of the National Broadband Network, expansion of 4GLTE and expansion of the fibre optic network.
- **e-Governance:** Government will work to create a national online portal to serve as a gateway to access digital government services, digitation of population, commercial and land registers; and electronic identification. Data centres to support the provision of services provided by government agencies will be expanded.

Financial Infrastructure

For many Guyanese citizens and small-to-medium businesses (SMEs), access to finance remains a hurdle, whether seeking financial capital to invest in start-ups, to sustain a business through an unexpected external shock, expand in light of opportunities, or increase efficiency through different technologies or processes.

As part of the 2009 LCDS, the Micro and Small Enterprise Development (MSED) project facilitated loans, grants, and training in 17 wide ranging low-carbon sectors working in collaboration with the local banking sector. A second phase will be implemented to assist entrepreneurs to access finance more easily for their low-carbon ventures, either through grants or loans under favourable conditions including guarantees on collateral requirements and reduced interest rates.

The project will be designed with consideration of lessons learned from the previous phase and will continue to take stock of the strong representation of female entrepreneurs. Under the first phase of the MSE project, female entrepreneurs represented 62% of grant beneficiaries and approximately 40% of loan beneficiaries. There were customised training programmes aimed at female entrepreneurs, in addition to those generally offered, and this will continue to be built upon.

Whether under the MSE project and in partnership with the Small Business Bureau or outside of the project, support will be given to female focused initiatives such as

the Guyana Women's Leadership Institute (GWLI) and the Women's Innovation and Investment Network programmes (WIIN) under the GWLI.

Climate-Compatible Health and Education Services

Health

Climate change has been shown to increase "illness and death from floods, heat waves and droughts; water and food insecurity; increased transmission and spread of infectious diseases, diminished air quality; and adverse physical and mental health impacts on populations."

A critical part of creating long-term, sustainable communities will require improving both access to and the quality of healthcare services across the countries. This is covered in the Health Strategy and a comprehensive treatment is beyond the scope of this LCDS. However, it is envisaged that significant portions of anticipated revenues from carbon credits sales will be deployed to scale up existing initiatives already being pursued by the Ministry of Health. Further work is needed but indicatively, this could include scaling up:

- **Telemedicine:** The health sector has planned to implement telemedicine within Guyana to enhance the quality of healthcare delivered, especially for the hinterland. A pilot is planned for implementation in 2022 after which the initiative could be scaled up to ensure coverage of all hinterland health facilities.
- **Smart Hospitals:** The Ministry of Health, in collaboration with the British Government, has assessed 80 healthcare facilities for implementation or upgrade to smart healthcare facilities. Currently, 5 hospitals of 80 assessed have been or are being converted to a smart healthcare facility: the Diamond Diagnostic Centre, Lenora Hospital, Mabaruma Hospital, Lethem Hospital and Paramakatoi Hospital. Scaling up could see a far greater number of healthcare facilities upgraded to smart healthcare facilities.
- **Elimination of Neglected Diseases:** Guyana is working to achieve the World Health Organisation target of elimination of neglected diseases by 2030, such as filaria.
- **Hinterland Healthcare:** The Ministry of Health has determined an essential package of primary healthcare services for 115 types of diseases to be offered at healthcare posts, healthcare centers, district hospitals, inter alia.
- **Training and staffing:** This could include:
    - Expansion of the community health worker programme for the hinterland and auxiliary services such as pharmacy aide, x-ray technician.
    - Development of a new nursing school.
    - Improvement of postgraduate education for doctors. Currently, there exists a postgraduate institute with 10 subject areas.
    - Establishment of a physician leadership programme in partnership with

McMasters University
- Partnership with York University to deliver training for a masters in hospital administration.
- Conversion of the Ministry's training department to an institute to offer certified training programmes.

Education

Education is an essential factor in both the fight against climate change and in the efforts required to combat climate change. Research has shown that "education helps students develop a strong personal connection to climate solutions, as well as a sense of personal agency and empowerment. It can have consequential impact on students' daily behaviours and decision making that reduces their overall lifetime carbon footprint." Recognising the strategic, long-term importance of the education system in embedding both knowledge about climate change, and the means for citizens to act individually and through their communities, businesses, societies, the Education Vision to 2030 will prioritise the objectives of the LCDS 2030. In doing so, it is hoped to ensure the long-term objective that the 2030 is owned and internalised by citizens to foster its public acceptance and support its successful implementation. Key initiatives will be more fully elaborated through the Education Strategy, but objectives include:

- **Improved Climate and Environmental Literacy.** Educating citizens, especially children, and raising their awareness regarding the causes and consequences of as well as the potential solutions for climate change, is a key factor in helping to address climate change globally. This includes understanding concepts outlined in this LCDS, such as global warming, greenhouse gases, carbon markets, the circular economy, urban planning, green buildings, deforestation, the United Nations Framework Convention on Climate Change (UNFCCC) and REDD+, green jobs, water footprint, sustainable food, and many more.

- **Caring for the Environment:** Greater environmental literacy can be accompanied by the development of a culture of caring for the environment, starting with very young children. In Guyana, this may include understanding the circular economy as it emerges in the coming years moving beyond "clean ups" when waste has been disposed, but instead learning how to prevent it in the first place or manage it when it is necessary to do so.

- **Learning about Guyana's world class nature:** Children (and many adults) do not always get the chance to fully appreciate Guyana's globally significant forests, biodiversity, water and marine resources. Yet, the country has a unique opportunity to be a source of new insights and learnings about how to preserve the world's resources and offer a model on how climate and development can be aligned.

Towards these ends, the Government intends to engage in a broad effort across

Government and will invite educational and research establishments including the University of Guyana, the Technical and Vocational Institutes, Iwokrama, the new International Centre for Biodiversity, Bina Hill Institute, and others, to better understand what initiatives are already in place and where new efforts are needed. Initial foundations include:

- **Strengthening of education in science, technology, engineering and mathematics (STEM):** Training in these disciplines enables young people to better understand the physical changes to their environment and provide them with the tools with which to combat climate change. A system of training along these lines will also train and qualify specialists for the needed skills and jobs that will be created in the implementation of this LCDS 2030.

- **Supporting the delivery of climate and environmental education in schools:** Whether as a separate subject or as a transversal theme in the school curriculum, it is essential to cultivate environmental values and knowledge among young people so that they can lead more sustainable lives. Working with NCERD, the Ministry of Education has already revised the school curriculum with emphasis on fostering environmental stewardship, beginning from the junior education level with the youngest students through to university and also persons in technical and vocational field. New interventions are being planned by NCERD including:

    - Climate Education Programme Pilot which targets students and teachers at the primary and secondary education levels. The programme offers important practical learning regarding coastal environmental measurements, analyses, reporting and actions.
    - An imminent Freshwater board game (in collaboration with the Guyana Policy Forum). The aim of the game is to promote learning on the conservation of freshwater organisms and positive & negative actions on the environment.
    - Micro science - this initiative enables students at the primary level (with the absence of science laboratories) to participate and benefit in experiments or demonstrations that utilize a minimum amount of equipment, materials, chemicals.
    - World Science or Environment Day is fully utilized to raise awareness on environmental issues and showcase environmental management (including environmental careers).

- **Improving skills training for the low carbon economy:** This involves educational and training facilities to ensure that as many Guyanese as possible have the chance to participate in areas essential the low carbon economy. For example, this would see training in technical skills such as energy auditing, installation and servicing of renewable energy components (solar and wind).

- **Building educational establishments that reflect environmental principles:** Physical facilities must set an example and use energy efficiently, by, for example, using energy from renewable sources. They must also promote efficient use of water and offer opportunities to interact with the environment, and they must be robust enough to withstand extreme weather events. The Ministry of Education recognises the need for educational facilities to be designed and built in a manner that increase resilience to the impact of climate change, such flooding. Measures are set out in the National Risk Management Policy for the education sector, and further work is needed to upgrade existing facilities.

In carrying out these efforts, the challenges of capacity building will be addressed, including through partnerships with international partners. For example, City and Guilds have already developed a variety of relevant curricula that are being used in technical institutions worldwide. Guyana is already participating in a Canadian-funded programme to provide training and certification regionally for Caribbean youth in areas related to a low carbon economy. At the same time, emphasis will be placed on the considerable body of information and research, including from institutions such as the University of Guyana and indigenous knowledge that is spread across many parts of the country.

CHAPTER FIVE
PROTECTING AGAINST CLIMATE CHANGE AND BIODIVERSITY LOSS

The adverse and potentially catastrophic impacts of climate change are already being experienced in Guyana. Since the 1960s, the country has observed marked increases in temperature, sea level, and the frequency and intensity of extreme rainfall events. The impacts on Guyanese people, the economy, and the environment during flooding and droughts are examples of the devastation climate change may cause.

The first half of 2021 saw catastrophic flooding and impacted large parts of the population. Over 74,000 acres (43,473 acres of cash crops and 30,684 acres of rice) of farmlands and over 20,000 farmers were affected. The 2021 flood is likely to be comparable to the 2005 flood which affected close to 37% of the population and caused economic damage equivalent to 60% of GDP. Some areas experienced 120-150 centimetres of standing water, which remained for several days. A socio-economic assessment of the damage and loss caused by the 2005 flood revealed major impacts on the agriculture sector, particularly in the regions of West Demerara/Essequibo Islands, Demerara/Mahaica, and Mahaica/West Berbice. Region Four was most severely affected in the 2005 flood (though less affected in the 2021 flood), experiencing close to 55% of the total damage, followed by Regions Two (23%) and Five (19%). Considerable losses were recorded in the sugar, rice, livestock, and other crops (fruits, vegetables, roots and tubers, and herbs and spices) subsectors.

Floods are not the only climate emergencies that Guyana faces. Following an extended period of dry weather in late 2014 and early 2015, the hinterland was facing drought conditions by April 2015. Region Nine (Upper Takutu-Upper Essequibo) and parts of Region One (Barima-Waini) were particularly affected, resulting in a reduction in the agricultural output in the Regions, a reduction in available water supply, and increased dust pollution, among other issues. The lack of rainfall caused decreased water levels in the wells, lakes, ponds, rivers, creeks and other water sources. Frequent bush fires destroyed several farms at Aranaputa. Local communities experienced limited access to potable water for domestic and agriculture use. Residents were forced to go to local

rivers, including the Rupununi River, for untreated water for domestic use. There were reports of an increase in the number of people suffering from vomiting, and diarrhoea. The drought conditions were also linked to a resurgence of pests, including acushi ants and caterpillars, which attacked the few remaining crops. Dasheen, cassava, eddo and other cash crops were particularly severely impacted by the drought.

With increases in the number of dry spells, drought conditions and changing rainfall patterns, stress on Guyana's internal water resources, aquifers and rivers is increasing. With resources from the Guyana-Norway Partnership, Guyana developed a Climate Resilience and Adaptation Strategy to set out a comprehensive and overarching framework for adapting and building resilience to climate change impacts. This chapter summarises elements of that strategy. The CRSAP built on the work that had been undertaken in Guyana over previous years and identified key climate risks and priority resilience actions.

In 2021, work re-started to implement the strategy. Specifically:

- The most important elements of the CRSAP are being brought up to date.
- Funding will be allocated to the priority climate resilience programmes - summarised below.
- A strategy to finance the remainder of the CRSAP - from ecosystem services payments and other sources - will be put in place and launched in 2023.

Sea Defense Enhancement and Maintenance

Of Guyana's c. 214,970 km^2 in land area, approximately 90 percent of the population live on the 15,000 km2 close to the low-lying coastline of approximately 459 km the majority of the coastal zone is below sea level and relies largely on engineered (seawalls and rip raps) and natural (mangroves) sea defense structures to provide protection from the Atlantic Ocean. In Regions Two, Three, Four, Five and Six, sea defense structures protect approximately 244 km of the coastline; 22.81 km are in either poor or critical condition. Mangroves are highly vulnerable to climate change, in particular sea level rise, which could destroy or damage mangroves and, with it, coastal habitats and fisheries infrastructure such as landing sites.

Despite significant investments to rehabilitate sections of Guyana's sea defense system, the 2014 survey of Guyana's sea defense structures, which covered 91.2% of the total length, showed the urgent need for investment as set out in the following table.

This will deliver on the following outcomes:

1. Guyana's sea defence system is more resilient to a changing climate.
2. Sea defence systems are restored and retrofitted.
3. Mangroves are restored and protected.
4. Coastal communities are protected against coastal flooding.
5. Improved awareness of the importance of the mangrove eco-system to the sea defence mechanism and livelihood among the general public, including the fishing community.

Strengthening Drainage and Irrigation Systems

Closely interlinked to the challenge of sea defenses is the drainage and irrigation (D&I) system which is connected to over 150 sluice gates/kokers which are located at the seawalls. With sea-level rise consequentially limiting the number of low tide days, the opening of the sluice gates/kokers to expel water out to sea is becoming increasingly restrictive, hence increasing the risk of flooding and further exposing Guyana's population and assets located in low-lying coastal regions. Additionally, blocked drains and disabled pumps exacerbate the problem of water expulsion. Therefore, the functional relationship between the D&I system and the seawall needs to be optimised for both to efficiently perform their critical roles. A fault in one could comprise the integrity of the other and efforts are underway to address some of the shortcomings of the D&I system.

Multiple economic activities, livelihoods and communities are dependent on D&I systems. These systems are critical not only for flood control and surface water drainage but also to provide water for agricultural, domestic and other purposes.

To carry out the dual role of drainage and irrigation, the systems are operated through the concept of nearly constant water levels. A large proportion of Guyana's coastal lands lie below sea level and drainage by gravity is possible only during low tides, which makes the systems prone to flooding during extreme rainfall events. The losses and damage from the 2005 floods in Georgetown and the surrounding region exposed the system's limitations in terms of handling a greater intensity of rainfall combined with tidal inflow.

Building Climate-Resilient Agriculture Systems

Agriculture in Guyana contributes approximately 31.9% to non-oil GDP, employs about 17% of the labour force and generates almost 21.3% of Guyana's non-oil export earnings in 2020. The two largest subsectors are rice and sugar, with a combined contribution to GDP of 7% or 24.8% of agriculture GDP over the period 2016-2020. The fisheries industry is also vital to Guyana's economy and dietary intake. It contributed on average, 0.8% of GDP over the period 2016-2020.

However, the conditions associated with a changing climate will have adverse effects on these sectors and by extension Guyana's economy. Sea level rise could increase water salinity in rice fields; temperature increase could reduce rice yields; changes in growing conditions can result in increased weed and pest infestation; the intensity and frequency of droughts are projected to increase, resulting in reduced yields. For sugar, the increase in temperature at night-time, affects the ripening of the crop and, coupled with a drought period, can affect yields. Increased rainfall reduces the days available for planting and reaping. Floods from more frequent and intense rainfall, due to over-topping and sea-level rise, reduce the discharge window available for coastal drainage and impact output negatively.

The 2005 floods resulted in damages to the agricultural sector amounting to US$52.6 million. The sub-sectors hardest hit were sugar, US$11.2 million; and rice, US$8.1 million. Non-traditional Agricultural Commodities sustained damages of US$28.8 million and livestock, US$2.9 million. With overall costs of US$29 million and US$14.7 million respectively, the droughts of 1997 and 2010 resulted in damages to the rice and sugar industries resulting in losses in export earnings to the country and income for many households. More than 1,500 Amerindian families in Southern Guyana, reliant on agriculture were affected and several rice farmers were forced to leave 35% of their rice fields uncultivated. Losses to the other subsectors of livestock and non-traditional agricultural commodities were numerous. In the 2021 floods, over 74,000 acres (43,473 acres of cash crops and 30,684 acres of rice) of farmlands and over 20,000 farmers were affected.
In accordance with the LCDS 2030, the Government will:

- Strengthen sea and river defense systems
- Improve flood control and water management (drainage/ kokers)
- Address drought prevention (including in Hinterland regions)
- Implement climate-smart initiatives
- Strengthen institutions such as the NDIA, Sea Defence, Hydrometeorological Department, etc.
- Improve response capability for climate events

Public Health Adaptation to Climate Change

Guyana's health sector already faces challenges including a limited number of health care professionals, shortages of equipment and supplies, and poor physical access to health facilities for some of the population. Health facilities (e.g., hospitals, health centres), which are vital to responding to risks in vulnerable communities, are themselves currently vulnerable to climate change impacts, such as flooding, due to their locations. In addition, it is widely accepted that climate change may exacerbate the incidence of vector and waterborne diseases, including malaria, dengue and chikungunya. Greater rainfall intensity increases the number of potential breeding grounds for mosquito species. Further, untreated pools of contaminated water are breeding grounds for the vector species identified above. These diseases represent a significant economic burden for Guyana's economy and society. Prevention has significant benefits not only by improving the length and quality of people's lives but also by reducing the costs which would arise from treatment and lost productivity.

