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NDC Private Sector Investment Strategy

Improving private sector investment in climate action in Belize

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Authors: Federico Antonio Canu, Thibaut Pasquet, Jingjing Gao, Lindy Charlery.
UNEP Copenhagen Climate Centre

Reviewers: Gabriela Prata Dias (UNEP-CCC), Kamil Salazar (Belize National Climate Change Office) and Elisabeth Resch (UNEP-CCC)

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Foreword

Climate change poses significant challenges to Belize, affecting our environment, economy, and communities. As a country highly vulnerable to climate impacts such as rising sea levels, extreme weather events, and biodiversity loss, Belize is committed to addressing these challenges through innovative and collaborative approaches. Recognizing the critical role of the private sector in driving climate action, Belize sought support from the NDC Partnership and the UNEP Copenhagen Climate Centre to enhance private sector investment in climate resilience and sustainable development.

This report represents a comprehensive effort to consolidate essential information on the scope, priorities, opportunities, and challenges related to private sector investments in climate action in Belize. It provides practical strategies to stimulate private sector engagement, fostering sustainable economic growth while addressing climate vulnerabilities. The report also serves as a foundation for exploring interventions by government and financial institutions to facilitate and incentivize private sector investments in key sectors such as renewable energy, energy efficiency, and climate-resilient agriculture.

Belize's updated Nationally Determined Contribution (NDC) sets ambitious targets for adaptation and mitigation. This strategy outlines key actions to improve private sector investments, including securing additional sources of climate finance, creating financial support mechanisms, developing enabling policies and regulations, and enhancing the capacities of public institutions, private enterprises, and farmers. These measures are designed to create an enabling environment that promotes private sector participation in achieving Belize's climate goals.

The recommendations in this strategy aim to leverage blended finance approaches for climate investments, mobilize additional private sector resources, and significantly increase the contribution of private entities to national climate finance flows. By aligning public and private sector efforts, Belize can advance its commitments under the Paris Agreement while ensuring sustainable economic development.

We extend our sincere gratitude to the UNEP Copenhagen Climate Centre and the NDC Partnership for their invaluable support in this endeavor. Together, we can build a resilient and sustainable future for Belize—one that safeguards our natural heritage while fostering economic prosperity for generations to come.

Sincerely,

Honorable Orlando Habet
Minister of Sustainable Development, Climate Change & Solid Waste Management

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List of Abbreviations

A/C	Air-conditioning
BAU	Business-as-usual
BCCI	Belize Chamber of Commerce and Industry
BEL	Belize Electricity Limited
Beltraide	Belize Trade & Investment Development Service
BSI	Belize Sugar Industries
BTB	Belize Tourism Board
BTR	Biennial Transparency Report
BZD	Belize Dollars
CAPEX	Capital expenditure
CARICOM	Caribbean Community
CCCCC	Caribbean Community Climate Change Centre
CIF	Climate Investment Funds
CSA	Climate-Smart Agriculture
DFC	Development Finance Corporation
DFIs	Development finance institutions
ESCO	Energy service companies
EPC	Energy performance contracts
ESG	Environmental, Social and Governance
ETAF	Energy Transition Accelerator Financing Platform
EU	European Union
FAO	Food and Agriculture Organization
FFS	Farmer field schools
FMO	Dutch Entrepreneurial Development Bank
GCF	Green Climate Fund
GHG	Greenhouse gas
GWh	Gigawatt hours
Ha	Hectares
IDB	Inter-American Development Bank
IEA	International Energy Agency
IIF	InsuResilience Investment Fund
IPP	Independent Power Producers
IRENA	International Renewable Energy Agency
kW	Kilowatt
kWh	Kilowatt hours
kWp	Kilowatt power
HLB	Huanglongbing (Citrus) Greening Disease
ICZM	Integrated Coastal Zone Management
IPPU	Industrial Processes and Product Use and Waste
MARC	Marginal Abatement Revenue Curves
MSMEs	Micro, Small and Medium-Sized Enterprises
MW	Megawatts
NDC	Nationally Determined Contribution
O&M	Operation and maintenance
OECD DAC	Development Assistance Committee of the Organization for Economic Co-operation and Development
PACT	Protected Areas Conservation Trust
PPCR	Pilot Programme for Climate Resilience
PPA	Power Purchasing Agreement
PV	Photovoltaic
SIRDI	Sugar Industry Research and Development Institute
SMEs	Small and medium-sized enterprises
SCF	Strategic Climate Fund
tCO2e	Metric tons of carbon dioxide equivalent
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollars

Executive Summary

Belize's updated NDC (2021) sets ambitious targets for both adaptation and mitigation aimed at achieving 5,647 KtCO2e of emission reductions between 2021 and 2030 compared to a business-as-usual (BAU) scenario, while building resilience, adapting and minimizing loss and damage due to the impacts of climate change (Government of Belize, 2021). To achieve this, a wide range of mitigation and adaptation measures have been identified. The total cost estimate for the implementation of the proposed NDC measures is US$1,712 million, but there is a funding gap of US$1,383 million (81% of the required investments). Investments required from the private sector are estimated at $172 million (10%) of the total investments required (Government of Belize; NDC Partnership, 2021). However, the private sector contribution came to only about $7 million (3.09% of total climate investments) between 2015 and 2019 ($227.4 million) (Commonwealth Secretariat, 2021). If this trend continues, private sector investments will contribute only 4% of the needed private sector investment and only 0.4% of the total NDC investments needed.

Belizean private sector investments in climate action remain low due to a variety of reasons. At the macro level, the relatively small size of the economy and population set barriers in terms of scale. In addition, Belize has relatively high national debt levels and budgetary constraints place constraints on the levels of government spending available for climate-related investments and government led private sector incentive mechanisms.

Belize's financial system is bank dominated, with limited micro-financing options for MSMEs. There is liquidity in the Belizean financial sector, but investments by the financial institutions are hindered by clients' risk profiles, lack of collateral and securities and lack of formalization of MSMEs. Commercial loans are comparatively high-cost and usually come with prohibitive collateral requirements considering the relatively high up-front investments needed in many of the identified climate measures relevant to private sector investments. Approximately 90% of Belizean businesses are micro, small and medium-sized enterprises (MSMEs), and their relatively small size and the high degree of informality in the sector hinders access to finance. This leads to high cost of finance, especially for MSMEs when accessible (Almendarez, 2023).

MSMEs are also prevalent in the agricultural sector, which is highly relevant for private sector investments in adaptation measures. Most farms in Belize are smaller than 20 acres (8 Ha), 25% are smaller than 5 acres (2 Ha), and only one-third of farmers have ownership of the land they cultivate. The limited formal ownership, farm sizes and related access to collateral to secure the relatively high up-front investments results in low access to credit for investment in climate measures. Farmers and private enterprises that have access to some collateral are in many cases already indebted to local financial institutions to finance daily operations such as inventory and farm inputs (fertilizers, seeds, etc.), so their available assets are often tied up in existing debt.

The implementation of certain climate resilient practices such as replanting sugar cane, crop diversification and introduction of climate and pest resilient crop varieties have one additional barrier. Even though these practices lead to higher productivity and resilience in the longer term, farm productivity usually drops during the first years of implementation, as the newly planted crops need time to achieve full productive potential. This lower income during the first years after the investment is an additional barrier for investments, and for debt repayment.

As a result of the barriers described above the private sector is disincentivized from investing in climate measures, mostly having to rely on their own equity, which is usually invested in the core business and operation expansion. The cost of finance remains high if indeed accessible at all.

Considering the existing finance gap and the limited role of the private sector, this NDC Private Sector Investment Strategy provides an integrated and strategic approach to improving private sector investments in climate action in Belize through the following main proposed actions:

- Securing additional sources of climate finance and funding from the international community to remove financing barriers and leverage national private sector investments,
- The creation of financial support mechanisms for incentivizing and facilitating private sector investments in climate action,
- Public sector policy and regulatory development to facilitate private sector investments in climate action,
- The development of public institutions', private enterprises' and farmers' capacities to attract commercial and concessional debt finance and donor investments.

By establishing the recommendations described in this NDC Private Sector Investment Strategy, enabling environments will be created, improving private sector investments in climate action in Belize by 2030 and beyond, aiming to leverage blended finance for climate investments and to:

- Mobilize an additional $263,695,000 in private sector investments,
- Reduce the NDC finance gap by 16%,
- and Increase the private sector contribution to climate finance from 3.09% to 15.4% by 2030.

