

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:

- o **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.
 - o **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.
 - o **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 businesses. 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 transshipment 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
- o Partnership with York University to deliver training for a masters in hospital administration.
- o 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 NCDER 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 as 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.