In accordance with the LCDS 2030, the Government will support:

- Improving public health adaptation infrastructure
- Improving planning and response capability of the health sector to climate-related impacts
- Developing and implementing programmes to tackle climate-related illnesses

This will deliver on the following outcomes:

1. The disaster risk preparedness and management capacity of the health sector is improved.
2. The health sector in Guyana is better equipped to recover from weather-related extreme events, particularly flooding.
3. Communities have better access to clean water and sanitation facilities and improved food hygiene.
4. The incidence of water and vector-borne diseases, such as malaria, dengue, and chikungunya, is reduced.
5. Critical health infrastructures are resilient to a variable and changing climate.
6. Health practitioners in Guyana are trained and prepared to respond to extreme events and climate change.
7. The public is sensitised about the risks of climate-related health impacts, including at the community level.

Emergency and Extreme Events/Flood Control and Management

In view of the current threats that climate variability and longer term climate change pose to water resources management in Guyana, the State will:

- Review current national legislative procedures, and guidelines for combining water-use and land-use planning.
- Develop and strengthen legislation to make environmental and social impact assessments mandatory in all significant developmental projects.
- Minimise the effects of climate variability and change as well as institute measures to mitigate the effects of, and prevent damage caused by extreme hydrological events (floods and droughts) in keeping with the National Climate Change Action Plan (2001).
- Draft Climate Resilience Strategy and Action Plan 2016

The Government will also take steps towards:

1. Undertaking comprehensive development and management of the main rivers by means of a system of structural and non-structural measures.
2. Assessment of end use of the resource and climate change impacts at source (for domestic and consumption) and for ecosystem availability.
3. Developing early warning and flood-proofing systems to manage natural disasters like floods and droughts.
4. Developing water resources of the major rivers for multipurpose use, including irrigation, fisheries, navigation, forestry, and aquatic wildlife.
5. De-silting watercourses regularly to maintain navigation channels and proper drainage.
6. Delineating water-stressed areas based on land characteristics and water availability from all sources for managing dry season demand.
7. Initiating actions to protect the water quality and ensure efficiency of its use.
8. Designating flood-risk zones and taking appropriate measures to provide desired levels of protection for life, property, vital infrastructure, agriculture and wetlands Ensuring that land-use planning/building regulations are adequate and enforced in respect of waterways and flood-prone areas.
9. Providing water conservation structures of adequate capacity after carrying out environmental assessments taking, into account multiple uses (e.g. fisheries and tourism) and removing conflicts (e.g. fencing of intakes in dams to allow for restricted fishing).
10. Ensuring rainwater harvesting techniques are incorporated into the building code and enforced.
11. Ensuring implementation of mitigation strategies in consultation with stakeholders.

CHAPTER SIX
ALIGNING WITH GLOBAL CLIMATE GOALS: OIL AND GAS

Since the first LCDS was published, oil and gas have been discovered off Guyana's coast, creating new opportunities to transform Guyana's development prospects. Oil and gas revenues will be managed strategically and responsibly, by:

- Using oil and gas revenues to boost national budget resources to fund **increased investments as well as social and economic investments, most notably in health and education.** This will enable all Guyanese to reach higher standards of living and wellbeing.
- Support for **diversification of the economy** by supporting non-oil sectors and supporting future development all across Guyana. This will involve support for transformational physical infrastructure outlined in this document – including river, road and air transport networks; the national digital connectivity network; and repairing coastal and Hinterland climate protection infrastructure.
- Managing oil and gas revenues **in accordance with the rules of the Natural Resources Act**, which sets a formula for saving revenues beyond those that are invested in the above objectives.

At the same time, the Government recognises that Guyana will need to align development of its oil and gas sector with global trends towards decarbonisation. It will do this through two strategic objectives:

- **Ensuring a domestic low-carbon transition:** As outlined in earlier chapters of this document, Guyana intends to achieve ambitious domestic targets to maintain its position as a net-zero economy, prioritising action on forests, low-carbon energy and transportation. In summary, Guyana's non-forest emissions can continue to stay low as the country grows its economy, while the forest will continue to sequester carbon and sustain the country's status as a net absorber of carbon. With the right economic incentives, ecosystem services can provide an at-scale diversification opportunity for Guyana, reducing the need to pursue high-carbon economic pathways.

- **Participating in a global low-carbon transition:** The majority of Guyana's oil and gas will be sold in the global marketplace. The Government believes that this market needs to develop in alignment with the goals of the Paris Climate Agreement, specifically, to stablise global temperature increases at less than 1.5 degrees Celsius above pre-industrial levels.

As a result, most of Guyana's oil and gas will serve global demand, and the trajectory will be set by those who create the demand. The Government will steward Guyana's oil and gas industry accordingly, and the measures to achieve this are set out below.

The Global Low-Carbon Transition: Aligning with Global Net Zero

To achieve the goals of the Paris Climate Agreement and stabilise global temperatures at or below 1.5 degrees above pre-industrial levels, global oil demand needs to fall sharply before 2050.

In March 2021, the International Energy Agency, with the involvement of energy and climate leaders from over 40 countries, set out seven key principles for meeting the goals of the Paris Climate Agreement, and "implementing net zero" in the global energy sector by 2050.

The seven key principles led to a July 2021 report, setting out how "Net Zero by 2050" could be achieved, and outlined how this requires a complete transformation of the global energy and transportation sectors. Between 2020 and 2030, global renewable energy capacity needs to increase four-fold, the use of electric vehicles across the world needs to increase eighteen-fold, and the energy intensity of global GDP needs to decrease by four percent per annum. Achieving this transformation will require huge leaps in innovation including advanced batteries, hydrogen electrolysers and direct air capture and storage.

The report outlines how, under the "Net Zero by 2050" scenario, global oil consumption will decrease from 98 million barrels per day in 2019 to 72 million barrels per day by 2030, and 24 million barrels per day in 2050.

By 2050, at this level of consumption, 70% of oil use will be in applications where the fuel is not combusted and therefore does not result in any direct CO2 emissions, for example, the use of oil as chemical feedstocks and in lubricants, paraffin waxes and asphalt.

Therefore, the central challenge for the international community is to align behind a scientifically and economically rational set of policies to drive oil demand down from almost 100 million barrels a day to 24 million barrels within 40 years.

Guyana's Policy Position

Guyana supports the achievement of Net Zero by the 2050 target, including the more short-term target of a 28% reduction in global oil demand by 2030.

To be effective, global policies to achieve these targets need to be fair, economically rational and based on science.

Fairness requires that the oil industry – which is worth US$3-4 trillion every year – should not just be for the benefit of incumbents, particularly when those incumbents are already very wealthy. The world's largest oil producer – the United States of America – has a per capita income of US$65,000 – about ten times that of Guyana. If Guyana were to prematurely forego oil and gas revenues, it would simply mean a continuation of a defacto monopoly where incumbents would meet demand and benefit from the industry which will be worth trillions of dollars for decades to come. It would also mean that Guyana would remain poor and unable to invest in lifting the living standards of its people. Rather than expecting supplier countries to forego opportunities by leaving them to incumbents, predictable global policies are needed. Since 2009, Guyana has supported two main global policies:

- **A global price on carbon, whether through a global carbon tax regime or a global carbon market**
  A carbon price, levied on the consumption of oil and gas, incentivises both investment in lower carbon replacements for fossil fuel electricity and transportation (for example, renewable energy and electric vehicles) as well as managing the global low-carbon transition, by progressively driving out the highest carbon, least economically viable fossil fuels, particularly coal, oil and gas. Calls for such a carbon price have been made for many years – notably in the 2010 report of the United Nations Secretary-General High Level Advisory Group on Climate Change Financing for which Guyana was a part of the 15-member team. Subsequent analysis emphasised the criticality of this issue, including the "Report of the High-Level Commission on Carbon Prices", sometimes known as the "Stiglitz-Stern Report", which concluded that a carbon price between US$50 and US$100 will be needed to achieve the dual goals of increasing low-carbon investment and aligning with a Paris Agreement target for reducing fossil fuel usage.

Despite this long-standing consensus that a global carbon price regime is needed, international action to progress this regime remains inadequate. The Government of Guyana supports calls for the international community – working through the United Nations Framework Convention on Climate Change (UNFCCC) and other relevant international institutions – to accelerate work on both the methodology and implementation of this pricing regime.

- **The removal of subsidies for fossil fuel production**
  In 2019, fifty of the largest economies in the world – who account for 80% of global greenhouse gas emissions – increased their support for fossil fuel production by 30%, with total support reaching US$178 billion. Most of this was in developed (OECD) countries. In effect, this uses public money to drive down the costs of oil production, regardless of the carbon-intensity of the oil and gas being produced.

  The Government of Guyana supports calls for the elimination of such fossil fuel subsidies, especially in OECD countries where subsidies are the most distorting. This will lead to the breakup of the current monopoly-like situation, and the stabilising of price levels

Combined, these two policies can drive the most carbon-intensive and least economically-rational oil and gas out of the market, enabling the remaining post-2050 supply of oil to be the lowest carbon and most economically efficient.

At the same time, to drive down carbon intensity further and remain relevant in a Paris Climate Agreement-compatible oil market, Guyana will significantly increase domestic policy measures, including:

- **Tax on Flaring**
  Globally, gas flaring – which results from the burning of natural gas – causes more than 300 million tonnes of carbon dioxide equivalent to be emitted every year. If this was used to produce energy, it would generate enough electricity to supply the entirety of the African continent's current annual demand.

  When the current Government took office in 2020, there were no safeguards in place to disincentivise or disallow flaring. At the same time, the industry's first floating production, storage and offloading vessel (FPSO) was flaring excessively due to a faulty gas compression system.

  The Government has taken action to address the historical issues of limited safeguards and the consequent lack of incentives for preventing excessive flaring, at the same time as putting in place measures to dis-incentivise all excessive flaring from new FPSOs in the future.

Policies have been introduced which prohibit routine flaring from oil and gas operations except for those flare streams necessary for safe operations (e.g. pilot flares). Certain, limited non-routine flaring circumstances are permitted but only with the approval of the competent authority, the Environmental Protection Agency (EPA) – these limited circumstances including flaring for well testing, emergencies, maintenance, and restarts.

To further dis-incentivise flaring, the Government has also implemented one of the very few taxes on flaring in the world – where approved flaring is subject to an environmental tax. The amount of the tax is set by Government, and as of mid-2022 was US$50 per tonne of carbon, along with payments for the actual gas lost.

With the introduction of these measures in 2021 and 2022, Guyana now has one of the world's strictest anti-flaring policy regimes. To enable Guyana's experiences to be shared with other oil producing nations, and to enable Guyana to benefit from the experiences of others, Guyana will join the World Bank's Zero Routine Flaring by 2030 initiative (ZRF). The World Bank describes the initiative as "a growing global coalition demonstrating strong environmental leadership and effective natural resource management". All oil and gas operators in Guyana will be encouraged to endorse the initiative – while also recognising that Guyana's domestic policies and strategies are stronger than the ZRF's minimum requirements.

- **Support for New Technology**
  The Government will continue dialogue with oil producers to ensure that, alongside the above measures, exploration and production operations continue to explore all possibilities for lower carbon technological innovation – including the use of renewable energy in oil production, Carbon Capture Utilisation and Storage (CCUS) and, – when technologically viable – green hydrogen. Further, new measures are being introduced to ensure that all waste management is the responsibility of the oil producer, from "cradle to grave".

CHAPTER SEVEN
ALIGNING WITH GLOBAL CLIMATE AND BIODIVERISTY GOALS

Implementing LCDS 2030 will advance progress towards the UN Sustainable Development Goals, and Guyana's multilateral, regional and bilateral agreements within the thematic areas of each programme. In fact, the LCDS is aligned to all SDGs to varying degrees. This alignment will feed into sector level planning and will be integrated within institutional programming at Governmental level. Where existing sector plans already exist, and in instances of new requirements stemming from global, bilateral and regional agreements/ conventions, these will be aligned with LCDS programme areas and future revisions of the LCDS will also take these developments on board. Implementation will be advanced, where relevant, in collaboration with NGO and development partners.

As outlined throughout this LCDS 2030, Guyana is following a development pathway that aims to simultaneously progress national and global solutions around development, climate change and ecosystem services. While national policies and plans are set through national processes, at the same time, Guyana is committed to a wide array of international treaties, conventions on pledges on climate, biodiversity and other broader sustainability. These are summarised below.

United Nations Convention on Biodiversity	• Conservation of Biodiversity • Sustainable Use of Biodiversity • Fair and Equitable Sharing of Benefits Arising from Use of Genetic Resources including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies. • Presently guided by the Strategic Plan for Biodiversity 2011-2020, including the Aichi Biodiversity Targets 2011-2020.

Cartagena Protocol on Biosafety to the Convention on Biological Diversity	Ensures the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on conservation and sustainable use of biological diversity, taking also into account risks to human health. • Key Components: • Consists of an Advanced Informed Agreement Procedure whereby countries of import have to be notified on the LMO prior to import. • Establishes a Biosafety Clearing House to facilitate the exchange of information on living modified organisms and to assist countries in the implementation of the Protocol. • Strategic Plan for the Protocol (2011-2020).
Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity	Provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources.
The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment. Aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

Convention on the International Trade of Endangered Species of Wild Flora and Fauna (CITES)	• CITES works by subjecting international trade in specimens of selected species to certain controls. • Legally binding • All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. • Each Party must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species. Species covered by CITES are listed in three Appendices, according to the degree of protection they need. • Appendix I lists species that are the most endangered among CITES-listed animals and plants. They are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial for instance for scientific research. • Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled. • Appendix III is a list of species included at the request of a Party that already regulates trade in the species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation.
Cartagena Convention for the Protection and Development of the Wider Caribbean Region	• Focuses on measures to prevent pollution from ships, pollution caused by dumping, pollution from sea-bed activities, airborne pollution, pollution from land-based sources and activities in the Wider Caribbean Region. • The only legally binding regional environmental treaty for the Region. • Countries are also required to protect and preserve rare or fragile ecosystems and habitats of depleted, threatened or endangered species; and develop technical and other guidelines for the planning and environmental impact assessments of important development projects. • Supported by three technical Protocols: Oil Spills, Specially Protected Areas and Wildlife (SPAW) and Land Based Sources of Marine Pollution (LBS).

Special Protected Areas and Wildlife Protocol under the Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region	The SPAW Protocol stresses the importance of protecting habitats and is focused on fragile and vulnerable ecosystems as a whole, rather than on individual species.
Oil Spills Protocol	• Strengthen national and regional preparedness and response capacity of the nations and territories of the region • Facilitate co-operation and mutual assistance in cases of emergency to prevent and control major oil spill incidents
Protocol Concerning Pollution from Land Based Sources and Activities	The LBS Protocol is a set of procedures developed to respond to the need to protect the marine environment and human health from land-based point and non-point sources of marine pollution.
International Convention for the Prevention of Pollution from Ships (MARPOL)	MARPOL is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.
The Minamata Convention on Mercury	Global treaty to protect human health and the environment from the adverse effects of mercury. Major highlights: • Legally binding • A ban on new mercury mines, the phase-out of existing ones, the phase out and phase down of mercury use in a number of products and processes; • Control measures on emissions to air and on releases to land and water; and • The regulation of the informal sector of artisanal and small-scale gold mining. Also addresses interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury as well as health issues.

Stockholm Convention on Persistent Organic Pollutants	Global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment.
Rotterdam Convention (formally, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade)	• Promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm; • Contribute to the environmentally sound use of those hazardous chemicals, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties. The Convention creates legally binding obligations for the implementation of the Prior Informed Consent (PIC) procedure.
Vienna Convention for the Protection of the Ozone Layer	Parties to promote cooperation by means of systematic observations, research and information exchange on the effects of human activities on the ozone layer and to adopt legislative or administrative measures against activities likely to have adverse effects on the ozone layer. The Vienna Convention did not require countries to take concrete actions to control ozone-depleting substances. Instead, in accordance with the provisions of the Convention, the countries of the world agreed the Montreal Protocol under the Convention would advance that goal.
Montreal Protocol on Substances that Deplete the Ozone Layer	Designed to reduce the production and consumption of ozone depleting substances in order to reduce their abundance in the atmosphere, and thereby protect the earth's fragile ozone Layer. The original Montreal Protocol was agreed on 16 September 1987 and entered into force on 1 January 1989. Includes a unique adjustment provision that enables the Parties to the Protocol to respond quickly to new scientific information and agree to accelerate the reductions required on chemicals already covered by the Protocol. These adjustments are then automatically applicable to all countries that ratified the Protocol.

United Nations Framework Convention on Climate Change	The objective of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." It states that "such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner."
Kyoto Protocol to the United Nations Framework Convention on Climate Change	• International agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets. • Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities"
Paris Agreement	• To strengthen the global response to the threat of climate change by keeping a global temperature rise below 2 degrees Celsius. • All Parties must put forward their best efforts through "nationally determined contributions" (NDCs) and to strengthen these efforts in the years ahead. This includes requirements that all Parties report regularly on their emissions and on their implementation efforts.
United Nations Convention on Combatting Desertification and Land Degradation	• Sole legally binding international agreement linking environment and development to sustainable land management. • Addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. • The new UNCCD 2018-2030 Strategic Framework is the most comprehensive global commitment to achieve Land Degradation Neutrality (LDN) in order to restore the productivity of vast expanses of degraded land, improve the livelihoods of more than 1.3 billion people, and reduce the impacts of drought on vulnerable populations to build.