Climate measures prioritized for private sector investments

The climate measures that have been identified and prioritized for private sector investments are:

- Investment opportunities in solar technologies
    - Solar PV for distributed Independent Power Producers
    - Solar PV for the commercial sector and hospitality
    - Solar Water Heaters
- Investment Opportunities in Energy Efficiency
    - Public / office buildings
    - Hotels and resorts
    - Energy efficiency in Micro, Small and Medium-Sized Enterprises
- Transition to e-mobility
    - Electric buses for public transport
    - Electric cars
- Introduction of climate resilient crop varieties
- Diversification from monoculture to multiple crops
- Water resource management
- Climate related insurance
- Climate-smart livestock practices

Private sector investment potential in mitigation measures

The implementation of solar technologies aligned with the new NDC ambition would mobilize $89 million in private sector investments. The investments would provide a good return, with potential annual revenues / savings of $11 million from approx. 81 GWh of generated power per year, and 35 GWh in electricity savings[1]. The total estimated annual emission reductions from these investments would amount to 130 $ktCO_2e$. Implementing energy efficiency measures in buildings is estimated to lead to $29 million of investments while providing total annual savings of $9 million from approx. 62 GWh of annual electricity savings1. Total estimated annual emission reductions amount to 22 $ktCO_2e$. Investments in e-mobility to achieve set targets would require aggregated investments of $103 million, with net annual costs of $4.5 million, noting that electric cars would lead to higher costs than baseline costs in private mobility. The total estimated annual emission reductions amount to 23.4 $ktCO_2e$.

The full implementation potential of the prioritized mitigation measures would mobilize $220.6 million of private sector investments by 2030, leading to an average $15.13 million of annual revenues/savings, while noting that electric cars show a general negative return on investment compared to baseline costs. Total renewable electricity produced is estimated at 81 GWh/year in 2030, and potential cumulative energy savings are estimated at 97 GWh/year. The total expected emission reductions are 174.6 $ktCO_2e$ per year.

The selected mitigation measures can effectively reduce the NDC finance gap. Private sector investments in solar PV and solar water heaters could cover almost 20% of the existing gap for renewable energy. Private investments could cover more than 33% of the finance gap for energy efficiency and eliminate and indeed reverse the finance gap identified in the NDC for the transport sector.

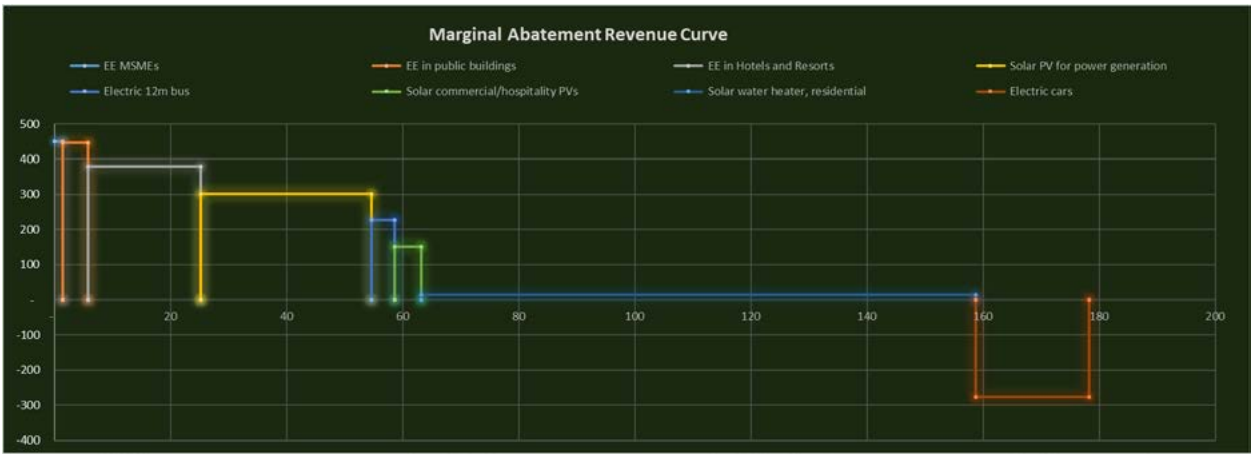
Table 1. Summary of potential mitigation investments and NDC finance gap reduction

Action	Estimated gap (incl. unfunded activities)	Finance Gap in %	Estimated private sector contribution potential	Residual funding gap
Renewable energy	459,036,410	100%	88,900,000	80.7%
Energy efficiency (electricity system and consumption)	87,062,747	94%	29,100,000	69.8%
Energy in the transport sector	14,962,000	21%	102,600,000	-123%

The figure below provides a visual overview of the Marginal Abatement Revenue Curve (MARC) for all mitigation measures. From the MARC it can be deducted that energy efficiency measures in buildings are the measures with greatest positive returns for each tCO_2e reduced.

1 The size of the dataset used in the analysis of energy efficiency measures in buildings is quite limited. There is therefore a high degree of uncertainty as to its ability to appropriately represent the Belizean building stock. Buildings are complex systems and appropriate energy efficiency measures are very case-specific. Investment decisions must therefore be made based on a thorough analysis for each building.

Figure 1. MARC for all selected mitigation options



Solar water heaters are the option with the highest GHG mitigation potential, given the number of potential applications, although the return on the investment is modest. All solar PV options carry positive returns on the investment. Electric cars are the only option that shows additional costs, while having a considerable GHG emission reduction potential given the large numbers of private vehicles that could potentially be introduced[2].

Private sector investment potential in adaptation measures

All analysed adaptation measures have been documented as capable of producing positive returns on investments[3]. The investments that can be mobilized for the contribution to NDC targets through the introduction of climate resilient crop varieties and diversification from monoculture to multiple crops are estimated at $2.72 million by 2030.

Investments in water management practices are estimated at $37 million by 2030. Insurance could mobilize $624,000 per year and cumulatively $3,120,000 to 2030 (5 years). For livestock, investments could amount to $255,000 USD for electric fencing, which has been prioritized for the short term (until 2030), and would enable intensive rotational grazing practices, with improved feed availability during dry periods. Total investments in adaptation measures would amount to approximately $43 million.

The investments in adaptation measures would see the investment gap in climate-smart agriculture (including insurance) more than halved from 63% to 26%. Electric fencing for livestock represents the smallest contribution (2.55%) and only slightly reduces the finance gap.

Table 2. Summary of potential adaptation investments NDC finance gap reduction

Action	Estimated total cost to meet target	Estimated gap (incl. unfunded activities)	Finance Gap in %	Estimated private sector contribution potential	Residual funding gap
Climate-smart agriculture	113,474,000	72,000,000	63%	42,840,000	26%
Sustainable crop production & livestock management	41,306,164	10,000,000	24%	255,000	24%

2 There is a degree of uncertainty as to the results and implementation potential, especially as regards the extensive implementation potential set for solar water heaters and electric cars.

3 The proposed adaptation practices and their benefits are very specific to contexts and farms, and hard to quantify with a reasonable level of certainty. While there is a reasonable degree of certainty regarding the costs of implementation, there is a high degree of uncertainty regarding farm benefits and return on investment. The analysis has therefore only aggregated investment costs, while presenting ranges and variable values for benefits in the respective sections.

Improving the financial offer and strategies for capitalization

There are three main instruments identified that should be offered in Belize to overcome the investment challenges related to the accessibility and cost of finance:

1. Concessional loans with lower interest rates to lower the cost of finance
2. Concessional loans with longer grace periods to allow time for farms' productivity to improve
3. Provision of guarantees to enable access to finance

Belize should continue to leverage existing relations with bilateral and multilateral donors and Development Finance Institutions (DFIs), while pursuing new opportunities offered by bilateral and multilateral initiatives aligned with the prioritized private sector measures.

The government of Belize should support the Development Finance Corporation's (DFC) and the Social Investment Fund's (SIF) efforts in seeking accreditation by the Green Climate Fund (GCF). The DFC's accreditation in particular would enable direct access to a variety of financial instruments with high concessionality conditions, enabling DFC to offer on-lending and/or blending for loans, equity and/or guarantees at a lower cost than is currently possible through intermediaries. In addition to GCF accreditation, the DFC and SIF should pursue fundraising efforts with other sources, with the explicit aim of funding climate priorities.

The Government of Belize should aim to establish a national fund/Trust that could provide low-cost debt for investments in climate action. Such a fund/Trust could initially be capitalized through Government funds and international support providers, including GCF through DFC direct access. The fund should ideally be revolving and self-sustaining, recycling capital as loans are repaid. The fund/Trust could offer:

- equity financing for large-scale climate projects capitalized by e.g. impact funds or even venture capitalists looking for both financial returns and climate impact.
- concessional loans for medium-sized projects, managed by local commercial banks with co-financing from the Fund/Trust.
- Guarantees to support higher-risk projects/lenders which lack collateral, blending concessional capital from international climate funds/donors to de-risk investments for local financial institutions (banks and credit unions)

The Fund could also provide a centralized architecture for investments channelled from the large variety of climate-related projects and programmes implemented in Belize which provide some form of support for financing activities in the private sector.

The government should strive to establish a credit guarantee mechanism, ideally managed through the proposed fund, offering guarantees to local banks and credit unions for loans to finance private sector investments in climate action. The guarantee mechanism could be capitalized by international donors, ideally backed by the government. The guarantee mechanism could be self-sustaining, with a fee structure covering administration costs.

Enhancing capacities, formalization and financial literacy

The high degree of informality in the private sector in Belize is a problem. Many businesses, being informal MSMEs, lack the records of cash flows and assets on which to assess their historical health and performance and as a result are not able to access finance from financial institutions. In addition, many farmers and businesses are not fully aware of the benefits of the prioritized climate measures and lack the capacity to implement them.