United Nations Convention on the Law of the Seas	• Lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules governing all uses of the oceans and their resources. It enshrines the notion that, all problems of ocean space are closely interrelated and need to be addressed as a whole. • The Convention comprises 320 articles and nine annexes, governing all aspects of ocean space, such as delimitation, environmental control, marine scientific research, economic and commercial activities, transfer of technology and the settlement of disputes relating to ocean matters.
Treaty of Amazonian Cooperation	• Signed on July 1978 by Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela, is a legal instrument that recognizes the transboundary nature of the Amazon. • The main purpose of the ACT is to promote the harmonious development of the Amazon while incorporating the countries' Amazonian territories to their respective national economies, an essential condition for reconciling economic growth with environmental preservation.
International Plant Protection Convention	Multilateral treaty deposited with the FAO that aims to secure coordinated, effective action to prevent and to control the introduction and spread of pests of plants and plant products. The Convention extends beyond the protection of cultivated plants to the protection of natural flora and plant products. It also takes into consideration both direct and indirect damage by pests, so it includes weeds.
International Treaty on Plant Genetic Resources for Food and Agriculture	Main objectives are the conservation and sustainable use of all plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use.
International Tropical Timber Agreement	The International Tropical Timber Organization (ITTO) is an intergovernmental organization promoting the sustainable management and conservation of tropical forests and the expansion and diversification of international trade in tropical timber from sustainably managed and legally harvested forests.
UN Clean Seas Campaign	The Clean Seas platform focuses on catalyzing change and transforming habits, practices, standards and policies around the globe to dramatically reduce marine litter and its negative impacts.

CHAPTER EIGHT
INVOLVING ALL GUYANESE IN THE LOW-CARBON TRANSITION

Ongoing engagement of all Guyanese is essential to successfully create a new low-carbon economy in Guyana. This is being done through (i) a national consultative process; (ii) ongoing input from the Multi-Stakeholder Steering Committee; (iii) the national budgeting process; (iv) ongoing communication and awareness-raising.

In line with this approach, this LCDS 2030 was produced after a seven month national consultation from October 2021 to June 2022. The National Consultation consisted of (i) national level engagements; (ii) thematic engagements; (iii) community based consultations; (iv) receipt of written feedback; (v) feedback via a website; (vi) an active public engagement programme; (vii) oversight by a Multi Stakeholder Steering Committee (MSSC). Each of these is summarised below.

Key themes identified throughout the LCDS, which will continue to be developed as

the LDCS moves to implementation, including consideration of a diverse range of stakeholder inputs.

Plans for continuing the broad-based consultative approach as the LCDS moves into implementation are set out in the Conclusion chapter. Gender equality will be a main implementation focus of the LCDS, emphasis on indigenous peoples and local communities is also a priority area, and highlighting the role and opportunities for youth is also another centerpoint for the involvement of all Guyanese.

National Level Sessions

Background and Structure of Engagements

LCDS 2030 was launched in October 2021. Stakeholder engagement commenced in November 2021, intended to sensitize key stakeholder groups on the content of the LCDS, seek feedback and recommendations, and clarify matters raised. The format of the presentation follows two main aspects: a presentation outlining progress made so far and the aspects of LCDS 2030 by Objectives and Programme Areas; and a discussion session. Following sessions held, requests for bilateral meetings are facilitated if requested.

The following stakeholder groups were engaged between October 2021 and 2022:

Government Ministries and Agencies

1. Office of the Prime Minister
2. Ministry of Finance
3. Ministry of Natural Resources
4. Ministry of Public Works
5. Ministry of Agriculture
6. Ministry of Amerindian Affairs
7. Ministry of Human Services and Social Security
8. Ministry of Culture Youth and Sport
9. Ministry of Health
10. Ministry of Tourism Industry and Commerce
11. Protected Areas Commission
12. National Centre for Education Resource Development
13. Hydromet Unit
14. Guyana Energy Agency
15. Environmental Protection Agency
16. Guyana Forestry Commission
17. Guyana Gold Board
18. Guyana Lands and Surveys Commission
19. Guyana Geology and Mines Commission
20. National Agriculture Research and Extension Institute

21. National Drainage and Irrigation Authority
22. Civil Defense Commission
23. Guyana Livestock Development Authority
24. Global Green Growth Institute
25. Guyana Rice Development Board
26. G-Invest
27. Competition and Consumer Affairs Commission
28. Guyana Tourism Authority
29. Small Business Bureau
30. Guyana National Bureau of Standard
31. Office of the President - Major General Joe Singh

Private Sector

1. Private Sector Commission
2. Guyana Manufacturers and Services Association
3. Guyana Gold and Diamond Miners Association
4. Forest Products Association
5. Credit Info
6. The Berbice Chamber of Commerce and Development Association
7. Bankers Association
8. Georgetown Chamber of Commerce and Industry
9. Bartica Chamber of Commerce
10. Halliburton
11. Exxon Mobil
12. Bulkan Timber Works

Civil Society

1. Guyana Marine Conservation Society
2. Amerindian Peoples Association
3. The Amerindian Action Movement of Guyana
4. National Amerindian Development Foundation
5. Guyanese Organization of Indigenous Peoples
6. Conservation International
7. World Wildlife Fund
8. Iwokrama International Centre for Rain Forest Conservation and Development
9. University of Guyana Student Clubs
10. University of Guyana Economics Society
11. University of Guyana Geography Society
12. University of Guyana Chemistry Club
13. University of Guyana Medical Lab Science Students' Association
14. University of Guyana Hindu Society
15. University of Guyana EcoTrust Society
16. University of Guyana Lions Club
17. University of Guyana Biology Club
18. University of Guyana Dental Association

19. University of Guyana Student Society
20. Vanda Radzik
21. Jocelyn Dow
22. Guyana Human Rights Association
23. Lawrence Latchmansingh
24. Clerical and Commercial Workers Union
25. University of Guyana Staff Union
26. University of Guyana Workers Union
27. Guyana Agriculture and General Workers Union
28. Guyana Labour Union
29. GUYSUCO Training Centre
30. University of Guyana
    a. Faculty of Agriculture and Forestry
    b. Faculty of Natural Sciences
    c. Faculty of Education
    d. Green Institute
    e. Department of Languages and Cultural Studies
31. Guyana School of Agriculture
32. Cyril Potter College of Education
33. Council for Technical and Vocational Training

Several follow up meetings were held, and agency and sector-specific matters were further detailed.

Gender Equality and the Role of Women and Girls in the LCDS

The gender dimension of the LCDS recognizes the different impacts that climate change and climate events have on women and men. The experience of floods and droughts in Guyana during the past two decades in particular has made it quite clear that the immediate effect and the subsequent consequences of floods have been particularly difficult for women. In indigenous communities where the farms are part of the women's work, the task of restoration of the farms and the need for alternative food supplies during and after floods or droughts puts a new and onerous burden on women and the household in general. In urban and rural communities women have experienced loss in long-term damage to homes and loss of livestock and kitchen gardens to mention a few. In all areas, the risk to health and the long-term impact of these realities have added unequally to the status of women.

The LCDS 2030 is cognizant of these realities and intends to provide a number of mitigating measures which would be based firstly on in-depth consultations with women on their particular roles in their homes and in their communities. Given the diverse nature of Guyana geographically and the different ethnicities that make up communities and the different cultural norms, it is necessary to create sensitive and appropriate solutions including training to address the common problem of climatic change events that are more frequent and more intense. Additionally, the role of women and girls in climate action is a high priority in the LCDS. This will include the role of women and girls in influencing change to achieve climate adaptation, creating awareness of LCDS objectives, innovating solutions to climate risks, and in being agents of change at the community and national levels.

Given that a low carbon economy seeks to address climate change and its varied impact on women and men, the LCDS 2030 recognizes that common and differentiated measures are required to address this reality. The LCDS 2030 will establish benchmarks and appropriate responses that take into account the realities of the disproportionately negative impact of climate change on women. Women have already been consulted in the design of the Strategy to date and provision is made for women-driven deeper analysis and the specific measures needed for mitigation and adaptation.

Women-centered approaches based on the realities and experiences that recognise the commonalities that women face are a cornerstone of the strategies. Equally important is that specific LCDS actions are conceptualized and deployed to be women driven and responsive to demography, age, and cultural norms. Women's representatives will be a significant part of the multi-stakeholder committee of the LCDS in order to ensure that their voices are heard at all levels and that they are direct beneficiaries of resources to help build their resilience. Further, the involvement of women will aim at establishing leadership over key LCDS projects and, resultant plans are honed at addressing their often times unequal access to resources. In so doing, the resources of the LCDS can be directed to improve the opportunities available to women by providing skills training and affordable financial resources to widen their choices.

Focus of LCDS 2030 on Youth

Guyana's transition to a low carbon pathway rests on all citizens through a multigenerational approach to policy development, decision making, programme implementation and stakeholder ownership. Representing over two thirds of the population, Guyana's youth bring dynamism, energy, creativity, and a fresh outlook towards the realization of these goals. The LCDS is formulated to enable and ensure meaningful youth participation is integrated and applied at all levels.

Young Guyanese number amongst millions globally who actively engage in building awareness and advocating for significant and meaningful action to curb the climate crisis. They organize events and work at the local and community level, nationally, regionally and at the global level to share knowledge on the plight faced by Guyana and other SIDs, and appeal for greater environmental responsibility and action.

The LCDS will harness attributes in policies, projects and programmes that enhance climate awareness and behavioral change in addressing pollution and other environmental ills, while promoting responsible consumption patterns, and overall encouragement for safe and healthy well-being amongst all Guyanese. The Strategy will be integrated in the schools' curricula at all levels, thereby inculcating environmental responsibility in all aspects of our children's education and consciousness.

Youth unemployment and underemployment will be tackled through the provision of educational, training, scholarships and employment opportunities across all sectors including entrepreneurship and business incubators; micro- and small business financing; academic, technical and vocational training; internships, and other avenues. Focus will not only be directed to information technology, business development and STEAM subjects, but also to general skills development and mentorship.

Guyana's leading role in ensuring food and nutrition security in the Caribbean region presents one of the greatest opportunities for youth involvement, employment and business development. The LCDS will enable enhancement of training provided by the Guyana School of Agriculture, University of Guyana and other institutions, and the expansion and upgrading of their curricula to match these needs that include climate adaptation, mitigation and resilience. Investments under the LCDS would upgrade drainage and irrigation systems, improve coastal infrastructure, and incorporate safeguards against climate events. The LCDS will also be directed towards increasing productivity and enhancing value-added production thereby enabling greater employment and business opportunities along the value chain.

Implementation of the cutting-edge LCDS Strategy also requires technological advancement, innovation, research and development, and for the need of specialized skills. Policies, programmes and projects of the Strategy would encourage, assist and incentivize these capabilities primarily among the youth, to meet the new and emerging needs of the oil and gas sector, and to enable national transition to clean and renewable

energy. Other human capital required for Guyana's low carbon trajectory based on the four pillars of the LCDS include marine biologists, hydrologists, climate scientists and other specialists thereby offering greater opportunity for the youth.

Generally, the LCDS envisages nurturing leadership roles and empowering youth to address and overcome social ills and other challenges which hinder their development and ultimately, Guyana's future growth. Youth perspectives would be integrated into policy making, programme design and project implementation to surmount these issues. Additionally, youth participation and expression through various platforms including the arts, culture and sport would be supported to promote young influencers and positive role models.

The LCDS values the youth as partners of today who will become the leaders of tomorrow to propel Guyana's socio-economic development while conserving our valued natural assets and securing citizens' future.

Thematic Engagements on the LCDS

The LCDS 2030 team participated in the following stakeholder sessions on LCDS 2030.

- **Moray House Stakeholder Meeting on LCDS 2030:** at this session, the LCDS Team presented an overview of the LCDS and responded to questions in the discussion session. Other presenters at this session included WWF, CI, and the University of Guyana. This session was attended by 75 participants and was live-streamed on the Moray House Trust Facebook page. Present at the meeting were members of civil society, the University of Guyana, Members of Parliament, as well as members of the private sector. The presentation was well-received, and responses were provided to queries from participants. A reminder was also issued for submitting comments and recommendations to the LCDS website or email address.

- **Meeting with Regional Officials on LCDS 2030:** over this period of reporting, a stakeholder session was held with regional officials on LCDS 2030. This session was attended by regional officials and the Ministry of Local Government representative.

- **Participation in Commission on the Status of Women (CSW 66), Guyana Preparatory Meeting:** CSW66 was held under the theme "Gender Equality Today for a Sustainable Tomorrow", with one of the thematic areas of focus being "Gender Equality, Climate Change and Disaster Risk Reduction". The LCDS 2030 team presented the scope of the LCDS 2030 within this area whilst covering the progress made under the first LCDS in advancing programmes that have resulted in the empowerment of women and girls. The focus of LCDS 2030 on gender equality was highlighted at the meeting. The meeting was attended by a broad cross-section of women and men from constitutional bodies, the religious community, the private sector, youths and civil society.

- **LCDS 2030 vision shared at Ministerial Round Table at the UN Commission on the Status of Women, 66th Session (CSW66):** At this meeting held at the United Nations, Minister of Human Services, Dr. Vindhya Persaud, presented Guyana's progress on climate change, environmental and disaster risk reduction policies and programmes in the area of advancing gender equality through holistic and integrated actions from global to local.

- **LCDS 2030 vision was highlighted at Commemorative Activities under International Day of Forests:** Over the third week of March, commemorative activities for International Day of Forests featured LCDS 2030. Included in the activities was a statement from the Ministry of Natural Resources on forests and Guyana LCDS 2030.

Community Based Sessions

Regional and Community Level Consultations: sessions have been held in every region, as shown in the table below.

Each session was attended by on average 100 persons, and coordinated by a Minister of the Government, Regional Representatives, and the LCDS 2030 team. Over 200 Indigenous Villages and forest-based communities have been engaged.

Summary of Villages, Communities and Organizations represented at Regional LCDS Consultations		
Regions	**Location**	**Villages/Organizations represented**
1	Mabaruma	St Dominic, Aruka Mouth, Arukamai, Sacred Heart, Aruau, Hobediah, Hotakwai, Lower Kaituma, Barima /Koriabo , Black Water Savannah, Lower Black Water, Lower Kariabo, Red Hill, Baracina, Unity Square, St Anselm's, Morawhanna, Imbotero, Smith Creek, Shell Beach, Kachikaimo, Three Brothers, Yarakita,White Water, Wauna, Tobago, Wanaina, Hosororo, Koberimo, Khan's Ville/Hill, Hobo Hill,Thomas Hill, Barabina , Mabaruma
	Port Kaituma	Matthew's Ridge, Arakaka, One Mile, Baramita, Eclipse Falls, 4 miles, Oronoque, Citrus Grove, Canal Bank, Sebai, Fitzburg, Port Kaituma
	Santa Rosa	Kariako, Kokerite, Waikerebi , SantaCruz (Little and Big Canaballi), Warapoka, Assakata, Kwebana, Fathers Beach, Manawarin, Waramuri, Haimaracabra, 7 mile (Santa Rosa and satellites) Kairie, Kamwatta, Parakese, Mora, Wallaba, Karaburi, Haimaruni, Rincon, Cabora, Huradiah, Koko, Paloma, Kumaka
2	Anna Regina	Bethany, Mashabo, Capoey, Mainstay/Whyaka, Tapakuma, St. Deny's, Akawini, Wakapoa, Charity, Kabakaburi, St Monica, Karawab., Lima Sands, Anna Regina (and Mayor &Town Councli, Onderneeming
3	Lenora	Zeelugt, Parika, Naamryck, Groenveldt, Stewartville, Lenora
4	Lusignan	Golden Grove, Non Pariel, Brixton, Foulis, Enmore,Unity/Vereeniging, Cane Grove, Mon Repos, Haslington, LBI, Buxton, Kuru Kuru
5	Bush Lot	#22 Bel Voir, Woodlands, Bel Air, Hamlet, Fellowship, Proffit, Rising Sun, Bush Lot, Armadale, Mahaicony, Farm, Cotton Tree, Moraikobai, Blairmont, Gelderland , Mara, Kilcoy/Hampshire, No. 52 -74 NDC, Plegt Anker, Enfield, Kintyre/Borlam NDC, Crabwood Creek, Wyburg/Caracas NDC, Corriverton M&TC , Maida/Talgorie NDC, Brothers Village, Rose Hall, Eversham
6	New Amsterdam	Loggers' associations from Canje River, Mara, and Lonsdale/Brothers/Sisters; New Amsterdam
7	Kamarang	Phillipai, Wayala Yeng, Amokokopai, Jawalla, Quebanang, Kako, Warawatta, Waramadong, Paruima, Omenaik, Kambaru, Imbamadai , Chinoweng, Wax Creek, Kamarang
	Bartica	Isseneru, Tasserene, Kangaruma/Asura, Miles Potaro Road, Karrau, Kartabo, Issano, Sacaralla Bay, Falmouth, Agatash, Daag Point, Mile Potaro Road.
8	Kato	Kato, Chiung Mouth, Kanapang, Penak, Itabac, Kurukabaru, Kamana, Waipa, Sand Hills, Catchcow, Kaibarupai, Karisparu, Paramakatoi, Mountain Foot, Bamboo Creek,Tuseneng, Taruka
	Mahdia	Chenapou, Campbelltown, Mahdia, Princeville, Micobie, El Paso, Sucre Junction, Mowasi, Muruwa
9	Annai	Fairview (Region 8, but administratively Region 9), Surama, Wowetta, Kwatamang, Rupertee, Annai Central, Apoteri, Rewa, Crash Water, Yakarinta, Massara, Kwaimatta, Anaruputa, Toka, Yupukari, Quatata, Fly Hill, Kaicumbay, Katoka, Semonie (& Students of Bina Hill Institute), Iwokrama, Conservation International, South Rupununi District Council, Sustainable Wildlife Management Project
	Maruranau	Sand Creek, Potarinau, Kraudanarau, Maruranau, Aishalton, Quiko, Shea, Baitoon, Achiwib, Sawarenau, Rupanau, Shulinab, Parikarainau, Meriwau, Parabara, Katoonarib, Lethem
10	Kwakwani	SandHills /Hittia, DeVeldt, Kimbia, Wiruni, Wikki/Calcuni, Parapee, Ituni, Hururu, Kaitapin, Bamboo Landing, Jonestown, Kimbia, Community Forestry Groups from Berbice River area
	Linden	Rockstone, Bamia, Wisroc, 47 Miles Mabura Road, Prosville, Andyville, Malali, Siberian, Coomacka Mines, 58 Miles Mabura Road, Kara Kara, Kairuni, Muritaro, Great Falls, Christianburg, Nottinghamshire, Watooka, Speightland, Ituni, Richmond Hill

Written Submissions Providing Feedback

Feedback continues to be received by email (official LCDS Email) and on website posting (LCDS 2030 website). Written submissions have also been received to date from the following entities/individuals:

- Conservational International – Guyana
- Guyana National Bureau of Standards
- Guyana Gold and Diamond Miners Association (GGDMA)
- Guyana Manufacturing and Services Association Ltd.
- Howard Bulkan
- Z. E. Khan
- Lawrence Latchmansingh
- World Wildlife Fund
- ExxonMobil Guyana
- Guyana Civil Aviation Authority
- British High Commission
- Women and Gender Equality Commission
- Guyana: Office of the UN Resident Coordinator
- Iwokrama
- Moruca District
- Amerindian People's Association

Feedback on draft LCDS 2030 from Website

The LCDS 2030 website has recorded 4,930 visits. (See Data Analytics Summary for Global Access of Guyana's LCDS 2030 below). Through the comments portal on the site, the following feedback has been additionally logged:

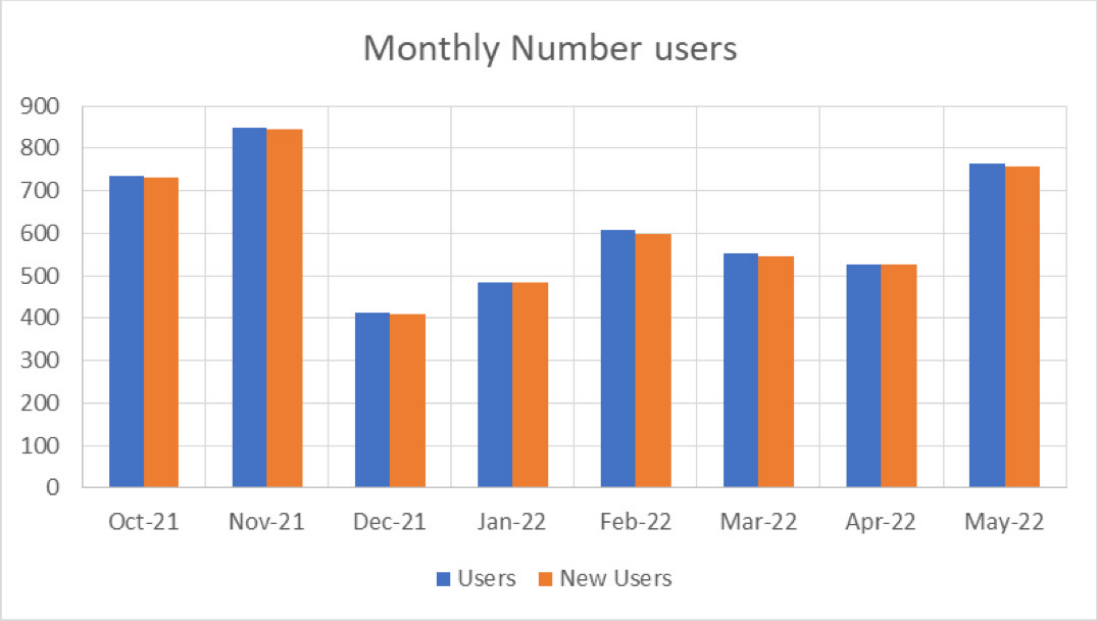
1. Iwokrama
2. Guyana Energy Agency
3. Guyana Tourism Authority
4. South Pole
5. Individual: Dr. Ulric Trotz
6. Individual: Dr. Anna Perreira
7. Individual: Dolwin Khan
8. Individual: Dr. Lesley Desouza
9. 5 anonymous contributors

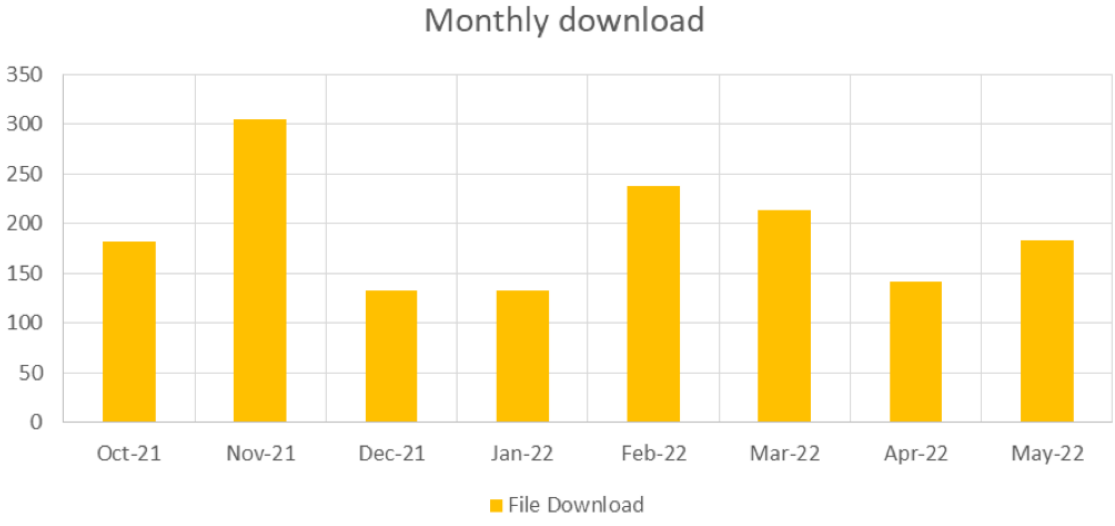
Data on LCDS Website Usage for October 2021 to May 2022

	Accumuled data							
	31-Oct-21	30-Nov-21	31-Dec-21	31-Jan-22	28-Feb-22	31-Mar-22	30-Apr-22	31-May-22
Users	734	1,583	1,995	2,480	3,087	3,640	4,167	4,930
New Users	732	1,577	1,985	2,469	3,067	3,614	4,139	4,898
Page view Count	1,589	3,927	4,898	6,362	7,895	9,545	10,754	12,364
File Download	182	487	620	753	991	1,204	1,345	1,528
Comments through website	4	10	11	23	24	86	86	87

Data on LCDS Website Usage over the duration of the Consultation Period

	Data by month							
	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22
Users	734	849	412	485	607	553	527	763
New Users	732	845	408	484	598	547	525	759
Page view Count	1,589	3,927	4,898	4,899	4,900	4,901	4,902	4,903
File Download	182	305	133	133	238	213	141	183





Active Public Engagement Programme

The LCDS engagement strategy also saw wide public engagement via radio, newspapers, and social media. A core of media experts worked on leading the public relations programme. It advanced the strategy of sensitisation of the public on the draft LCDS. This saw engagements as follows:

i. Radio and television programmes, public service announcements (PSAs), interviews
ii. Literature: brochures, flyers, posters, newspaper articles, press releases
iii. Public events (including Government officials & MSSC members)
iv. Virtual meetings (Zoom and other platforms)
v. Social media platforms (YouTube, Facebook, Instagram, Twitter, and other online sites)

A full report on all LCDS Communication and Consultation activities is also prepared and published on the LCDS Website.

Multi-Stakeholder Steering Committee (MSSC)

The MSSC was re-constituted to oversee the LCDS development and implementation processes. The Committee will comprise members of Government bodies, Non-Governmental Organisations, Civil Society, the Private Sector, and Indigenous communities.

The first meeting of the Multi-Stakeholder Steering Committee (MSSC) for the Low Carbon Development Strategy (LCDS) 2030 was held on 14th February, 2022 at the Office of the President.

In addition to supporting the next phase of the consultation, the main objective of the MSSC will be to advise on implementing the LCDS 2030, including supporting the catalysing of low carbon investments. This role is reflective of the new framework for forest carbon financing, which will see greater national ownership and participation in the process of earning and managing payments. The new MSSC will support work on restoring Guyana's ambition for the future on the forest, climate, biodiversity protection, and sustainable development.

The MSSC's membership covers a wide range of issues pertinent to Government Agencies responsible for land management, as well as climate-related and environmental issues; focal agencies for low carbon development; the private sector, Indigenous Peoples and Local Communities, the broader civil society and other stakeholder groups. Representation on the MSSC comprises the Offices of the President and the Vice President, the Office of the Prime Minister, Ministry of Public Works, Ministry of Amerindian Affairs, Ministry of Finance, Ministry of Natural Resources (including Guyana Forestry Commission and Guyana Geology and Mines Commission), Ministry of Agriculture, the National Toshaos' Council, Amerindian Peoples' Association, Guyanese Organisation of

Indigenous Peoples, The Amerindian Action Movement of Guyana, National Amerindian Development Foundation, Private Sector Commission, Indigenous Peoples Commission, Forest Products Association, Guyana Gold and Diamond Miners Association, in addition to representatives of Labour Unions, Women's organizations and youth groups.

The MSSC will meet regularly after the National Consultation is completed and the LCDS has been tabled in the National Assembly to take forward elements of the LCDS, which will require further consultation and idea generation. This will continue during the LCDS implementation.

Photographs below show engagement sessions with community stakeholders on LCDS 2030. Sessions were organised by Regional Offices, the LCDS Team and Village Leaders, working closely with the MSSC.


Preserving the Past.
Protecting the Future


LCDS website

2 Clean Energy

CONCLUSION: Implementing LCDS 2030

After seven months of National Consultation, this LCDS 2030 sets the direction of travel for Guyana's economic development. Feedback received through the consultation has been incorporated and the document is to be tabled in the National Assembly. New opportunities for development can be unlocked where Guyana earns new revenues from the sale of carbon credits.

As the LCDS moves to implementation, each of its elements will be subject to more detailed consultative processes, aligned around the national budget process - where progammes will be subject to annual consultations involving Non-Governmental Organisations and individuals as part of preparations for the National Budget. Annual measures will also be part of the scrutiny of the national budget by the National Assembly.

Guyana's Nationally Determined Contribution (NDC)

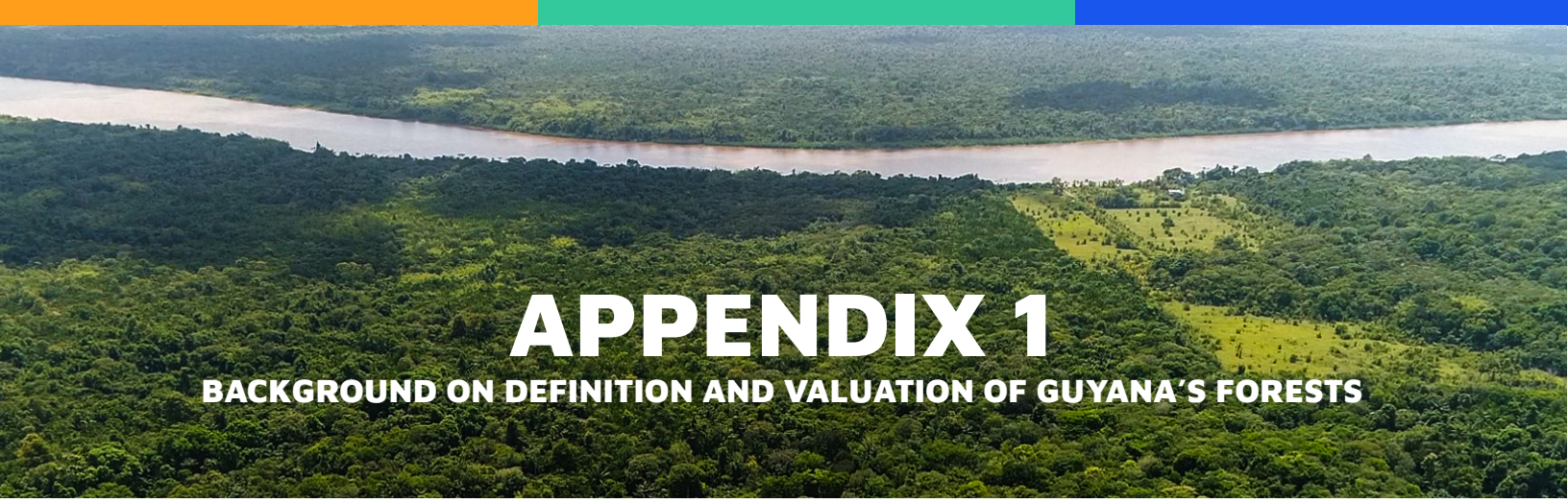
LCDS 2030 will inform, and be informed by, Guyana's Nationally Guyana's Nationally Determined Contribution (NDC) submitted to the UNFCC. NDCs outline efforts by each country regarding commitment to national emissions targets and areas of adapting to the impacts of climate change. Countries are required to routinely update NDCs and

track measures outlined with the aim of achieving the objectives of conditional (based on the availability of financing) and unconditional (largely implemented with domestic, available resources) contributions. Guyana's NDC covers areas of land use, energy, and climate adaptation and reflects Guyana's position as a high forest cover low deforestation jurisdiction (and therefore a predominant net carbon sink) whilst outlining areas of climate action in land-use sectors and energy, and outlines programme for adapting to climate impacts and vulnerabilities.

The Results-Based Management framework within the LCDS 2030 Investment Plan will be shaped around NDC priorities nested within Guyana's broader LCDS 2030 vision and will reflect updates as Guyana's NDCs are periodically revised.

Investment Plan for LCDS 2030

Accompanying the LCDS will be an Investment Plan 2030 that will outline the main Programme areas for each sector within the LCDS. This will identify Project-based initiatives that will be undertaken along with budget and financing options, with Key Performance Indicators and indicative timeframe for implementation. Focal points on implementation for each programme will also be identified. It is intended that the Investment Plan will be reviewed every three years to take on board necessary updates as may be required. The Investment Plan will be the mechanism to direct activity implementation, track LCDS financing to KPIs within the national budgetary process, and allow for dedicated monitoring and reporting on the implementation of programmes, by SDGs, sectors, and other relevant reporting criteria. The Investment Plan will be the means through which climate financing from the LCDS will be measured and the impacts of actions financed, and monitored.