The Government of Belize should design new climate projects and leverage existing ones for a variety of capacity building activities.

Enhancing the formalization and improving the financial literacy of the private sector

The Government of Belize should leverage past efforts by the Belize Trade & Investment Development Service (Beltraide) and the Belize Chamber of Commerce and industry (BCCI), and aim to establish a programme to enhance the formalization of the private sector, especially for micro and small enterprises and enhance the business related capacities for bookkeeping, financial literacy of private enterprises and capacities to present investment proposals and interact with financial institutions.

Such a programme should include:

- Support for business formalization with guidance on registering businesses with the Companies Registry, Social Security Board (SSB), and Belize Tax Service.
- Hosting workshops on meeting legal and regulatory requirements, including business permits, tax obligations, and labour laws.
- Creation of partnerships with financial institutions to showcase tailored banking and financing options for newly formalized businesses, and guidance in submitting loan applications.
- Improvement of financial literacy and record-keeping with basic accounting training, introducing bookkeeping, cash flow management, and making financial state-

ments, ideally supported simple accounting software and mobile apps for financial tracking.
- Training on business management and growth strategies and developing solid business plans to attract finance and submit loan applications.

Enhance capacities to implement climate-smart agriculture practices

There are already a variety of projects which include training on climate-smart agriculture practices. Ideally these projects and new projects could contribute to the establishment of more permanent structures related to the prioritized measures by providing training through extension services and farmer field schools (FFS).

The Ministry of Agriculture agricultural extension service offices could serve as hubs for the development and implementation of FFS, and prepare farmers and livestock producers to make best use of the newly available financial support mechanisms. SIRDI could host sugar cane dedicated FFS, as is already the case in existing projects. FFS should be established in collaboration with first mover farms which have implemented climate-smart practices.

The following activities should be considered:

1. Develop FFS curriculum and deliver training in coordination with local associations and Research and Development Institutes (including local academic institutions) on climate-smart agriculture and livestock practices, and financial literacy training, to target population.
    - FFS programme focusing on climate-smart agriculture and livestock practices to be delivered by the agricultural research and development institutions.
    - FFS programme focusing on financial literacy training to be provided by Beltraide and BCCI in collaboration with DFC, credit unions and District Offices of the Departments of Agriculture.

2. Identify model farms to test and showcasing the benefits of the proposed measures and use model farms as part of farmer field school programmes
3. Provide extension services to assist farmers and livestock producers in selecting the most effective and efficient new set of practices (suitable for their specific contexts).

This would ensure that farmers and livestock producers are trained in climate-smart agriculture and livestock practices and have the needed capacities to implement and to engage with financial institutions to invest in the practices.

Developing capacities and knowledge base to promote energy efficiency

Energy efficiency in buildings is among the prioritized measures with the best return on investment, but energy efficiency is seldom implemented. Most business lack information and the knowledge base to select the most appropriate energy efficiency measures and mainly invest their available capital in their core business. In the public sector, the Ministry of Finance is the entity usually paying the electricity bills in the public sector, and most institutions do not have a direct incentive to invest in renewable energy and energy efficiency to lower their energy costs. Institutions that would like to invest are hindered by their annual budgets. These barriers could be overcome by expanding the requirements and implementation of energy audits to identify energy efficiency opportunities and procuring energy service under an energy performance contracting (EPC) shared savings scheme where Energy Service Companies (ESCO) would invest on clients' behalf and be repaid through the energy savings.

However, only one energy service provider in Belize currently has the capacity to both perform energy audits and implement energy efficiency measures, and none have the needed capacity or experience to invest on clients' behalf under an EPC. Belize Electricity Limited should have the size and capacity to take on the role of ESCO, investing on client's behalf, and being repaid through energy generated or saved. It already offers the installation of solar PV systems through a leasing model, and given its position could easily implement payment systems to expand the scope to household level third party investments in solar technologies such as solar water heaters and smaller PV installations.

ESCOs from the region could be approached for public procurement of energy efficiency projects. This could also be an effective strategy to attract foreign private sector investments, while ensuring long-term savings for the public sector and paving the way for private sector energy efficiency investments in public facilities. Public procurement could be structured and managed by the Energy Unit under the Ministry of Public Utilities, Energy, Logistics and E-Governance, which could perform or coordinate the procurement of energy audits and ESCO services in public buildings in coordination with the Procurement Unit under the Ministry of Finance.

As DFC has already embarked on promoting ESCO implementation frameworks and financing through its energy efficiency and renewable energy loans, it could, with government support, enhance awareness-raising efforts to mobilize start-ups and incite organizations to embark on EPC.

The government should also consider attracting international support to address capacity building needs for local professionals and staff involved in procurement, for them to master EPC contracts, as well as capacity building needs for energy auditors to enable them to conduct investment grade energy audits.

The following capacity building measures are required, ensuring that the financial institutions are able and willing to make use of the financial mechanism proposed, and end clients are willing and able to invest in renewable energy and energy efficiency measures:

- Review of public procurement rules to allow procurement of ESCO services
- Training of public officials on ESCO service procurement
- Development of contracting modalities for ESCO procurement for public sector
- Training of energy service providers on monitoring and verification to enhance ESCO capacities
- Training energy auditors to perform investment grade energy audits, requiring technical training in essential technologies
- Training of the finance sector and the staff on assessing loan requests to enhance technical capacity and assessing risks of renewable energy and energy efficiency projects.

Policies and regulation in support of private sector investments in climate action

Belize has strong policies related to the prioritized measures, embedded in climate targets and strategies, and aligned with sectoral plans.

Although the regulatory environment still lacks some central regulation that needs to be in place to allow for widespread investment in certain climate measures, there are regulatory changes and incentive structures that could further support private sector investments in climate action without putting an undue burden on the public budget.

Implement dual metering for all customers

Dual metering is a prerequisite for the implementation of feed-in-tariffs and grid connected decentralized renewable energy generation. By implementing dual metering as is already under development for commercial and large residential customers and pilot projects for targeted areas (Belize Electricity Limited, 2024) households and businesses will be able to sell surplus electricity generated to the grid, encouraging widespread installation of solar PV while lowering energy bills.

Streamline import levies on all components of solar PV systems

There are currently reduced import levies on solar PV systems, but these do not apply if batteries are imported separately, which might disincentivize battery replacement or expansion in conjunction with PV systems or sourcing the lowest cost supplier. There should therefore be a differentiation between duties on standard batteries and those on batteries for systems which could further support the roll-out of renewables.

Implement energy efficiency building codes

There are regional energy efficiency building codes, but they need to be written into law in Belize.

Expand energy efficiency labelling scheme and make it mandatory

There is a voluntary energy efficiency labelling scheme for selected appliances. Obligatory energy labelling for most appliances will guide consumer investments in energy efficiency.

Mandate energy audits of large energy consumers and implement energy audits in the public sector

The regulations do not mandate energy audits or implementation of energy efficiency measures, and there is therefore a very poor knowledge base on energy efficiency and related investment opportunities in Belize. Mandatory audits for large energy consumers and execution of audits in the public sector will enhance the knowledge base and identify investment opportunities which can be implemented by ESCOs.

Establish a public registry of authorized energy auditors and guidelines and requirements for energy audits.

Such a registry will enable the streamlining of audit methods and enhance trust in the audit results.

Update and formalize a registry of energy service providers and ESCOs.

DFC has a list of energy service providers and assessment of their capacities. The registry should be maintained and ideally transition to a public registry with formal accreditation to enhance trust in the energy service providers' and ESCOs' competencies.

Consider expanding the Road Service Permits.

Road Service Permits should be expanded to a period of 8 years to give private operators enough time to recover their investments in electric buses. Currently the government has attracted support from the international community to procure the first buses, but it might be necessary to make investments in public e-mobility attractive for private operators, to achieve full e-mobility in the future public transport sector.

Revise import duties on cars to make them dependent on fuel efficiency.

Electric cars are capital intensive and face competition from cheap used cars from Mexico and the US. Import duties should incorporate aspects of fuel efficiency. In addition to promoting e-mobility it would also lower emissions from transport by promoting more efficient combustion engine cars.

Establish and implement a national drainage and water management plan.

There are a variety of support initiatives for the agriculture sector in Belize, but the government of Belize should make a drainage and water management plan and invest in main drainage arteries and water storage solutions, to enable farm level investments in drainage and water management.

Explore regional insurance initiatives and make strategic alliances

The government should establish a clear policy on the provision of insurance products for farmers in Belize and use the experience from the region with parametric insurance, while strategically engaging with insurers, donors and supporting providers by subsidizing premiums.

Enhancing transparency and MRV of private climate finance

The government should leverage existing transparency efforts and engage with the national financial institutions for the application of a taxonomy for climate finance and reporting on climate-related investments to the national online system managed by the National Climate Change Office (NCCO). The data provided by the financial institutions could be coupled with data from the Statistical Institute of Belize, BEL and Department of Transport, which could provide insight into equity financed renewable energy, energy efficiency technologies and private e-mobility, allowing each type of climate measure that has been prioritized to be tracked, related investments estimated and progress against the overall targets of the NDC Private Sector Investment Strategy to be monitored.