APPENDIX 1

BACKGROUND ON DEFINITION AND VALUATION OF GUYANA'S FORESTS

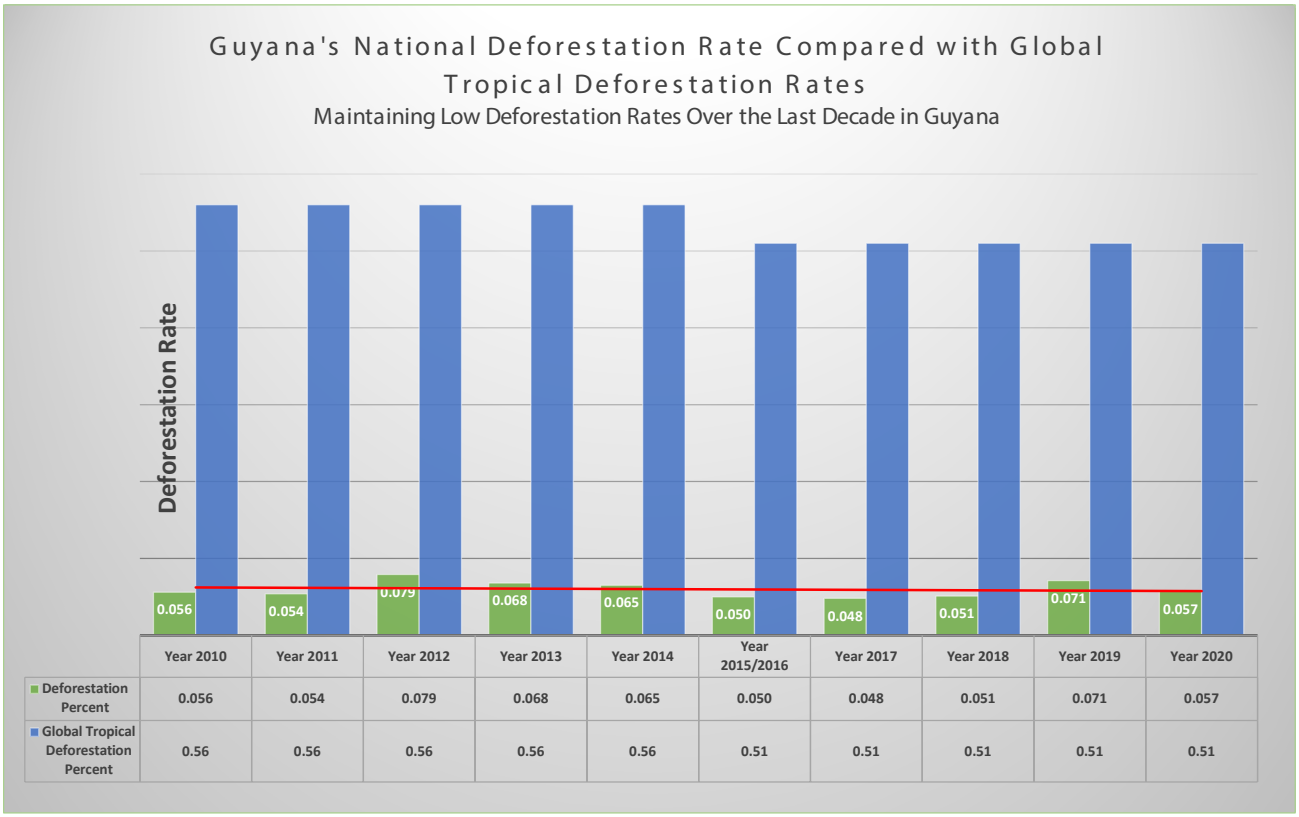
FOREST CLIMATE SERVICES

As set out in Chapter Two of this document, Guyana may progress with integration of its REDD+ Programme with voluntary carbon markets such as ART TREES. While the functional aspects are described in Chapter Two, there are certain institutional capabilities which underpin Guyana's market integration, mainly captured under two key capabilities (MRVS and Safeguards):

- **Monitoring, Reporting and Verification System (MRVS) -** Guyana's MRVS Roadmap, set out in 2009, was aimed at building a comprehensive national system to monitor, report and verify forest carbon emissions resulting from deforestation as forest degradation. The overarching objective of the Roadmap is for all forest-related emissions by sources and removals to be monitored, reported and verified following United Nations Framework Convention on Climate Change (UNFCCC) guidance. With steady progress over the last 12 years, this has been achieved. The MRVS is now a combined Geographic Information System (GIS) and field-based monitoring system that provides the basis for measuring verifiable changes in Guyana's forest cover and resultant carbon emissions, which will underpin results-based REDD+ compensation in the long-term, based on international guidance and best practice. Through the MRVS, Guyana can account for and report on forest change nationally in terms of forest area loss and forest carbon emissions. These reports have been the basis of performance measurement under the Guyana Norway Agreement. The MRVS will allow Guyana to account for performance under any new forest agreement in the future, while allowing the country to achieve the objectives of the Low Carbon Development Strategy. The system is well-positioned to integrate complex market-based fundamentals, including uncertainty assessment, provisions for risk reversals, project nesting, and linkages to forest carbon registries. Forest financing markets requirements of tracking additionality, leakage, preventing double counting and double issuance of carbon credits, and eventually facilitating project nesting have been addressed and will be further strengthened through the structure of Guyana's MRVS. Additionally, the work programme commenced on Community MRV will be advanced under the LCDS and will build on existing work conducted by Government and development partners over the past 10 years, including CI, WWF and Iwokrama.

MRVS Phase Three Priorities - MRVS Phase Three will support the improvement of the necessary human and physical capabilities sustained by local institutions and create the platform for monitoring, reporting and compliance verification under a market-based mechanism. This phase will also build on the REDD+ readiness phase of the MRVS development and result in routine annual reporting on forest carbon emissions and removals in compliance with UNFCCC and IPCC requirements. Simultaneously, the project will create complementary systems for reporting on REDD+ governance compliance requirements, such as supporting REDD+ forest sector safeguards, Guyana's Nationally Determined Contributions, and the UN Sustainable Development Goals 13 and 15.

Trend Line Showing Stable Deforestation Rates for Guyana from 2010 to 2020



	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014	Year 2015/2016	Year 2017	Year 2018	Year 2019	Year 2020
Deforestation Percent	0.056	0.054	0.079	0.068	0.065	0.050	0.048	0.051	0.071	0.057
Global Tropical Deforestation Percent	0.56	0.56	0.56	0.56	0.56	0.51	0.51	0.51	0.51	0.51

- **Safeguards Information System for REDD+ and ART-TREES -** Growth in the extractive sectors is only sustainable if safeguards are adhered to. The National Safeguards Information System (SIS) for REDD+ will seek to serve several functions for Guyana, including reporting on results-based financing, providing local information on the country's performance against the Cancun Safeguards for REDD+, as well as ensuring maintained stakeholder support for REDD+. More specifically, it will provide information on the actual outcomes of Guyana's conformance with the Cancun Safeguards throughout REDD+ implementation, including in the context of accessing REDD+ results-based payments in application of the methodological framework established in the Warsaw Framework for REDD+.

Through the development of the Safeguards Information System (SIS) for REDD+, Guyana intends to monitor REDD+ activities in accordance with the objectives of Cancun Safeguards and report on the progress in implementation of the Safeguards. Guyana is continuing efforts in implementing the safeguards listed in decision 1/CP.16. Further, Guyana seeks to develop a system for reporting in how safeguards are being addressed and respected in accordance with decisions 12/CP.17, 12/CP.19, 17/CP.21. The Cancun Safeguards have been agreed to at the 16th Conference of the Parties to the United Nations Framework Convention on Climate (COP16) in 2010. Countries are expected to implement these safeguards in keeping with national contexts and circumstances. More specifically countries are required to:

- Implement REDD+ activities in a manner consistent with the Cancun Safeguards. REDD+ activities, regardless of their funding source, are to be implemented in such a way that the Cancun Safeguards are addressed and respected.
- Establish a system to provide information on how Cancun Safeguards are being addressed and respected.
- Provide the most recent summary of information on how the Cancun Safeguards are being addressed and respected.

The following safeguards are among the areas to be included in Guyana's reporting:

- That actions complement or are consistent with the objectives of the national forest programme and relevant international conventions and agreements.
- Transparent and effective national forest governance structures, taking into account national legislation and sovereignty.
- Respect for the knowledge and rights of Indigenous Peoples and members of local communities by taking into account relevant international obligations, national circumstances and laws, and noting that the United Nations General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples.
- The full and effective participation of relevant stakeholders, in particular, Indigenous Peoples and local communities.
- What actions are consistent with the conservation of natural forests and biological diversity, ensuring that the actions are not used for the conversion of natural forests but are instead used to incentivise the protection and conservation of natural forests and their ecosystem services and to enhance other social and environmental benefits.
- Actions to address the risks of reversals.
- Actions to reduce displacement of emissions.

Over the past decade, the advanced MRVS built in Guyana enables the country to move to the next stage of its forest climate services strategy. Key information relating to that strategy is set out in this appendix including:

- Definition of forests
- Resulting Forest Area
- National Forest Carbon Stock
- Valuation of Guyana's Forest Ecosystem Services
- Next Step in monetising value: ART-TREES

1. Definition of Forests

Guyana's definition of forests is in conformance with Decision 11/CP.7 of the Marrakesh Accord which was adopted by the UNFCC in 2002. This was later extended to land use, land-use change and forestry activities carried out under the Clean Development Mechanism (CDM) of the Kyoto Protocol by Decision 19/CP.9 adopted at Milan (UNFCCC, 2004).

Guyana classifies land as forest if it meets the following criteria:

- **Size:** Over a minimum area of one hectare
- **Canopy Cover:** Tree cover of minimum 30%
- **Height of Stand:** At a minimum height of five metres at maturity.

Land area that satisfies the area, height and crown cover criteria for forest but are not classified as forest include lands that are predominantly under agriculture, infrastructural development and settlements.

2. Forest Area

Utilising the above definition, Guyana's MRVS Report 2020 reported total Forest Cover as 18,001,790 hectares about 85 percent of Guyana's territory.

3. Guyana's National Forest Carbon Stock

Guyana completed a national field assessment of forest carbon stocks in 2018 and concluded that on average at the 95 percent Confidence Level, one hectare of forest stores 1,213 tCO2 (tons of carbon per hectare of forest). The results of the field assessment were submitted to the UNFCCC as part of Guyana's Reference Level for REDD+ and has been found to be robust. Additionally, the field assessment was also audited as part of the Guyana Norway Agreement Performance audits and validated.

Guyana's MRVS Report 2020, has reported total Forest Cover as 18,001,790 hectares.

Guyana's total forest carbon stock is:

Total Hectares of Forest X Average Carbon Stock per Hectare = Total Carbon Stock

18,001,790 ha X 1,213 tCO2 = 21,836,171,270 tco2

4. Valuation of Forest Carbon and Wider Ecosystem Services of Guyana's Forest

Estimates of the economic value that Guyana's eco-system services provide to the world are up to US$5.4 Billion annually. This derives from a focus on the broader ecosystem valuation. The valuation references the UNU-IHDP and UNEP (2014), Inclusive Wealth Report 2014, Measuring progress toward sustainability, published by the Cambridge University Press.

This Report assesses Non-Timber Forest Benefits. It expresses that one way to assess ecosystem services (ES) from an asset perspective is by valuing the expected flows of ecological services over time at their marginal contribution to economic welfare (United Nations Statistics Division 2013b). The valuation table below summarises the 15 highest values of ecosystem services, excluding climate services, as there is already a market for forest carbon services.

This results in total forest area of Guyana, multiplied by the value of US$2,990 per hectare annually, and computing an estimated US$5.4B annually.

Hectares of Forest X Value per hectare = Total Value

(18,001,790 ha X US$2,990) = US$54.B annually broader ecosystem services valuation

This is in line with other studies including a 2009 study by McKinsey & Company which used very conservative valuations to establish that the Economic Value to the World (EVW) provided by Guyana's forests if left standing, contributed US$40 billion to the global economy each year.

On the other hand, a related independent assessment by McKinsey & Company estimated the value of Guyana's rainforest, if harvested and the land put to the highest value subsequent use, to be between US$4.3 billion and $23.4 billion. The wide range of estimates is driven by fluctuating prices for commodities such as logs, rice and palm oil – but the most likely estimate is US$5.8 billion. This forest value known as Economic Value to the Nation (EVN) is the equivalent of an annual annuity payment of between US$430 million and $2.3 billion, with the most likely annuity payment being US$580 million.

However, generating this EVN, while economically rational for Guyana, would have significant negative consequences for the world by reducing the Economic Value to the World (EVW) stated above.

Therefore, Guyana's advocacy for a market-based mechanism for valuing forests seeks to achieve a long-term monetisation of standing forest value that is between the Economic Value to the World (US$40-US$54 billion) and the Economic Value to the Nation (US$580 million).

However, as set out in 2009, this will happen in a stepwise fashion, in part because capabilities for forest monitoring and verification need to be in place to begin.

The first phase was the Guyana-Norway partnership which used a proxy-based system as set out in the Guyana-Norway Joint Concept Note. Now that the MRVS and other capabilities have been built, the next step will be integration with a market mechanism as set out in Chapter Three of this LCDS.

5. Starting Access to Markets – Target Methodology

In guiding Guyana's integration with a jurisdiction-scale, market-based mechanism as set out in Chapter Three of this document, Guyana will be seeking markets that recognise all aspects of REDD+ as defined by the UNFCCC.

This means that Guyana believes that markets should create long term incentives to encourage all countries to improve their HFLD score (which captures both the extent

of standing forest and the rate of deforestation in a given jurisdiction). Practically, that means that markets must grow to recognise:

- Conservation of Standing Forests: Guyana's forests store more than 19.5 Gt CO2 to 21.8 Gt CO2.
- Removals: Every year, Guyana's forests remove about 154 million tCO2 from the atmosphere
- Reductions in Deforestation: Guyana aims to stay 90 percent below the global average
- Restoration of Forests: Guyana aims to restore about 200,000 hectares of forest as a priority

Guyana will seek out markets that best match Guyana's strategic objectives across these four areas, and has set out a methodological approach, where the crediting level for grow emissions is to be determined by:

Historical emissions level up to 15 years
plus
(HFLD Score X 0.1% of carbon stock)

Where:

- Forest Carbon stock to include all carbon pools appropriately adjusted for uncertainty.
- Reversal buffers provisions not utilised, will be added to Guyana's carbon registry following the end of a crediting period.
- Inclusion of provision (subject to refinements) remaining forest.

Evolving markets will be kept under review but as of late 2021, the two market-based mechanisms that may deliver against Guyana's objectives for jurisdiction-scale approaches, aligned with global REDD+ targets, are:

- **ART-TREES - The Architecture for REDD+ Transactions (ART)** has been developed to foster the environmental integrity needed for REDD+ emission reductions and removals (ERRs) at national and jurisdictional scale. ART provides a credible standard and rigorous process to transparently register, verify, and issue REDD+ emission reduction and removal credits that ensure environmental and social integrity. ART also aims to unlock new long-term financial flows to protect and restore forests.

- **VCS-JNR -** As one of the leading voluntary carbon market standards, VCS provides an avenue for nesting of project level activities on reforestation within Guyana's carbon market structure and potentially, future integration of relevant HFLD aspects which may be adopted by these and similar standards. Nested project will be facilitated to include private sector engagement.

APPENDIX TWO – ART-TREES

1. Background to TREES

The REDD+ Environmental Excellence Standard (TREES) sets out ART requirements for the quantification, monitoring, and reporting of GHG emissions and removals; demonstrating the implementation of the Cancún Safeguards; and verification, registration, and issuance of TREES credits. TREES has been designed to ensure that all TREES credits issued are real, measured, permanent, additional, net of leakage, verified by an accredited independent third party, and are not double-counted. As a result, TREES credits will represent high quality while still allowing flexibility for implementing REDD+ programmes at a national level or subnational as an interim measure.

Unlike other forest carbon accreditation programmes, ART includes a module for recognising carbon stored within High Forest Cover Low Deforestation (HFLD) countries and offers a dedicated recognition within the crediting programme that includes forest carbon protection. Most carbon accreditation programmes provide payments for restoring forests that were lost.

Importance of Intact Forests to ART TREES

ART's standard TREES 2.0 includes approaches for the full range of necessary actions needed for a broad range of forest countries and communities to contribute to Paris Agreement targets. This includes reducing emissions from deforestation and forest degradation, the most urgent priority for the forest sector, and protecting intact forests and restoring forest landscapes.

By ensuring the continuum of climate action is eligible for participation in carbon markets, ART offers an incentive for jurisdictions to reduce deforestation, restore forests and ultimately become High Forest – Low Deforestation (HFLD). Intact forests contribute both climate mitigation and adaptation benefits by storing carbon, regulating local and regional climate, supplying critical moisture to agricultural lands, and resisting wildfire. Also, providing incentives to HFLD jurisdictions lowers the risk of cross-boundary shifting of deforestation emissions (i.e., leakage).

TREES 2.0 Credits Are Additional and Fungible

TREES HFD credits are additional and fungible. HFLD credits constitute additional climate action. Published projections are that future deforestation will extend into intact, high

carbon forests, resulting in an estimated 170 billion tons of CO2 greenhouse emissions by 2050,[2] equivalent to four times annual global CO2 emissions (2019). TREES 2.0 incentivizes jurisdictions to protect intact forests since guarding the carbon sequestered in these forests is essential to meeting the goals of the Paris Agreement.

Jurisdictions that qualify as HFLD can use a different, conservative crediting approach, and must also report annual emissions from deforestation and degradation, account for leakage, uncertainty and reversals, avoid double counting and adhere to the same rigorous environmental and social safeguards requirements. These yielding credits are fungible with those generated by the approach used for non-HFLD jurisdictions.

Like all other ART participants, TREES requires action from HFLD jurisdictions. Under TREES, all HFLD jurisdictions must have a jurisdictional REDD+ implementation strategy, which in Guyana's case is its Low Carbon Development Strategy, that establishes the actions they are taking to mitigate current and future drivers of deforestation and forest degradation. Without financial incentives, it is less likely that forests in HFLD areas will remain effectively protected. Moreover, providing incentives to jurisdictions with intact forests to maintain those forests lowers the risk of deforestation shifting to these countries as nearby jurisdictions with high deforestation begin reducing their forest-related emissions.

2. ART-TREES Valuation of Guyana's Forest Climate Services

The ART-TREES valuation of Guyana's ecosystem services focuses on carbon valuation. In summary, the valuation adopts ART TREES V2 HFLD (High Forest Cover Low Deforestation) approach which computes crediting level of carbon units for sale using a formula:

Historical Emissions for Past 5 years from the forestry sector
+
(HFLD Score X 0.05% of country forest carbon stock)

While the ART-TREES mechanism does not yet include all aspects of what Guyana believes is needed for a robust, globally-applicable market mechanism, it is believed to provide a sound foundation for the next phase of Guyana's market integration. A summary of ART-TREES performance against Guyana's target methodology is set out in the table below.

[2]Busch, J. & Engelmann, J. (2017). Cost-effectiveness of reducing emissions from tropical deforestation, 2016– 2050. Environmental Research Letters. 13, 015001. https://doi.org/10.1088/1748-9326/aa907c

GUYANA'S FOREST CARBON FINANCING MECHANISM	ART-TREES	FURTHER WORK NEEDED
Includes incentives for Reducing Deforestation	Yes	No
Includes Incentives for Forest Restoration	Yes	No
Includes Incentives for Forest Conservation	Yes	No
Includes Incentives for GHG Removals	Forest Remaining Forest excluded from current structure.	Yes
Use of HFLD Score	**Yes**	**No**
Multiplier for Forest Carbon Stock applied at 0.1%	Multiplier for Forest Carbon Stock applied at 0.05%.	Yes
Forest Carbon stock to include all carbon pools appropriately adjusted for uncertainty.	Forest Carbon stock excludes soil, deadwood and litter.	Yes
Historical Average to cover the immediate historical period of 15 years.	Historical average determined by previous five years.	Yes
Adherence to Cancun Safeguards.	Yes	No

A key gap where Guyana believes ART needs to pursue further work in collaboration with Guyana and other forest countries, is to address removals. Under ART-TREES, sinks provided by 'forests remaining forests' in REDD+ are not currently valued, but they are significant in scale, are expected to continue functioning decades into the future if undisturbed, and face increasing threats. A mechanism is needed that explicitly gives a value to actions that maintain these sinks.

Despite this and other areas for future improvement, the methodology provides the potential for Guyana's next phase of market integration while the short-comings are addressed. The detailed calculation of Guyana's reference level, as well as the next steps in the ART process, are set out below.

3. Detailed Calculation

Guyana's HFLD Score

The HFLD Score is the sum of the Guyana's Forest Cover Score and Guyana's Deforestation Rate Score, expressed as a unit value.

Guyana's 2020 Forest cover = 83.7%
Guyana's deforestation rate 2016-20 = 0.060%
Expressed as a unit value, Guyana's HFLD Score is = 0.8

Guyana's Historical Emission for Past 5 Years

Guyana's MRVS Report 2020, has reported historical emissions for the past five years as 15,068,951tCO2.

Carbon Credits

Crediting levels are computed under ART TREES using the equation:

Historical emissions for past five years from the forestry sector
+
(HFLD Score X 0.05% of country forest carbon stock)

Gives Results in tons of CO2:

15,068,951 tCO2 + (0.8 X (0.05% of 17,196,304,923 tCO2)

= 21,947,473 tCO2

4. Additionality and Maintaining Environmental Integrity

To ensure environmental integrity, the following additional provisions will be made. Credits will be reduced if:

ACTUAL GROSS EMISSIONS EXCEEDING 25% FROM HISTORICAL LEVEL	ACTUAL GROSS EMISSIONS EXCEEDING 35% FROM HISTORICAL LEVEL	ACTUAL GROSS EMISSIONS EXCEEDING 45% FROM HISTORICAL LEVEL	ACTUAL GROSS EMISSIONS EXCEEDING 55% FROM HISTORICAL LEVEL	ACTUAL GROSS EMISSIONS EXCEEDING 65% FROM HISTORICAL LEVEL	---	ACTUAL GROSS EMISSIONS DOUBLING HISTORICAL LEVEL
Reduced by 10% on crediting level	Reduced by 15% on crediting level	Reduced by 20% on crediting level	Reduced by 25% on crediting level	Reduced by 30% on crediting level	…	No payments

Provisions for Reversal Buffers: If emissions exceed the Crediting Level, it is considered a reversal and is compensated by retiring buffer credits. If reported emissions are above the 15-year emissions average by greater than 15 percent, an additional deduction is taken from the final ERs.

Provisions for Uncertainty (based on Monte Carlo Analysis): Estimates of emission reductions and removals are adjusted based on estimated uncertainty to minimse the risk of over-crediting. Countries endeavor to minimise all forms of uncertainty. Uncertainty will be quantified in terms of the half-width of the 90% confidence interval as a percentage of the estimated emissions.

5. Issuance of credits

Credits will be issued under the Guyana Carbon Registry and any other structure that is associated with the Guyana credit issuance.

Payment Scenarios

FOREST VALUATION BASED ON CARBON MARKET POTENTIAL

CASE YEAR PRESENTED - YEAR 2021

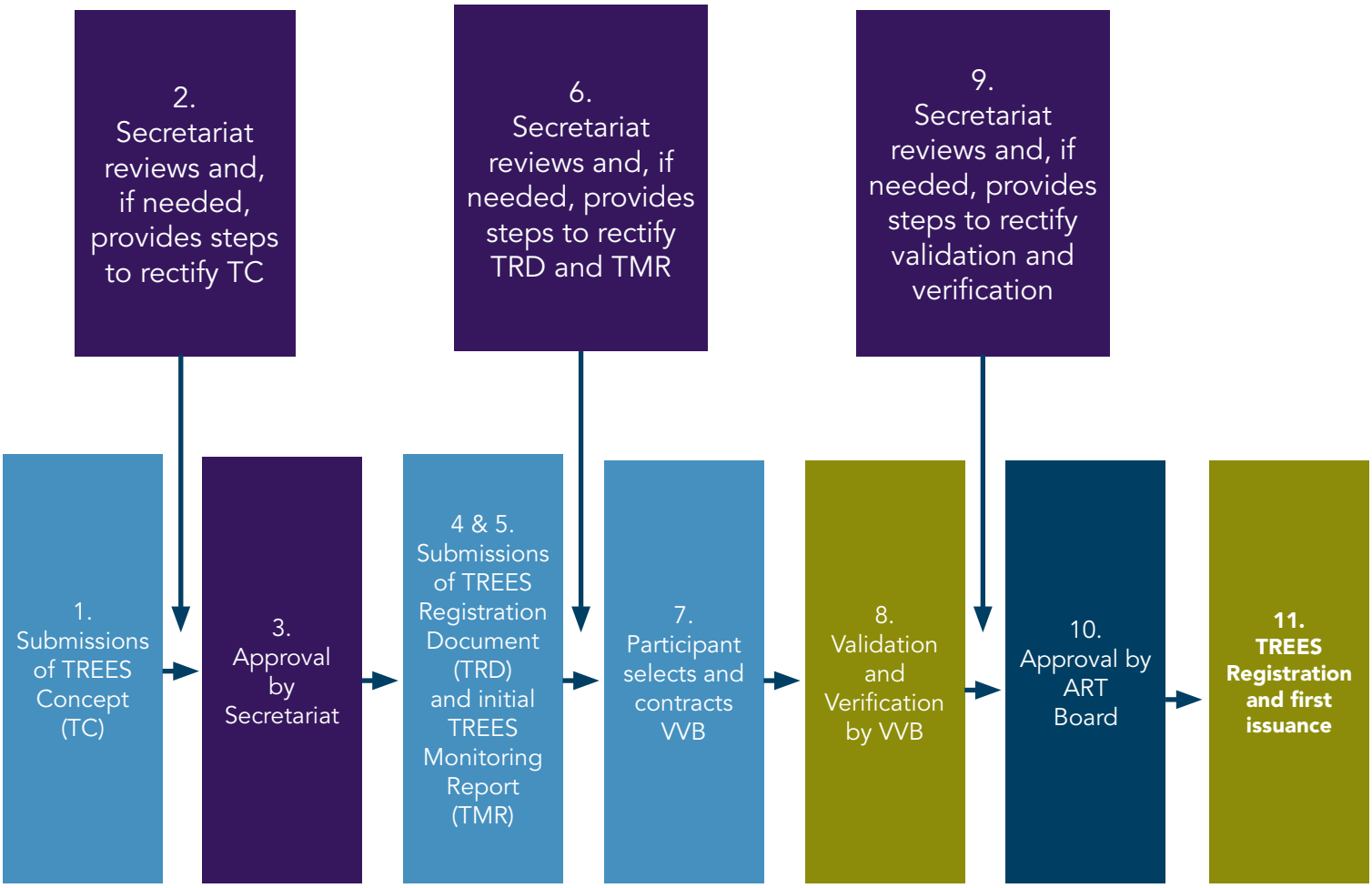
CREDITING LEVEL (TCO2)	PROJECTED EMISSIONS LEVEL (TCO2)	EMISSIONS REDUCTIONS (TCO2)	PAYMENT LEVEL AT US$10 PER TON/CO2	PAYMENT LEVEL AT US$20 PER TON/CO2	PAYMENT LEVEL AT US$30 PER TON/CO2
21,947,473	13,000,000	8,947,473	89,474,730	178,949,459	268,424,189

Provisions for Amaila Falls Hydro Power Project

The development of Guyana's Amalia Falls Hydropower Project (including road line, transmission line corridor and dam extent) is expected to impact approximately a quarter of one percent of Guyana's forest, and this expectation has been integrated into Guyana's LDCS, since it was first launched. Given the centrality of Amaila Falls Hydropower to Guyana's clean energy goals as outlined in Chapter Four, provisions were made to support its development within the Guyana-Norway partnership. The precedent established under the Guyana-Norway partnership will be carried forward into ART-TREES.

6. The ART Process

The process to enter ART using TREES requires approval of a TREES Concept, a successful initial Validation and Verification, and TREES Registration. Guyana will be required to submit documents and gain approval for each of the stages above to reach the final step of issuance of the approved credits to be sold. The eleven (11) steps involved in the ART process are outlined below:



The steps that Guyana will be required to follow as summarised in the diagram above is as follows:

1. The participant submits a TREES Concept to the Secretariat for review. Guyana completed this step in December, 2020.

2. The ART Secretariat reviews the TREES Concept for completeness and will request revisions as needed. Guyana completed this step in December, 2020.

3. The Secretariat approves the inclusion of the participant in ART. Guyana has completed this step in December, 2020.

4. Following approval, the participant's TREES Concept is referenced in the ART Registry as listed. Guyana is listed on the ART Registry.

5. The participant submits the TREES Registration Document and the initial TREES Monitoring Report covering the initial calendar year(s) to the Secretariat for a completeness check. These documents are prepared in draft for submission for periods 2016 to 2020 and 2021 to 2025 have been developed in draft to be submitted by end of September 2021.

6. The Secretariat reviews the TREES Registration Document and TREES Monitoring Report for completeness and will request revisions as needed. The Secretariat then approves the TREES Registration Document and TREES Monitoring Report for validation and verification.

7. The participant selects a Validation and Verification Body from the list of approved ART Validation and Verification Bodies maintained on the ART website. The participant solicits bids and negotiates contracts directly with the selected Validation and Verification Body (VVB). The selection process will include a disclosure of conflicts of interest and mitigation measures, if conflicts are identified.

8. The Validation and Verification Body conducts the validation of the TREES Registration Document and the verification of the TREES Monitoring Report in line with the requirements of the TREES Validation and Verification Standard.

9. The Validation and Verification Body submits the Validation and Verification Report and Verification Statement to the Secretariat who reviews the documents to ensure completeness. The Secretariat will request revisions as needed.

10. The Secretariat submits the participant's final package and a recommendation to the ART Board for approval. The Board requests additional information as appropriate and approves the credit issuance.

11. Following Board approval, the participant's TREES Registration Document and Monitoring Report are referenced in the ART Registry as Registered and TREES credits are issued based on the initial verification. For countries like Guyana, which have demonstrated conformance with the High Forest /Low Deforestation (HFLD) criteria and have used the HFLD crediting approach, TREES credits issued will be labeled as HFLD.

The HFLD crediting approach is explained below.

7. Eligibility to Participate as HFLD in ART

Participation in ART can take one of two tracks. The first focuses on reducing deforestation and being credited for doing so. As Guyana has maintained low deforestation rates and emissions levels, this avenue will yield very low benefits for Guyana.

The second track (the HFLD participation) allows for the maintained low rates of deforestation rates and emissions level to be factored into the determination of crediting level for payment. Conceptually, this track offers a more beneficial structure for Guyana as an HFLD country.

To be eligible to participate in ART as an HLFD country, the HFLD score threshold must be met. The HFLD Score is therefore a central part of the HFLD crediting approach and comprise the main eligibility criterion, and also is a main part of the formula used for computing the crediting level.

The HFLD Score is the sum of the Participant's Forest Cover Score and the Participant's Deforestation Rate Score as exemplified in the figures below and outlined in the equations in 4.1 below. Participants whose HFLD Score is 0.5 or higher for each year of the reference period meet the HFLD Score threshold and are considered HFLD participants under ART.

$$\text{HFLD Score}_t = \text{FCS}_t + \text{DRS}_t$$

WHERE

HFLD Score_t	**HFLD Score in year t**
FCS_t	**Forest Cover Score in year t (Equation 3)**
DRS_t	**Deforestation Rate Score in year t (Equation 4)**

8. The ART TREES HFLD Crediting Methodology

The HFLD Crediting Level will be calculated in accordance with the formula presented in Equation 5. The TREES Crediting Level is first calculated (emissions crediting level from the average of emissions during a historical period of five years with no overlaps with crediting period and no gaps). This crediting level is then adjusted based on Guyana's HFLD Score and forest carbon stocks to determine the HFLD Crediting Level.

$$HFLDCL_n = CL_n + (HFLD\ Score_{avg} * Carbon\ Stock)$$

WHERE

$HFLDCL_n$	HFLD Crediting Level for crediting period n; CO_2e/yr
CL_n	Crediting Level for crediting period n; CO_2e/yr (Section 5.1)
$HFLD\ Score_{avg}$	HFLD Score averaged across reference period (Section 5.2.1)
Carbon Stock	0.05% of Standing Forest Carbon Stock withing jurisdiction

9. Additional Provisions

Reversal Risk Assessment

TREES establishes a starting level of reversal risk for participants of 25 percent. The starting risk level may be lowered if participants can demonstrate that mitigating factors exist. The risk level is associated with a buffer deduction taken from the final verified TREES ERR quantity prior to each issuance.

Guyana is required to provide for the number of TREES credits that will be contributed to the buffer at each issuance. Each monitoring report must identify the buffer contribution and all justifications for the contribution for each year reported. Performance payment in Chapter Three provides for reversal buffers from identified amounts.

Uncertainty Assessment

TREES requires that estimates of emission reductions and removals are adjusted based on estimated uncertainty to minimise the risk of over-crediting. Participants are required to endeavour to minimise all forms of uncertainty. Requirements to track uncertainty and to avoid systematic bias must also be included in country submissions.

Under TREES, uncertainty is quantified in terms of the half-width of the 90 percent confidence interval as a percentage of the estimated emissions. Sampling errors must be estimated and included in the uncertainty calculation.

Model and allometric errors are excluded; as such errors are considered consistent between emissions in the crediting level and crediting periods.

Uncertainty is required to be assessed on both activity data and emission factors. Errors need to be propagated between sources using Approach 2 (Monte Carlo simulation). Monte Carlo simulations are required to use the 90 percent confidence interval and

a simulation n of 10,000. The bootstrapping method is allowed to be used where the probability density function is unknown. The simulations will form the basis for estimations both of value and uncertainty at each step, as the simulated sum of components will be more accurate than an arithmetic approach.

HFLD Annual Emissions Increase Deduction

For each year of the Crediting Period, HFLD Participants are required to compare their total reported annual emissions. If the total annual emissions exceed the crediting level, a deduction must be applied to the total credits generated. The deductions are as follows:

ENVIRONMENTAL, SOCIAL, AND GOVERNANCE SAFEGUARDS

TREES requires Participants to demonstrate they have implemented REDD+ actions defined in the REDD+ implementation plan consistent with Cancún Safeguards ensuring activities do no harm. It is the goal of this Standard to provide concrete guidance on how a participant can demonstrate that it has addressed and respected all the Cancún Safeguards, while drawing on the step-wise nature of REDD+ implementation.

REGISTRY REQUIREMENTS/ACCOUNT REQUIREMENTS

All participants, including Guyana, will have an account in the ART Registry, managed by the ART Secretariat. The ART Registry will contain country information, documentation, Validation and Verification Reports, records of serialised credit issuance, and credit cancellation, transfer, and retirement data. The Secretariat will also manage a pooled reversals buffer account in the ART Registry which will be publicly available.

PUBLICLY AVAILABLE DOCUMENTATION

All approved and final TREES documents will be publicly available through the ART Registry. Participants may designate certain parts of the documentation as Commercially Sensitive Information (CSI). In these cases, redacted versions of TREES documentation can be made publicly available. However, this information as well as any requested supporting documentation must be available for review by the Secretariat and Board and the Validation and Verification Body (VVB).