Elisabeth Stanzer, Pixabay

1 Introduction

Belize is a Caribbean country situated in Central America. The territory has a land area of approx. 22,967 km^2 (95% mainland and 5% small islands or cayes), including 280 km of coastland. Geographically, Belize exhibits a varied terrain, encompassing verdant rainforests and the world's second-largest barrier reef. The nation experiences a tropical climate typified by a wet season spanning June to November and a dry season from November to April.

Belize is an upper middle-income country (World Bank, 2023), with an estimated population of approx. 441,000 (2022), of which, more than 50% are below the age of 24 (Statistical Institute of Belize, 2023). The nation's demographic composition is characterized by a diverse demographic landscape and an intricate interplay of ethnicities, including Creole, Maya, Garifuna, Mestizo, among others, contributing to a multifaceted cultural milieu. Despite its income status, an estimated 52% of the population is affected by poverty, mostly in rural areas and most predominantly in the Toledo district (2018) (Statistical Institute of Belize, 2023).

The private sector accounts for approximately two-thirds of the economy of Belize. The Belizean economy is underpinned by agriculture and tourism, sectors that in addition to renewable energy, are the ones related to climate action that traditionally have attracted private sector investments in Belize (Commonwealth Secretariat, 2021). Agriculture forms a vital economic driver, with key export commodities such as sugar, citrus, and bananas. The tourism sector, reliant on the country's natural assets, assumes a substantial role in the national GDP.

Concurrently, the nation grapples with the diversification of its economic base and the facilitation of climate-oriented financing mechanisms. The country has demonstrated its commitment to climate action by acceding to the Paris Agreement in 2016. Subsequent government initiatives aim to curtail greenhouse gas (GHG) emissions, elevate the penetration of renewable energy sources, and promote judicious land management practices to mitigate climate change effects.

Belize is classified as a Small Island Development State and is highly vulnerable to climate change and related disasters. The country is already being heavily affected by the current changes in climate, including increased risks and intensity of floods, droughts, hurricanes, sea level rise, coral bleaching, and coastal erosion. Building climate change resilience is therefore a high priority for Belize, to reduce vulnerability, boost growth and protect its population. Investments in infrastructure resilience to storm and sea level rise, early warning systems, and coastal and broad ecosystem conservation can help build resilience, especially in tourism, agriculture, and aquaculture (IMF, 2023). Belize plans to reduce GHG emissions by inter alia protecting and restoring forests, mangroves, and seagrass ecosystems, expanding renewable energy generation, reducing the use of conventional transport fuel, and enhancing energy efficiency (Government of Belize, 2021). These objectives are embedded in the country's Nationally Determined Contribution (NDC) to the Paris Agreement for the period between 2021 and 2030. However, there are still significant financing gaps to reaching the rate of implementation of climate actions needed to achieve the national NDC targets.

1.1 The role of the Belizean private sector in addressing climate change

Belize's updated NDC (2021) provides an ambitious target estimating a cumulative emission reduction total across all sectors of 5,647 ktCO_2e between 2021 and 2030 compared to a business-as-usual (BAU) scenario. The NDC also includes adaptation actions in key economic sectors and supporting systems, to build resilience and adapt to the already occurring impacts of climate change and thus minimizing loss and damage (Government of Belize, 2021).

The total cost estimate for the implementation of the proposed NDC actions is $1,712 million, and the expected funding gap is estimated at $1,383 million, approximately 81% of the required investments, although $776 million are expected to be recovered in the energy and waste sectors through fees to the final users, still leaving a funding gap of more than 35% of the required investments. Private sector investments required are estimated at $172 million, corresponding to 10% of the total finance required (Government of Belize; NDC Partnership, 2021).

Belize's private sector climate-related investments represent the smallest share of climate investment sources in the country. The Climate Finance Landscape Report of Belize 2015-2019 shows that out of a total of $227.4 million invested between 2015 and 2019, only 3.09% came from private sector sources, amounting to approximately $7 million (2015–2019) (Commonwealth Secretariat, 2021). There is therefore a need to facilitate the scaling up of private investments in climate action in Belize to achieve the national climate ambitions for low carbon and climate resilient development. This is recognized by the government of Belize through the identification of one of the core strategic directions in its Climate Finance Strategy 2016-2026 as "*Promoting Private Sector Investment in Climate actions*".

Given Belize's current credit rating (Caa1, Moody's 10/2025), international investors are expected to require a very considerable return on an investment if they consider an investment at all. Given the expected risk premium that would be required by international investors, the focus should be on de-risking instruments for international investors, and especially on incentivizing domestic private investments.

Belize's economy and private sector consist mostly of Micro, Small and Medium-Sized Enterprises (MSMEs), accounting for approximately 90% of established businesses, 45% of GDP and providing up to 50% of private sector employment (Beltraide, 2021). The high cost of finance is recognized as having negative implications for private sector investments in Belize and as being one of the main barriers to private sector investments in climate action (Commonwealth Secretariat, 2021).

However, the private sector faces barriers to enhancing investments in climate action. At the macro level, Belize's relatively small economy and population constitute barriers in terms of scale. High national debt levels and high costs of debt also have negative impacts on the levels of financial access for climate-related investments. MSMEs, face barriers associated with the lack of access to finance and the cost of finance when it is accessible (Almendarez, 2023). As a result, MSMEs are in dire need of financial and technical support.

25% of the country's 10,000 registered farmers work on farms less than 5 acres (2 Ha), 57% on farms less than 20 acres (8 Ha) and only one-third of farmers have formal ownership of the land they cultivate. 30% work on government leased land, 7% on rented land, and the remaining have access to land through informal or communal arrangements. The limited access to collateral through formal ownership or the limits set by the size of land results in low access to credit for investment in adaptation practices, such as the introduction of technologies, practices and infrastructure, which could enhance farmers' resilience.

Another important barrier is the lack of access to insurance products that can help farmers and companies to recover from climate shocks and extreme events.

1.2 Purpose and scope of the strategy

Considering the existing gap in finance for climate action and the role of the private sector and its investments for the achievement of the national climate targets, especially in relation to renewable energy, energy efficiency, tourism and agriculture, the NDC Private Sector Investment Strategy provides an integrated and strategic approach to improving private sector investments in climate action in Belize, with emphasis on MSMEs. This is done through a set of proposed actions:

- Securing additional sources of climate finance and funding from the international community to remove financing barriers and leverage national private sector investments,
- The creation of financial support mechanisms for incentivizing and facilitating private sector investments in climate action,
- Public sector policy and regulatory development to facilitate private sector investments in climate action,
- The development of public institutions', private enterprises' and farmers' capacities to attract commercial and concessional debt finance and donor investments.

The vision of the NDC Private Sector Investment Strategy is a Belize where enabling environments are created to ensure that Belize's private sector is a major driving force in creating a climate-resilient, low-carbon economy by 2030 and beyond, empowering sustainable development, fostering innovation, and catalysing investments that align with the country's NDC targets. By mobilizing capital, advancing green technologies, and promoting inclusive partnerships, Belize will accelerate the transition to a future in which economic growth, environmental stewardship, and social well-being are harmoniously balanced, positioning Belize as a regional leader in climate action and sustainable development.

The recommendations provided in the Private Sector Investment Strategy aim at leveraging blended finance for climate investments and mobilizing additional private sector investments by 2030, and contribute to the following goals:

- Mobilizing $263,695,000 of private sector investments by 2030
- Reducing the current NDC finance gap by 16% (from 81% to 65%) with enhanced private sector contribution by 2030
- Increasing the private sector contribution to climate finance in Belize from 3.09% (compared to the 2015-2019 baseline) to 15.4% by 2030.

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2. Situation Analysis

2.1 Climate risks and vulnerabilities and identification of adaptation priorities

According to the Climate Risk Index Belize ranks as the 33rd country most affected by climate change in the world for the period 2000–2019. (Eckstein, Künzel, & Schäfer, 2021), and incurs annual losses of close to 4% of GDP due to natural disasters (Government of Belize, 2021). Impacts experienced in the country to date include sustained droughts, floods, increased coastal erosion and changing precipitation patterns. Combined, these impacts are having significant negative effects on environmental, physical, social and economic systems within the country, and these negative effects are expected to increase.

Projected climate change impacts by 2100 include:

- Temperature increase of between 2°C and 4°C; average annual temperature in Belize has already shown a tendency to increase in the last few decades.
- A decrease in the length of the rainy season of between 7 and 8%.
- An increase in the length of the dry season of between 6 and 8%.
- A 20% increase in the intensity of rainfall in very short periods.

Other expected impacts are increased erosion and contamination of coastal areas, sea level rise, flooding and increase in the intensity and frequency of natural hazards such as hurricanes. These impacts are already materializing on the low-lying coastal zone and have significant negative consequences on a multitude of environmental, physical, social and economic systems in Belize. (Government of Belize, 2021). Economic impacts of recent extreme events include Hurricane Keith (2002) which inflicted economic losses of approximately 30% of GDP, Hurricane Dan (2007), which caused losses equivalent 7% of GDP (64% of which in the agricultural sector), and Hurricane Earl (2016), which caused a 1% decline of GDP decline and a contraction of almost 25% in the primary sector (Green Climate Fund, 2019).