APPENDIX THREE
THE GUYANA-NORWAY PARTNERSHIP

When it was agreed, the Guyana-Norway partnership was the second largest Interim REDD+ arrangement in the world and for performance in the period 2009 to 2015, Guyana received a total of US$212.52 million dollars in payments to be invested in the LCDS.

In the absence of a UNFCCC REDD+ mechanism, Guyana and Norway sought to create a globally replicable model for a likely REDD+ mechanism. The model was built from nine building blocks. Together, they fulfilled three core functions:

1. Earning Payments Guyana was paid using a calculation based on independently verified delivery of forest climate services.
2. Managing Payments the Guyana REDD+ Investment Fund (GRIF), hosted by the World Bank, was the principal financial intermediary with an IDB Renewable Energy Account providing similar services and,
3. Investing Payments the process for funding LCDS projects through a set of mutually agreed Partner Entities.

The Programme has been and continues to be an overall success. However, a few areas that have impacted its effectiveness include the slow pace of intermediation for transfer of resources, mixed successes working with partner entities, and slow pace in some cases of national implementation bodies.

Earning and Managing Payments

The following table summarises Guyana's earnings, plus associated investment income.

	ACTUAL PAYMENT (USD)
2009 Performance Payment	30,355,594
2010 Performance Payment	39,474,415
2011 Performance Payment	Combined with following year
2012 Performance Payment	80,034,965
2013 Performance Payment	43,886,657
Direct Disbursement for Capacity Building and EU-FLEGT Projects	14,815,886
Awaiting Disbursement from Norway	4,000,000
TOTAL RECEIVED FROM NORWAY	**212,597,518**
Investment Income – GRIF (World Bank Trustee Account)	3,200,000
Investment Income – IDB Renewable Energy Account	5,100,000
TOTAL AMOUNT AVAILABLE FOR INVESTMENT IN LCDS	**220,800,000**

Investments made from Guyana-Norway Partnership Payments

The following table summarises Guyana's earnings plus associated investment income.

2013 LCDS THEME	PROJECT	ALLOCATION (US$ MILLION)	EXPENDITURE (US$ MILLION)	2022 STATUS
High Potential Low Carbon Sectors	Micro and Small Enterprise Development	5.1	5.1	**COMPLETE**
Hinterland Development	Amerindian Development Fund – Phases I and II	8.1	8.1	**COMPLETE**
	Amerindian Land Titling	13.3	5.2	**ONGOING**
Human Capital	Institutional Strengthening	6.4	6.3	**COMPLETE**
Adaptation and Resilience	Cunha Canal Rehabilitation	3.4	3.3	**COMPLETE**
	Flood Adaptation Infra-structure	47	0	**UNDER DESIGN**
	Climate Resilience Strategy and Action Plan	0.3	0.3	**COMPLETE**
Digital Infrastructure	ICT Access and e-Services, for Hinterland, Poor, and Remote Communities	17.0	7.9	**ONGOING**
Governance	Transforming Forest Management – MRV System	12.6	12.6	**COMPLETE**
	Support for EU-FLEGT Implementation	1.7	1.7	**COMPLETE**
	Sustainable Land Use Development and Management	14.8	4.8	**ONGOING**
Communication	LCDS Communication and Outreach	1.2	0.2	**COMPLETE**
Renewable Energy	Solar Power across various Regions	85	0	**COMMENCING**
TOTAL		**215.9**	**55.5**	

Support for Micro and Small Enterprise and Vulnerable Groups' Low-Carbon Livelihoods

The Micro and Small Enterprise Development and Building Alternative Livelihoods for Vulnerable Groups project addressed two of the major bottlenecks that constrained the development of Micro and Small Enterprises (MSEs) and the ability of vulnerable groups to build alternative livelihoods in Guyana: i) limited access to finance and ii) limited technical and business skills.

Access to finance was addressed through (i) a credit guarantee facility where the project guaranteed at first 40%, and later up to 70%, of the collateral requirements for loans at participating financial institutions and (ii) a grant scheme to assist vulnerable persons with viable business propositions. The Government also worked with participating Commercial Banks to lower their interest rates from a range of 14% to 26% all the way to six percent for any entrepreneur who was approved for a loan for their low carbon venture under the project.

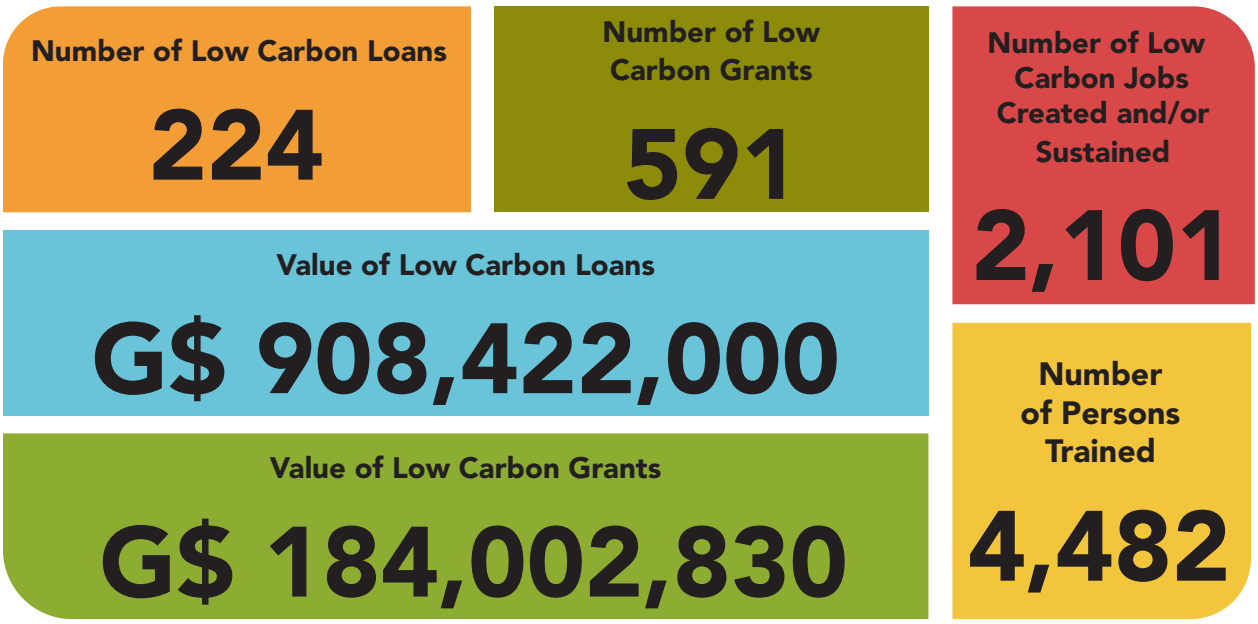
Lack of skills was addressed through a training voucher scheme which enabled MSEs to obtain necessary skills at existing training institutions. The project targeted MSEs who were in or who wished to transition to low carbon sectors. Seventeen low-carbon sectors were funded under the project:

- Two hundred and twenty-four loans were approved at a value of US$ 4,339,138 or approximately G$ 908,422,000. The percentage of loans by sector were as follows: 46.9% in professional and business services; 9.8% in fruits and vegetables; 12.1% in agriculture and agro-processing; 15.2% in arts and crafts; 5.4% in manufacturing activities; 2.2% in internet and computer based services; 2.2% in eco-tourism; 1.8% in sustainable forestry and wood processing; 0.9% in entertainment, music and the performing arts, 1.3% in aquaculture, 0.4% in apiculture, 0.4% in energy efficient transportation and logistics, 0.4% in low carbon energy production/ distribution, 0.9% in publishing and printing. Males represented 61% of the loan beneficiaries and females, 39%.

- Five hundred and ninety-one grants were approved at a value of US$ 891,055 or approximately G$ 184,002,830. The percentage of grants by sector were as follows: 40.6% in professional and business services; 22.8% in agriculture and agro-processing; 16.2% in fruits and vegetables; 6.8% in arts and crafts; 4.7% in manufacturing activities; 4.2% in internet and computer based activities; 1.0% in apiculture; 0.8% in sustainable forestry and wood processing; 1.0% in entertainment music and performing arts; 0.5% in eco-tourism; 0.8% in publishing and printing; and 0.3% in aquaculture). Males represented 38% of grant beneficiaries and females, 62%.

- A total of 4,482 people were trained in several areas including: basic business management skills, record keeping, packaging and labelling, a special course aimed at female entrepreneurs, climate smart agriculture, sustainable forestry,

plumbing, videography, photography, cosmetology, cookery, and craft. A total of 2,101 jobs were sustained and/or created in low-carbon sectors by the loans and grants under the micro and small enterprise development project (1,217 jobs from grants and 884 from loans).



AMERINDIAN DEVELOPMENT FUND PROJECT

The socio-economic development of Amerindians was supported through the implementation of two separate phases of the Amerindian Development Fund (ADF) project which funded the implementation of the Community Development Plans (CDPs) of Amerindian communities and villages.

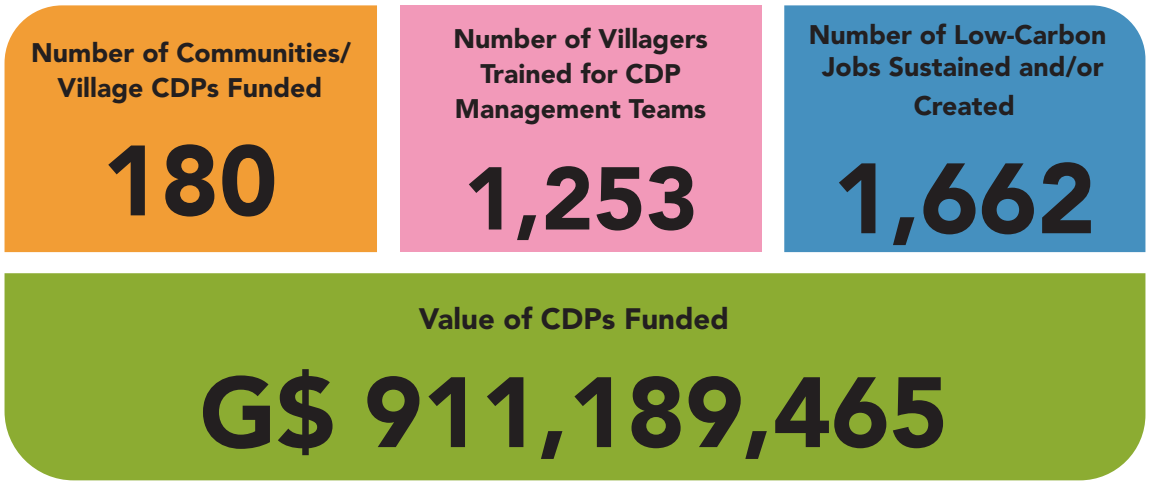
The development of the CDPs was led by the communities and villages and approved at their Council meetings. The first phase funded 26 communities and villages and the second phase funded 154 communities and villages. The project aimed to strengthen the entrepreneurial and institutional capabilities of the village economies of Amerindian communities; improve linkages with the private sector to further develop value chains; and strengthen institutional frameworks to support local economies. CDPs implemented were categorised under the following sectors: agriculture, village infrastructure, tourism, manufacturing, village business enterprise, and transportation.

Between both phases of the project, the CDPs of 180 communities and villages were funded and implemented at an approximate value of US$4,412,540 or G$911,189,465.

To support the sustainability of CDPs, the project sought to improve linkages with the private sector to further develop value chains and strengthen institutional frameworks to support local economies. As a result, beneficial connections with several agencies and institutions, including the Small Business Bureau (SBB); Guyana Livestock and Development Agency (GLDA); Guyana Tourism Authority (GTA); National Agricultural Research and Extension Institute (NAREI); Regional Democratic Councils (RDCs); New Guyana Marketing Corporation (NGMC); Guyana Technical Institute (GTI); Global Seafood Distributors; Georgetown Chamber of Commerce and Industry (GCCI); and the Guyana Energy Agency (GEA) were made. Workshops and seminars were held, along with technical capacity building sessions for communities and villages. The CDP database generated over the life of the project was also shared with various agencies and institutions. The database lists all grant recipients, types of CDPs, typologies, villages, tranches disbursed, dates, population, and other particulars.

Community Development Officers (CDOs) were trained in monitoring and financial accounting techniques and Community Management Teams (CMTs) were trained to prepare budgets, financial reports and provided with business management, marketing and leadership techniques training.

In addition to the various training and capacity building sessions, support was also given to specific CDPs based on needs assessment, in the form of intensive Cluster Training Sessions in cattle management, fish culture, business operations and woodworking.



Cattle rearing at Kurukabaru

Village Shop in Princeville

Cassava Processed Products in Tiger Pond

Guest house built in Karasbi

AMERINDIAN LAND TITLING

Amerindians total approximately 14 percent of Guyana's population and currently own in excess of 15.65 percent of Guyana's territory, up from about six percent in the early 1990s.

The Amerindian Land Titling (ALT) Project, which is ongoing, seeks to accelerate the legal demarcation and titling of Amerindian lands. The ownership of land empowers and allows Guyana's first peoples the liberty to engage in and promote investments towards their own social and economic advancement.

Under the ALT project:

- 15 villages were issued with absolute grants, bringing the total number of Amerindian villages titled with Absolute Grants to 111.
- 26 villages were demarcated and 24 were issued with certificates of title in what is the final step in the titling process. This brought the total number of villages demarcated and issued with Certificates of Titling to 101.

The principle of Free Prior and Informed Consent (FPIC) continues to be an important and respected principle that is applied to ensure that under the project. Amerindians are provided with enough information well in advance of planned or proposed activities to allow communities and villages to agree or consent to the execution of those activities.

Under the project, over 210 persons were trained in FPIC to ensure that not only do Amerindians understand their rights but importantly, for other stakeholders to recognise and understand those rights and practically apply the principle of FPIC during project implementation.

A communication strategy was formulated under the project and associated activities involved the distribution of communication materials (including brochures and flyers on the titling process), radio and television broadcasts, documentaries on titling activities, and workshops throughout communities and villages in the various regions. Many of the communication materials were translated into the different Amerindian languages.

A grievance redress mechanism was established as an alternative for helping to resolve land titling disputes. Twenty-three persons were trained as GRM liaisons, 254 community members were trained in mediation and 378 persons were part of cluster awareness exercises on the core function of the GRM.

Number of Villages and Village Extensions Issued Absolute Grants under the ALT Project

15

Villages and Village Extensions Issued Certificates of Title under ALT Project

24

Total Number of Villages with Absolute Grants

111

Total Number of Villages Demarcated and Issued Certificates of Title

101

Little Kaniballi-Santa Cruz Village General Meeting examining maps of requested extension with MoAA Team and Sworn Land Surveyors

Participants at the Santa Rosa Village General Meeting along with MoAA Team as part of the consultative investigation on village extension request

INSTITUTIONAL STRENGTHENING IN SUPPORT OF GUYANA'S LCDS

The Institutional Capacity in Support of Guyana's LCDS project was implemented to further enhance national institutional capacity in Guyana to address the impacts of Climate Change through the effective implementation of the LCDS, and to assist Guyana in meeting its commitments under interim REDD+ partnerships. The specific objectives of the project were: (i) to strengthen the technical and administrative capacity of the principal institutions responsible for implementing Guyana's Low Carbon Development Strategy, namely the Office of Climate Change (OCC), the Project Management Office (PMO) and the Guyana Forestry Commission (GFC); and (ii) develop and implement a Monitoring Reporting and Verification System on a national level.

Under the project:

- A total of 156 communication and outreach sessions on climate change, the LCDS and REDD+ were conducted.
- The development and implementation of a mechanism for a national scale Monitoring, Reporting and Verification System was supported.
- Methodologies for determining the extent and scale of forest degradation were developed and a digital database of archived satellite data and national spatial data sets were established.
- Historical and current drivers and processes affecting forest carbon levels were assessed and implementation plans for long term measurements and monitoring of national forest carbon stocks were developed.
- Within the REDD+ Secretariat, eight technical staff were trained in the area of forest carbon stocks and change assessments, fourteen field staff were trained in forest carbon monitoring systems; and six staff were trained in GIS and Remote Sensing.
- Multiple reports and areas of research were advanced by the Guyana Forestry Commission, including: Assessment Report in Current Drivers and Processes Affecting Forest Carbon; Report on Independent Forest Monitoring; MRVS

Interim Measures Report for Year Three; Report on Identification of Non-Carbon Ecosystem Services for Integration into Guyana's National MRVS Assessment; Report on Shifting Agriculture; Report on Assessment of Requirements of a Monitoring System for Carbon as well as Non-Carbon Variables.

- A strategy for a national scale Opt-in Mechanism was completed. The Opt-in Mechanism is viewed as an innovative approach intended to help Amerindians to "opt-in" to the national REDD+ mechanism.
- An institutional diagnostic study of the Environmental Protection Agency was completed.

CUNHA CANAL REHABILITATION PROJECT

About 39% of Guyana's population and 43% of GDP are in regions exposed to significant flooding risk, and extreme weather events that are increasing in frequency. These extreme weather events including the floods of 2005 demonstrated the significance of the risks posed by inhibited drainage capacity of the East Demerara Water Conservancy (EDWC), which is one of Guyana's most important natural drainage and irrigation and flood control mechanisms.

The EDWC is a large shallow reservoir that covers an area of 571KM^2 and stores approximately 250 million cubic metres of water at the maximum safe operating level. The EDWC protects various parts of Guyana, including Georgetown, the East Coast and East Bank areas preventing flooding and providing agricultural lands and urban areas with irrigation and drinking water.

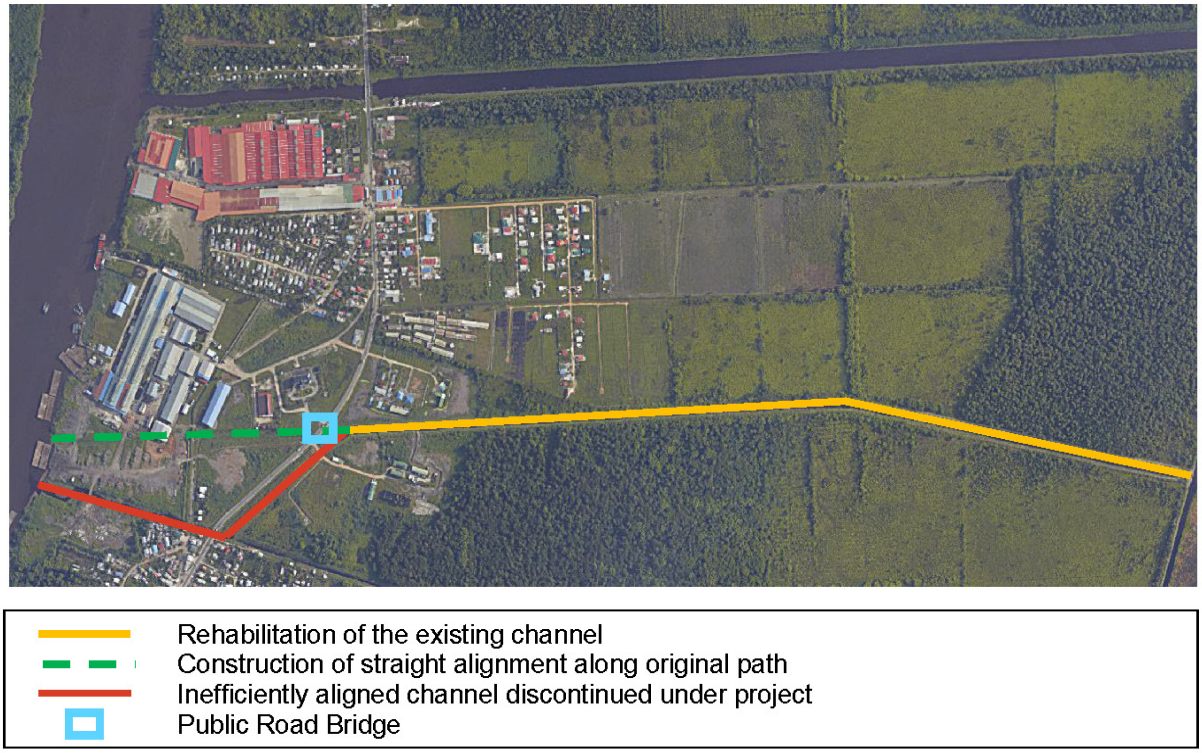
The Cunha Canal is one of the canals or channels that supports the drainage of the EDWC into the Demerara River and helps to prevent the risk of water levels exceeding the safe operating level of the EDWC dam through overtopping or catastrophic breaching and flooding.

Around 1990, the Cunha Canal was diverted from its original alignment to a smaller discharge channel. This diversion reduced the discharge capacity of the canal, and it went into disuse soon afterwards. The discharge through the canal was re-established during the 2005 flood but with a limited capacity as it was affected by circuitous routing and structural limitations.

The Cunha Canal Rehabilitation project was a major adaptation project to increase the capacity of the canal to drain the EDWC, as well as local agricultural areas surrounding the canal. The project aimed to support a more climate resilient economy in Guyana, reduce the vulnerability of catastrophic flooding in Guyana's low-lying coastal area, and prevent significant losses to human lives, crops, and livestock.

The Cunha Canal Rehabilitation Project included: (i) the re-routing of the canal along its original straight alignment, widening it to approximately 66 feet, and excavating to remove the build-up of sediments and weeds to allow for a straight flow into the Demerara River that eliminates hydraulic restrictions; (ii) rehabilitation of the former outlet structure or sluice to control the discharge of water and prevent river water from entering the canal during high tide; and (iii) the construction of a bridge on the East Bank of Demerara Public Road where the canal intercepts the road.

Aerial view of Cunha Canal



CLIMATE RESILIENCE STRATEGY AND ACTION PLAN

The adverse, and potentially catastrophic impacts of climate change are already being experienced in Guyana. Since the 1960s, Guyana has observed marked increases in temperatures, sea levels and the frequency and intensity of extreme rainfall events. The impacts on Guyanese people, society, economy and environment during flooding events in 2005, 2006, 2008, 2010, 2011, 2013, 2014 and 2015 and the droughts of 1997-1998, 2009-2010 and 2015-2016 are poignant examples of the devastation climate change may cause. Flooding in 2005, for example, caused damage estimated at US$465 million (60% of GDP at that point) and during the drought in April 2015 potable water had to be trucked into communities in Regions One and Nine. Guyana has been described as

being 'particularly vulnerable' to climate change because of high levels of exposure and sensitivity to climate risks and limited capacity to adapt.

The Climate Resilience Strategy and Action Plan (CRSAP) identified key climate risks and priority resilience building actions and aimed to provide a comprehensive and overarching framework for adapting and building resilience to climate change impacts. The Strategy and Action Plan are underpinned by the five cross-cutting pillars of adaptation identified in Guyana's Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), namely information, research and systematic observation; institutions and capacity building; policy and legal frameworks; infrastructure and technology; and finance.

The CRSAP identified that climate change will create serious and high magnitude risks for all 15 sectors assessed in Guyana. There are 43 serious risks that are relevant now and projected for the 2030s, with four additional serious risks projected for the 2030s only. These serious risks are spread across 13 different sectors. Seventeen risks could have catastrophic impacts and a further 22 risks are almost certain to occur. Four risks have been identified with the combination of catastrophic consequences and almost certain likelihood; these are found in the agriculture, indigenous peoples and housing sectors.

These risks can, however, be mitigated and the CRSAP identified sectoral resilience objectives and actions to address all risks highlighted that are relevant now and into the 2030s. Work will commence on implementing the resilience objectives aimed at addressing risks based on identified risk level and priority.

ICT ACCESS AND E-SERVICES FOR HINTERLAND, POOR, AND REMOTE COMMUNITIES

Fostering sustainable development in the Hinterland and vulnerable areas is one of the core priority outcomes of Guyana's Low Carbon Development Strategy (LCDS). A key component in achieving such an outcome is the provision of public services and information via the deployment and use of new Information and Communications Technologies (ICTs).

The ICT Access and e-Services for Hinterland, Poor, and Remote Communities Project is still ongoing and aims to provide the necessary infrastructure, equipment, hardware, and software necessary to enable access to high-quality ICT, training and e-services in all parts of Guyana, with particular attention given to vulnerable groups and remote communities who might otherwise be excluded. The project will provide the supporting capacity to create linkages to generate inter-sectoral benefits in areas such as education, health and business. The goals of the project include the development of a digital

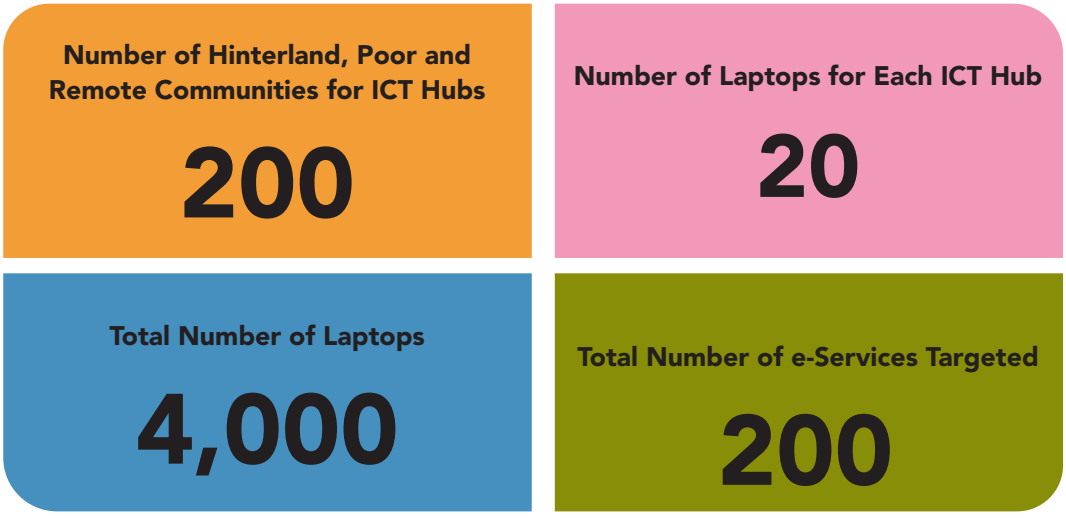
knowledge-based society, enhancement of national efficiency and competitiveness, and the promotion of inclusive and sustainable growth and development.

Ninety Very Small Aperture Terminals (VSATs) which are two-way satellite ground stations with a dish antenna used to provide internet access to remote locations were procured and installed in communities and villages. Additionally, 180 solar systems were procured to provide the necessary energy to power the ICT equipment at the hubs and any additional equipment/appliances using the extra capacity.

From 2021, ICT hubs will be established in 200 communities and villages. Each hub will be equipped with printers and televisions, as well as 20 laptops and software.

Also, under the project, consultancies were commenced to conduct a comprehensive capacity assessment of the National Data Management Authority (NDMA); map current ICT deployment and capacities in the public sector; and to undertake a multi-dimensional capacity assessment of public institutions that will offer e-services, identifying gaps and bottlenecks in the process. The following reports were completed:

1. Baseline Report focused on market research looking at Guyana's profile, education, health, business, and as-is analysis of technical infrastructure and regulation.
2. Technical Report looking at technology assessment, design options for Guyana, commercial assessment of solutions, proposed Guyana solution, rollout phases, stakeholder analysis, business models, implication for legislation and policy development, and an implementation plan.
3. E-Services Readiness Assessment Report on important service needs, status quo of e-services readiness today, vision of e-services offered by government agencies, and description of selected e-services.



SUPPORT FOR THE GUYANA FORESTRY COMMISSION'S MONITORING REPORTING AND VERIFICATION SYSTEM (MRVS)

The Joint Concept Note (JCN) between the Government of Guyana (GoG) and the Government of the Kingdom of Norway; identified the stepwise and progressive development of Guyana's Monitoring Reporting and Verification System (MRVS) and outlined the mechanism for receiving financial payments for Guyana's provision of forest carbon-based services. These payments are result-based and dependent upon, among other indicators, deforestation and forest degradation measured against an agreed reference level.

While the project had several stages over nine years, the overall goal of the project in the initial years 2010 to 2015 was to establish a sustained MRVS for implementing REDD+ policies and to receive results-based compensation for such activities in the long-term in a way that built the capacity of the GFC, contributed to Guyana's low-carbon development pathway, and supported the sustainable development of natural resources. More specifically, the project aimed to further build capacity in the GFC to carry out forest cover and change monitoring and forest carbon monitoring/ measurement in fulfillment of the MRVS Roadmap and to build stakeholder awareness and participation in the successful design and implementation of the MRVS as an essential tool for the implementation of the LCDS, and in overall sustainable forest management.

The continued development and implementation of Guyana's MRVS for 2016 to 2021 maintained its focus on the implementation and further development of the key technical areas of forest area change assessment and monitoring and forest carbon measurement and monitoring. Emphasis was placed on improvements in the emissions and removals reporting, and application of the system to improve forest management.

Over the years Guyana's MRVS has become an internationally acclaimed model, viewed as one of the best globally. Over the years the following were important areas of achievements under the projects:

- Mapping and assessment of changes in forest area were conducted.
- Satellite data coverage of Guyana at a national scale was acquired.
- Independent accuracy assessments for forest maps and change estimates were conducted.
- A systematic national forest carbon measurement system was designed and implemented.

- Emission factors for main forest degradation drivers were established and uncertainty assessments conducted.
- Areas for future development of the MRVS to include additional aspects and to reduce uncertainties and efficiencies were assessed.
- The use of evolving technologies for REDD+ within Guyana's MRVS was explored.
- Modelling activities to inform a reference level for REDD+ for Guyana was conducted.
- The methodology for treatment of shifting cultivation was improved.
- Foundations and data sources for a REDD+ safeguard information system were developed.

SUSTAINABLE LAND DEVELOPMENT AND MANAGEMENT PROJECT

The Sustainable Land Development and Management project remains ongoing. Its goal is to establish an enabling environment for promoting sustainable and climate-resilient land development, management and reclamation.

This will be achieved through, among other things, the development of a harmonised national land policy and legislative framework, strengthened capacity of the Guyana Lands and Surveys Commission (GLSC), the design and development of an integrated and robust spatial data infrastructure, as well as an open-data geospatial information system. The overall outcome will be to support improved land administration, enhanced governance of tenure, in addition to improved technical support services and mechanisms to encourage adoption of sustainable and climate-smart land use systems and management practices. The project will strengthen the application and enforcement of regulations, land use planning, incentive measures, knowledge sharing, as well as assessment and monitoring in line with the Sustainable Development Goals (SDGs).

Under the project:

- Legal reviews of land related legislations have commenced and the legal capacity of GLSC was strengthened with law resources to support the GLSC Legal Division.
- The Standard Operating Procedures for Land Administration are pending revision to increase efficiency of land administration processes.
- The National Spatial Data Infrastructure (NSDI) Action Plan was completed and the National Spatial Data Infrastructure and geospatial platform is being established. This will enhance the accessibility, communication, and use of geospatial data to support a wide variety of evidence-based decisions at all levels to support sustainable land management in Guyana.

- The Session of the Committee for the Review of the Implementation of the Convention (CRIC 17) of the United Nations Convention to Combat Desertification (UNCCD) was hosted in Georgetown, and for the first time in the English-speaking Caribbean.
- Development commenced for the five-year Strategic and Business Plan for GLSC.
- The process of development for the National Land Policy was been initiated. Consultations with 27 government institutions were completed to identify land sector challenges, assess the policy demand and agree on a process and structure to develop the National Land Policy.
- The re-mapping of Guyana using LIDAR technology commenced.
- Land tenure information systems, processes and user capacities were reviewed.
- Infrastructural capacity of GLSC was increased through procurement of communications, IT, and other equipment.
- Human capacity of the GLSC was strengthened through recruitment, attendance of GLSC staff at international conferences and workshops, and enrollment in relevant diploma programmes at the University of Guyana.
- An MOU was signed between UG and GLSC for the delivery of a Diploma Programme in Land Administration.
- Regional outreaches were conducted in Regions three, four, six and 10 to address land tenure and governance issues for hundreds of citizens and clients of the Commission.

UTILITY SCALE SOLAR PHOTOVOLTAIC PROGRAMME

The utility scale solar photovoltaic programme is one of Guyana's significant steps in keeping with its vision of stimulating future economic growth through clean, renewable, resilient energy sources and infrastructure, while decoupling from fossil fuels.

The specific objectives of the programme are to: (i) avoid CO2 emissions with the development of solar PV generation plants; (ii) lower the cost of electricity generation while supporting the country's transition towards renewable energy-based generation; and (iii) improve the operation and management of the isolated systems of Essequibo and Linden and develop local skills for services related to solar PV generation systems.

The programme, Guyana's largest utility scale solar programme, will invest in eight utility-scale, photovoltaic solar projects totalling 33MWp across three areas in Guyana: (i) 10 MWp of generation capacity connected to the DBIS at the Berbice area; (ii) 8MWp in the Essequibo Coast Isolated System including a BESS with a minimum capacity of 12MWh; and (iii) 15MWp connected to the Linden Isolated System inclusive of a BESS with a minimum capacity of 22MWh. Each facility will be connected to the 13.8kV primary distribution network in the area.

Operational efficiency and capacity building are also major aspects of the programme and will address upgrades and digital modernization, via energy management applications, in the isolated Essequibo and Linden electrical systems. This will promote real-time monitoring and control while also improving reliability, efficiency, and stability of the systems. The support includes: (i) the installation of automated monitoring and control systems; (ii) remote control systems for substations; (iii) a Disaster Risk Management Plan for flood-prone sites; and (iv) training and apprenticeship programs with a gender and inclusion focus.

Gender equality and social inclusion are important principles in the LCDS and the programme will finance the following activities to promote gender equality and diversity through: (i) training programs for women in solar PV, Solar Job and Workforce Development, with paid apprenticeship opportunity; and (ii) the design and implementation of an apprenticeship program for diversity and inclusion within the Project Executing Unit in GPL and other Government Energy Agencies.

The programme will provide 27,000 households with cheap, clean energy and is expected to benefit approximately 70,000 people.

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