2.1.1 Agriculture

The agricultural sector has already experienced losses in the magnitude of $232 million due to hurricanes and tropical storms between 2000 and 2016 (Green Climate Fund, 2019). In 2019 total rainfall was 1,325 mm versus the average 2,087 mm since the 60's. This drought resulted in agricultural losses of $38.5 million for Belizean farmers. Projections indicate that temperatures could rise by as much as 2.1°C by the 2050s, while average rainfall could decrease by 7- 10 % (World Bank, 2021). Production losses of between 10% and 20% are expected by 2100 (Green Climate Fund, 2019). The rural population, many of whom are subsistence farmers, and where the poor, marginalized and indigent population is mostly found, have little or no resources to recover from climate-related events. Single women in these groups, who are heads of households with few alternative sources of income are especially vulnerable.

Smallholder farmers are not only impacted by extreme events, but also by persistent and unpredictable seasonal variations. Drought following temperature rise and decrease in precipitation in the dry season poses a serious threat to agricultural productivity as smallholder farmers rely largely on regular precipitation. Sugar cane farming is also highly exposed to droughts, as it relies mainly on rainwater. These farmers have limited investment capacity, preventing them from investing adaptation measures that could enhance their resilience. (Green Climate Fund, 2019).

2.1.2 Fisheries and costal zones

The fisheries sector is under threat from warmer sea surface temperatures, ocean acidification, sea-level rise, and extreme weather events, which could lead to an annual loss of approximately $ 12.5 million per year, endanger food security and the livelihood of Belize's 3,500 licensed fishing operatives (Green Climate Fund, 2019). Aquaculture productivity will be particularly affected, leading to negative impacts on the domestic seafood market and increasing prices (National Climate Change Office, Ministry of Sustainable Development, Climate Change and Disaster Risk Management, 2022). Loss of land and mangroves due to rising sea levels are the primary causes affecting aquaculture production.

Another focus for Belize's adaptation activities relates to costal management, especially mangrove restoration to protect physical assets from flooding, while providing essential habitats for fisheries. Mangroves provide natural protection against coastal erosion and storm surges, while acting as important nurseries and protecting biodiversity, thus also having an impact on the fisheries sector. Mangrove conservation and restoration can therefore not only enhance resilience but generally decrease the economic vulnerability of the coastal areas and their population. In addition, mangrove restoration also carries mitigation co-benefits.

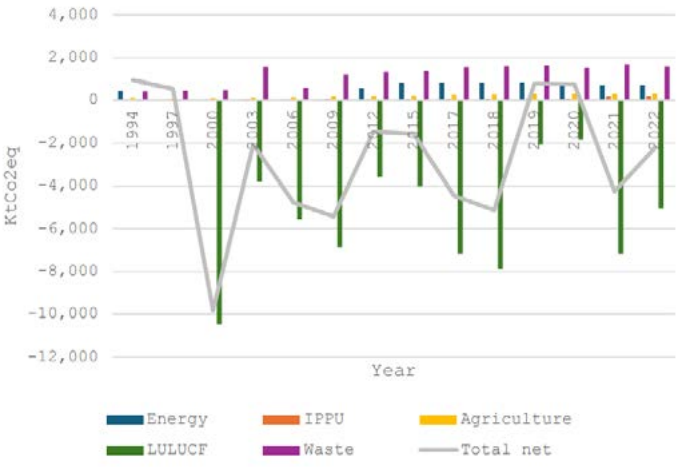
The importance of costal ecosystems and marine resources is highlighted by the fact that Belize has established a

Ministry of Blue Economy and Civil Aviation and has a dedicated Blue Economy Unit. Belize has established frameworks to conserve coastal habitats and has an Integrated Coastal Zone Management (ICZM) Plan (2016), incorporating ecosystem services and integrated risk analysis into decision-making (Government of Belize, 2021). While Belize is expanding on its conservation efforts and policies, to decrease pressure on the marine ecosystem, which will ensure the sustainability of the sector, there is a need for measures to be in place that can enhance the resilience of the sector to the expected impacts of climate change, while also support the shifting of livelihoods, practices and sources of income for people reliant on fisheries. This includes access to insurance products to protect the industry against climate-related shocks, and also the creation of alternative sources of income through practices such as aquaponics. As for Coastal Zone Management, Ecosystem-based Adaptation practices involving the conservation and restoration of mangroves could also provide an excellent opportunity to enhance resilience in the sector, while contributing to GHG mitigation.

2.1.3 Tourism

The tourism industry in Belize is largely nature based, and therefore dependent on the country's unique natural resources. In addition to the threat to the natural habitats that the tourism industry relies upon, climate change also poses a threat to the physical properties, which are often located in the proximity of the natural habitats at risk. The industry is highly affected by extreme weather events, flooding, saltwater intrusion and erosion. The combined effects of reduced tourism demand, loss of infrastructure, loss of beaches and the loss of the barrier reef is estimated to lead to reduced income of approximately $ 24 million per year (Green Climate Fund, 2019). In addition, the increase in vector-borne diseases in the region, such as the rise of Chikungunya and Zika virus, which may be linked to the changing climate, not only has negative effects on the health of the local population, but also creates a significant negative impact on the choice of travel destinations (Green Climate Fund, 2019).

Figure 1. Total net GHG by sector (kt CO_2 eq), 1994 -2022
(National Climate Change Office, 2024)



2.2 GHG emission profile and identification of mitigation priorities

The GHG emission profile of Belize has historically been characterized by its being a net carbon sink. This is mainly due to the large forest ecosystem, covering over 60% of the country's surface, allowing for substantial carbon sequestration. The energy sector has historically been the highest source of emissions. The second largest emitting sector was Agriculture, followed by Industrial Processes and Product Use and Waste (IPPU). However, the most recent GHG inventory submitted on 31 December 2024 by Belize to the UNFCCC, shows a different picture. The availability and use of new datasets, especially for wastewater treatment and discharge, shows that the leading producer of GHG emissions is actually the Waste sector, followed by Energy, Agriculture and IPPU. Net emissions are still negative, mainly due to emission removals from Belize's forests.

The Effluent Limitations Regulations, in force since 1996, control effluent discharges into inland waters and the marine environment, setting licensing conditions to improve industrial effluent treatment. Amendments in August 2009 addressed domestic wastewater treatment, enhanced effluent standards, and categorized sensitive waters. Despite the recent GHG inventory showing that wastewater treatment and discharge is the largest source of GHG emissions in Belize, current information does not allow the potential attractiveness of investment in wastewater actions to be assessed.

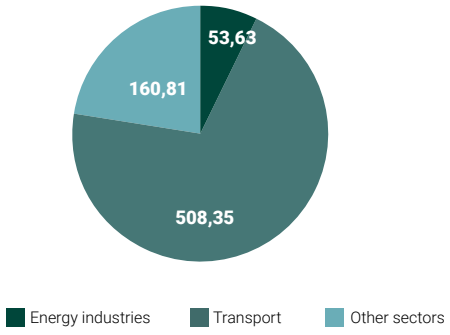
Given the novelty of the findings of the National Inventory Document and lack of formal registration or estimation of liquid waste generated by the industrial sector, the strategy has emphasized GHG emission hot spots identified in the series of earlier GHG inventories, identifying the Energy Sector as the priority sector in terms of GHG mitigation. It has also been recognized that even though wastewater treatment and discharge is the largest emitting sub-sector, scope for private sector investments in this sub-sector is currently limited. Investments in climate action in the sub-sector should be primarily driven by public investments in infrastructure, with the potential for further leverage through regulatory change, steering private sector investments towards wastewater treatment technologies.

During stakeholder consultations, the sectors identified as priority for private sector investments in climate action were Energy and Agriculture.

2.2.1 Energy & Transport sector

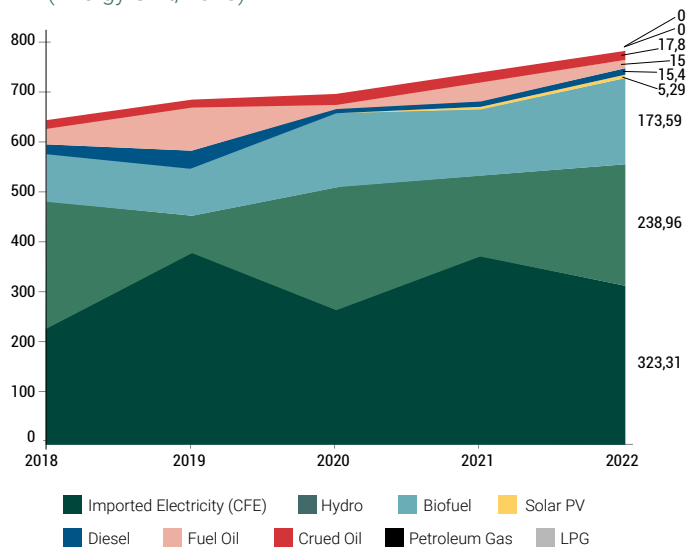
The Energy sector, including electricity generation and transport, accounts for approximately 10% of Belize's GHG emissions. The transport sector is the largest contributor, accounting for approximately 70% of GHG emissions within the Energy sector. Emissions from Energy industries are relatively low (approximately 7.4% of emissions in the Energy sector), largely due to the high share of renewable energy in the electricity generated in Belize.

Figure 2. GHG missions in the Energy sector in kt CO_2e
(National Climate Change Office, 2024)



Although, Belize imports a large share of its electricity from Mexico, which has a more carbon intensive electricity mix, and emissions related to electricity generation which is being imported is not included in the national GHG inventory. Therefore, increasing renewable electricity generation would further help Belize mitigate GHG emissions.

Figure 3 Historical electricity generation by fuel type
(Energy Unit, 2023)

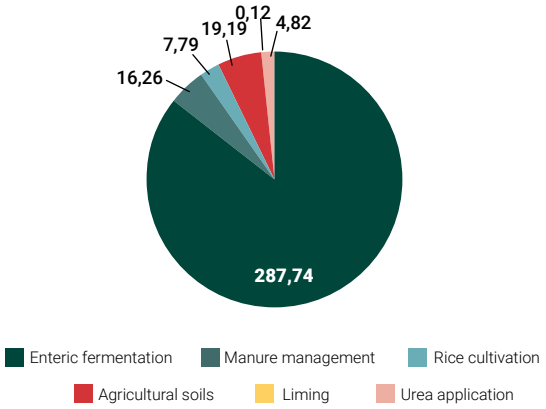


The steep decrease in renewable energy generation and the related increase in electricity imports in 2019, was triggered by severe drought conditions, and consequently by a sharp decrease in hydropower and biomass (bagasse) electricity generation (Energy Unit, Ministry of Public Utilities, Energy & Logistics, 2021), highlighting the interconnection between climate impacts, energy security and GHG emissions. It also highlights the need for further diversification of renewable energy generation as an adaptation measure to increase the resilience of the power sector.

2.2.2 Agriculture, Forestry and Land Use

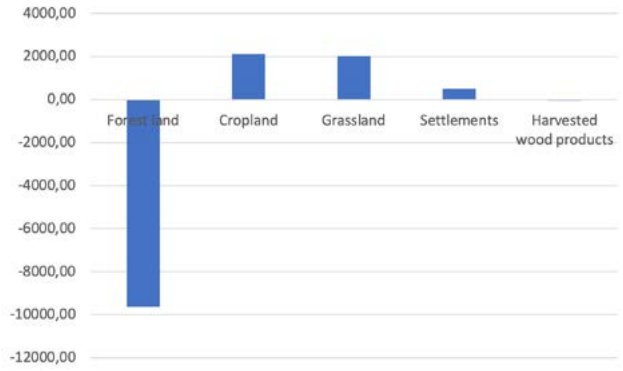
Enteric fermentation makes up the bulk of GHG emissions in the Agriculture sector, and has seen a steady increase over past years, showing the importance of addressing livestock emissions from a mitigation perspective.

Figure 4 GHG missions in the Agriculture sector in kt CO_2e
(National Climate Change Office, 2024)



The emissions from the agriculture sector should be considered alongside the large natural areas still preserved in Belize, housing large carbon sinks in the form of tropical forests. Belize has extensive and unique tropical forests, pivotal to global biodiversity, housing multiple species. With the highest forest cover in Central America and the Caribbean, forest conservation has historically been a top priority, evident through an elaborate protected areas system. Approximately 44% of Belize's land and sea areas are safeguarded, encompassing diverse management structures, such as terrestrial reserves, marine reserves, and officially recognized private conservation efforts. However, these invaluable forests face escalating pressures from land conversion, degradation activities, and threats to biodiversity from unsustainable practices and climate-related impacts. There is therefore considerable scope for exploring opportunities related to silvo-pastoral practices, ensuring that the livestock sector contributes to forest conservation and improving the carbon sequestration capacities of Belize.

Figure 5 Emissions in the LULUCF sector in $ktCO_2e$
(National Climate Change Office, 2024)



2.3 NDC targets – ambition and relevant sectors (mitigation and adaptation)

Belize's updated NDC has set emission avoidance targets against a BAU baseline projected to 2030. Emission reductions against BAU across all sectors amount to a total of 5,647 $KtCO_2e$ between 2021 and 2030. The NDC also sets adaptation priority areas and actions. The private sector and related investments can be expected to play a role towards most of the NDC targets summarized above, but not all actions contributing to these targets are expected to require private sector investment. Among the sectoral NDC targets, the following mitigation and adaptation actions relevant for private sector investments have been identified.

Land use change and forestry:

- Assess potential to reduce emissions related to fuelwood collection, which could be related to investments in alternative cooking technologies.
- Promote public measures and partnerships with private landowners, local communities, and other relevant stakeholders to encourage mangrove preservation and reduce mangrove loss by 2025

Agriculture:

- Improve the management of 80,000 hectares of the agro-landscape through good agricultural and silvo-pastoral practices, which could be related to private investments in sustainable agricultural practices by farmers.
- Mobilize infrastructure investments for Climate-Smart Agriculture (CSA)
- Establish a financing facility for CSA investments through local financial institutions.
- Promote the reduction of agricultural GHG emissions through implementing effective livestock management, which could be related to private investments in improved livestock practices by farmers.
- Improve both crop and livestock husbandry practices, increase access to drought tolerant crops and livestock breeds.
- Adopt better soil and water management practices, including the use of biochar and improved (solar-powered) irrigation systems.
- Explore crop and commodity insurance schemes and pilot insurance product.

Energy:

- Implementation of hydropower, solar, wind and biomass, including in the tourism sector, which could be related to investments in renewable energy power generation by households and the private sector and the development of a market for energy efficiency services.
- Install 40 MW utility-scale solar power by 2025.
- Expand the use of biomass, including bagasse, for electricity generation.

Fisheries:

- Encourage the development of the sector through value adding and diversification in fish species through research partnerships, private sector engagement, pilot programmes and extended support services.
- Explore the development of alternative livelihood plans for people in the fishing industry and their households, who are affected by the establishment of restricted fishing measures.

Tourism:

- Promote energy efficient technologies in the tourism sector, namely by the increase of appliance efficiency (e.g. refrigeration, cooling and lighting) in tourism buildings (hotels, hostels, etc.), and, which could be related to private investments in efficient technologies.
- Promote the development of a market for energy efficiency services.
- Promote the retrofitting of buildings, especially accommodating passive construction practices and improvements to the building envelope.
- Promote local practices in tourism industry that support climate resilience and adaptation.

Transport:

- Increase the uptake of electric vehicles in private transport fleets, accompanied by a network of renewables-sourced charging stations.
- Develop mobility plans and means for implementation for transport of people and goods, including last mile logistics.

2.4 NDC implementation finance gap

The estimated resources required to meet Belize's NDC mitigation and adaptation targets, range between approx. $1,708 million as communicated in Belize's first Biennial Transparency Report (BTR) to the UNFCCC (National Climate Change Office, 2024) and $1,712 million, as described in the Resource requirements report for Belize's NDC (Government of Belize; NDC Partnership, 2021). The sources agree that there is a funding gap of 81%. While the BTR identifies waste management, fisheries and the transport as underserved NDC actions with a large funding and resource gap, the Resource requirements report specifically provides information on a Finance gap of almost 100% for renewable energy, followed by waste management (97%), mangrove protection and restoration (95%), energy efficiency (94%). These are also among the action areas requiring most resources. Climate-smart agriculture is also among these, with a relatively large funding gap.

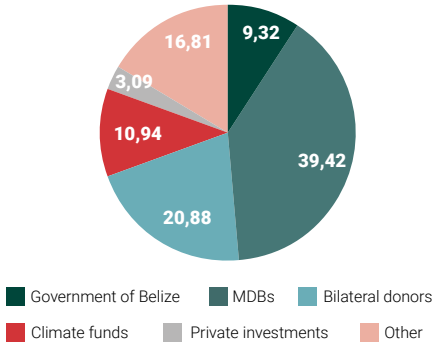
Table 3 NDC Finance Gap by Action

Action	Estimated total cost to meet target	Estimated gap (incl. unfunded activities)	Finance Gap in %
Renewable energy	460,050,610	459,036,410	100%
Mangrove protection and reforestation	330,798,801	315,798,801	95%
Waste Management	327,400,000	317,200,000	97%
Climate-smart agriculture	113,474,000	72,000,000	63%
Energy efficiency (electricity system and consumption)	93,068,247	87,062,747	94%
Land use, human settlements and infrastructure	82,747,969	25,050,000	30%
Energy in the transport sector	71,000,000	14,962,000	21%
Reforestation, forest protection and sustainable forest management	67,749,000	29,883,872	44%
Sustainable crop production & livestock management	41,306,164	10,000,000	24%
Coastal and marine resources	35,684,740	11,750,000	33%
Tourism	35,554,715	16,950,000	48%
Water	25,117,112	11,005,112	44%
Fisheries and aquaculture	12,978,000	750,000	6%
Human health	12,571,575	8,271,575	66%
Blue carbon market	2,641,510	2,614,510	99%
Fuel wood consumption	250,000	250,000	100%
Total	1,712,392,443	1,382,585,027	81%

Source: Adapted from the Updated NDC (Government of Belize, 2021) and Resource requirements report for Belize's NDC (Government of Belize; NDC Partnership, 2021).

Belize's private sector climate-related investments represent the smallest share of climate investment sources in the country. The Climate Finance Landscape Report of Belize 2015-2019 shows that out of a total of $227.4 million invested between 2015 and 2019, only 3.09% came from private sector sources, mainly directed towards renewable energy and energy efficiency initiatives. This stands in sharp contrast to the general distribution of climate finance between public and private sources at the global level, where normally private sector investments, and especially for renewable energy, make up the largest share of climate investments (Climate Policy Initiative, 2022). There should therefore be scope for exploring opportunities to enhance private sector investments in renewable energy and energy efficiency.

Figure 6. Climate investment sources in Belize (2015–2019) (Commonwealth Secretariat, 2021)



2.5 Widening the scope for private sector investments to close the NDC finance gap

The government of Belize has recognized the importance of private sector engagement for enhancing climate finance flows towards climate action, and ***Promoting Private Sector Investments in climate actions*** is one of the core strategic directions in its Climate Finance Strategy 2016-2026. However, the private sector faces some barriers for enhanced investments in climate action.

The relatively small size of Belize's economy and population, and the country's relatively high debt levels and high costs of debt constitute barriers in terms of scale and accessibility to finance for climate-related investments. MSMEs account for approximately 90% of all businesses in Belize and employ about 50% of the work force. Among MSMEs, micro enterprises represent more than 87% of all businesses. MSMEs lack access to finance, and face high cost of finance when accessible, and there are limited micro-financing options for MSMEs (Almendarez, 2023).

Of all business owners who are confident about securing financing from banks, only 14.4% actually have their loan applications approved. This is very much aligned with success rates, 21% for small enterprises and as low as 9% for micro enterprises (Beltraide, 2021). Commercial loans are comparatively high-cost and usually come with prohibitive collateral requirements considering the needed capital investments in many of the prioritized climate measures, and tend to only accept immovable assets (e.g. buildings and property). Approximately 50% of MSMEs have access to less than $12,500 in movable and immovable assets to use as collateral, which hinders their access to loans from national financial institutions (Beltraide, 2021).

The Government of Belize and Belizean institutions are aware of the need to support the private sector and MSMEs in particular, and there are ongoing programmes, mostly grant based aiming at facilitating access to finance for MSMEs. The country has passed the Credit Reporting Act and approved the introduction of a Bill in 2022 for the establishment of a credit bureau and is working towards the establishment of a collateral registry (Ministry of Agriculture, Forestry, Fisheries, the Environment, Sustainable Development and Immigration, 2020).

In addition, there is a gender aspect related to MSMEs. Male owners represent 67.6% and 66.7% respectively for small and medium-sized enterprises, while female ownership is well represented in micro-enterprises (55.2%). This also contributes to women having a lower approval rate on their loan applications compared to males (Beltraide, 2021). There is therefore a need to facilitate access to concessional finance to MSMEs, potentially backed by guarantees to de-risk investments for the financial institutions, especially with a view at facilitating access and business growth to women-led enterprises.

MSMEs in Belize are aware that their businesses are vulnerable to climate change and are willing to implement climate adaption measures (Nuanda Consulting, 2021). However, they are in dire need of financial and technical support. 25% of the country's 10,000 registered farmers work on farms less than 5 acres (2 Ha), 57% on farms less than 20 acres (8 Ha) and only one-third of farmers have formal ownership of the land they cultivate. 30% work on government leased land, 7% on rented land, and the remaining have access to land through informal or communal arrangements. The limited access to collateral through formal ownership or the limits set by the size of land results in low access to credit for investment in adaptation practices which could enhance farmers' resilience.

The lack of access to insurance products that can help farmers and companies to recover from climate shocks and extreme events is a barrier to the sustainability of the agriculture sector and the Belizean economy. The availability and use of insurance could also be a powerful instrument to de-risk credit-based investments. It should therefore be a priority to explore how Belizean farmers and businesses can be enabled to invest in their own resilience not only through enhanced access to credit and micro-credit for the introduction of technologies, practices and infrastructure, but also through the availability of insurance products.

2.6 National Financial Institutions

DFC is the bank in Belize which offers the broadest selection of green financial products, including concessional green credit lines for Sustainable Energy Loans (renewable energy and energy efficiency) and Climate Resilient Cattle Loans. DFC also provides a wide array of other loans, including agriculture loans.

SIF provides a matching grant for loans provided by local financial institutions for investments in CSA practices, including among other water management practices, crop diversification, and GHG mitigation activities, including energy and water efficiency, alternative energy sources and waste and crop loss reductions. The matching grant can be up to 60% to $16,000 for smallholder farmers' investments in CSA practices 30% up to $30,000 for Medium and Large Farmers and/or Farmers Organizations.

Commercial banks generally do not have a clear climate investment focus, nor do they track their climate-related investments, although climate change forms part of the business considerations, especially in the aspects of risks. One of the commercial banks in Belize (Belize Bank) has accessed credit risk abatement instruments from the international community (CARICOM Development Fund's Credit Risk Abatement Facility) to expand access to financing for SMEs in renewable energy and energy efficiency. Although relevant climate investments in e.g. energy technologies, irrigation for agriculture etc. are not normally treated as dedicated climate investments, in some cases they form part of the business proposition.

One of the banks consulted, which is primarily public owned, has a dedicated focus on SMEs and aims to fill the observed financing gaps for SMEs. It also aims to provide preferential rates and fees for climate-related investments over time and makes sure not to engage in investments in companies that have practices that are harmful to the environment. However, the bank does not receive many requests for investments in climate-related projects.

In addition to commercial banks, credit unions are among the largest financial institutions in the country, and the two largest are second only to Belize Bank Ltd in terms of volume of assets under management. They provide a wide array of banking services to their customers, ranging from consumer loans to mortgages, both secured and unsecured by collateral. Loans to businesses are targeted at all sectors of the Belizean economy, with the main volume flowing towards agriculture and fisheries. These two sectors in particular have benefited from access to green loans that some credit unions have been offering over the past few years.
The scope, size and clientele of credit unions vary, and so do the products that they offer. Some have a dedicated geographical coverage while others offer targeted credit products e.g. for sugar cane farmers. They have the capacity to offer smaller credits and might be more flexible in terms of collateral. While the average size for commercial loans provided by banks is around $55,600, Credit Unions' average commercial loans are approximately $14,600 (Beltraide, 2021). In addition, women make up an estimated 60 per cent of credit union membership. Credit unions will therefore be important stakeholders to consult and engage for enhancing access to finance to MSMEs in particular and for improving access to finance for women.

The national financial institutions express a lack of capacities to assess projects that involve new technologies, which they are not familiar with and are not willing to venture into projects where the perceived risks are high. Capacity building in the financial sector will thus also be needed.

In general, liquidity is not an issue for the financial institutions. The credit unions have received support from the IDB, among other climate funds, to develop EcoMicro labs, loan programmes which offered softer terms to micro and small enterprises. Atlantic Bank has also received support for on-lending through IDB for green and development related projects. DFC receives credit lines from international and regional development finance institutions. However, most financial institutions have difficulties finding projects with an acceptable risk profile.

2.7 Priority climate actions in need of enhanced private sector investments

Even though the Belizean public is very sensitized about the challenges related to climate change, the need for investment in climate mitigation and adaptation is still a novelty for many Belizean enterprises, as are the related opportunities. The few larger and export-oriented enterprises are aware of the need for enhanced climate action, but the majority of businesses (MSMEs) lack awareness of benefits and opportunities related to investments in mitigation and adaptation, and do not have the financial strength for the needed investments in climate technologies and practices. Extensive stakeholder consultations were held with public and private sector stakeholders and representatives to identify and prioritize climate actions in need of additional support and strategically placed for leveraging additional private sector investments. A list of consulted stakeholders is available in Annex I.

2.7.1 Renewable energy and energy efficiency

Belize boasts a high potential for solar energy adoption and stands to gain substantially from its harnessing. The country enjoys abundant solar irradiance year-round, with an average 1500 kWh/kWp solar output (Global Solar Atlas, 2023). This makes it a prime candidate for solar energy generation. With a small yet dispersed population and vast tracts of undeveloped land, solar energy can provide an efficient, sustainable, and decentralized power source, reducing reliance on imported fossil fuels. Solar PV costs have known a decreasing

trend over the last decade, as explained by the International Energy Agency in its yearly report IEA (International Energy Agency, 2022). In the context of volatile international energy markets, solar appears as a viable alternative to fossil fuels, which still contribute a major part of the Belizean energy mix.

Solar technologies are of high priority and very relevant for private sector investments, especially for the tourism industry. Most of the electricity generation plants in Belize are Independent Power Producers (IPP) contracted through Power Purchasing Agreements (PPA) with Belize Electricity Limited (BEL) (~64% public ownership). The Belizean sugar industry is already utilizing sugar cane bagasse for power generation. Belize Sugar Industries (BSI) also has a pipeline of potential investments in climate-related measures (e.g. expanding the power generation capacity, transition to biodiesel for trucks, investing in solar energy and others). BEL's capital investment plan provides for the interconnection of at least 60MW utility scale solar power by 2028, with the first plan scheduled to be online by mid-2025 (Belize Electricity Limited, 2024). Thus, private sector investments already play a large role in the utility scale renewable power generation in the country, and there are already investments planned for large utility scale solar energy power generation.

There is not much publicly available information regarding energy efficiency potential in Belize. Existing studies show that there is a great energy efficiency potential in Belize, especially related to air conditioning and lighting (U4E, 2022). Analysis shows that efficient room air-conditioning could provide 26 GWh of electricity savings by 2030, corresponding to savings of $5.8 million in electricity bills and 9.2 kt CO_2e emission reductions. Energy-efficient lighting could provide 6.7 GWh of electricity savings by 2030, corresponding to savings of $1.5 million in electricity bills and 2.4 kt CO2e emission reductions[4]. Larger facilities, such as hotels, office buildings and other commercial facilities are identified as the primary target of energy efficiency measures. In smaller facilities (SMEs), between 60-80 % of the total energy costs are for A/C and inefficient cooling equipment.

Measures with room for additional private sector investments are identified at different levels:

- Small-scale household level solar technologies for localized electricity demand.
  At this scale the main challenge for solar PV generation at the moment is that electricity meters are unidirectional and do not allow for selling surplus power back to the grid. There is also a lack of regulation that would allow such schemes, but there is a plan to revise the regulatory framework, so hopefully this barrier could be removed in the near future. Solar water heaters are both relevant and feasible, but information and financing are needed for wider dissemination. Solar water heaters do not face the same challenge and are highly relevant. There could be room for a utility-led programme, with an on-bill financing approach for e.g. public housing for low-income households.

- Medium scale solar PV installations with the commercial sector.
  The Utility company BEL has a programme whereby it rents the roof space of companies for solar PV generation, but the companies need to invest in the system. In these cases, smart meters are installed. However, the systems need to be of a certain size to be feasible and in many instances, companies lack the technical capacity to assess the technologies available and calculate the potential return on investment. Access to finance and the cost of finance are also issues. For the tourism industry located off-grid, these systems and small-scale systems can be of high value, but the same financial and technical challenges remain.

- Solar PV for water pumping for irrigation purposes could be very relevant for private sector investments. Only 10% of the national agricultural land is under irrigation, the sector and national economy are already experiencing the impacts of increasingly irregular rain patterns and prolonged droughts. Farmers nevertheless have problems obtaining access to finance from the national commercial financial institutions for the investments needed, which are seen as too risky.

- Energy efficiency in buildings.
  Energy efficiency in buildings is relevant for private sector investments both for public and private buildings. In private buildings and facilities, the owners can invest in energy efficiency measures but often lack the technical capacity to assess savings potentials and implement energy efficient technologies. For both public and private buildings, energy service companies (ESCO) should have the needed technical capacities and could in theory make the needed investments on behalf of the clients through Energy Performance Contracts (EPC). However, apart from a pilot project aimed at providing finance for the implementation of renewable energy and energy efficiency investments under an EPC approach, the EPC concept is still a novelty in Belize, and a great deal of information dissemination and capacity building of ESCOs would be needed to attract companies and households to enter into EPC with ESCOs.

4 Numbers are extracted from the United for Efficiency Country Savings Assessment for Belize (2022)

There is a demand for energy services, especially from resorts, and there is also a market for ESCO services. The challenge is that the payback time is long. Another challenge is that an ESCO wishing to include renewable energy generation cannot do so without first obtaining a licence from the Public Utilities Commission, since it would effectively become a power producer, selling the electricity to customers. Renewable energy is especially cost effective off-grid, as there is currently no possibility of selling electricity back to the grid, and the price for fuel, i.e. generators, is high. There is a **need for clear legislation requiring BEL to buy back surplus power from decentralized renewable electricity generation.**

There is a large potential for energy efficiency with ESCO models also in the public sector, considering public buildings such as office buildings, police stations, hospitals, schools, etc. which are in dire need of retrofits. But there would be a need to enhance capacities of energy service providers to become ESCOs capable of assessing and taking on the financial risk of the investment and to improve benchmarking and monitoring and verification capacities.

In the tourism sector, investments in renewable energy and energy efficiency are of high relevance. Several operators already invest in PV technology using their own available capital. The difficulty in accessing debt finance and the cost of finance are reported as barriers to further scaling up the uptake of PV technology in the sector. The Belize Tourism Board (BTB) used to offer a matching grant or equity up to $50,000. Some operators applied for the grants but still reported challenges with financing and especially the cost of finance from financial institutions. The EPC model could help overcome the financial barrier, but the challenges described remain. **A public building programme for ESCOs could provide proof of concept**.

2.7.2 E-mobility

E-mobility is also a high priority sector including for public transport, private mobility, and the considerable fleet of vehicles used for tourism purposes. However, given its novelty in Belize, stakeholders need to be convinced of the technology and the financial gains/savings before they are willing to invest.

The Caribbean Community Climate Change Centre (CCCCC) has assisted with a plan for the provision of 77 e-buses by 2030. UNDP has started introducing the first e-buses through a pilot project funded by the EU, and the first three buses acquired by the Government have been put out to tender for their operation. However, a variety of barriers remain for the introduction of e-buses based on private sector investments. First of all, e-buses have a much higher up-front cost compared to internal combustion buses and especially compared to the used buses that are commonly imported. Banks also only accept 50% of the value of the bus as collateral asset. The main regulatory barrier consists of the current length of Road Service Permits of two years, which does not provide enough security to justify operators' investment. **Extension of Road Service Permits to 8-10 years would be needed to make investments in public e-mobility attractive**.

Investments in private e-vehicles face similar challenges, the high CAPEX and competition from affordable, although inefficient used cars from the US. **Revised import duties on vehicles, taking fuel efficiency into account, could incentivize investments in private e-mobility.** BEL and NTCS GreenBee have started rolling out e-charging infrastructure in Belize, with the first one of twelve charging stations installed in 2022, and now available in multiple locations along the main highways and in populated areas. Development Finance Corporation (DFC), Belize's development Bank, offers favourable loans to businesses for the purchase of electric cars.

2.7.3 Climate resilient crop varieties and diversification

The sugar industry is mostly based on one variety of cane (B79474), accounting for 60% of the planted cane in the country. There is a need to introduce climate resilient varieties. BSI, in collaboration with the CCCCC, has participated in a project where four promising climate resilient varieties have been identified. Farmers nevertheless say that there is still lack of knowledge about which varieties are the most suitable for the specific climate in Belize and which would be more appropriate regarding the expected changes in climate. Sugar cane replanting is also needed periodically, to maintain high productivity, so this could be an opportunity to adapt sugar cane cultivation to the new climate conditions.

DFC offers loans at favourable conditions for sugar cane replanting for farmers thar are registered as active cane farmers, are creditworthy and have a positive recommendation from the Sugar Industry Research and Development Institute (SIRDI). BSI offers sugar cane farmers with credit on production inputs such as fertilizers and replanting with favourable conditions.

There is not only a need to diversify the varieties but also to explore multiple income generating activities from the land. Even if farmers are aware of the need for diversification to other crops like vegetables, they say that this is hindered by the lack of food processing facilities available, and uncertainty about the potential offtake of additional products, so farmers **need a diversification plan**. Investments in shifting to resistant varieties and diversification could be made in combination with replanting efforts, although access to and the cost of finance for farmers is reported as a major barrier for investments.

The Citrus industry is also mainly under a rain-fed monoculture system. The industry has seen a steep decline since 2009, a 43% decrease in the production of oranges and a 21% decrease in that of grapefruit. This sharp decline is mainly caused by extreme weather events, and disease and pest outbreaks which are exacerbated by climatic changes that influence plant growth, and the development and survival of vectors, especially the greening disease (Huanglongbing, HLB). The degree of correlation between climate change and the occurrence and severity of the greening disease in Belize is still to be confirmed, although seasonal changes are likely to have an impact on the vectors' (mites') feeding and reproduction cycles (Aurambout, 2009). The conversion towards climate and disease resistant varieties is therefore a high priority for the sector. Two HLB resistant species have been identified, and some trees of these varieties have been planted, but their productivity and suitability to the local climate conditions and the expected climate change have not yet been assessed. It will require one or two more years before this can be properly assessed. The varieties are patented and there is a cost of $1 per plant.

In the Cacao sector, the changing climate poses challenges to production. In particular, the changing rain patterns can lead to heavy rains in the blooming season, ruining harvests, while making it difficult to dry the beans, which are traditionally dried in the sun. Cacao is mainly produced in tree-shaded areas where an equilibrium of shade and ventilation must be observed to allow for optimal growth and avoid fungal diseases. The expected changes in climate make harvest predictions challenging for farmers, and there is a need to diversify production with other crops and potentially combine cacao production with hardwood production. The hardwood can provide the needed shade, while also providing financial security in case of shocks. On the processing side, there is a need for investments in solar driers, transparent roofing that can prevent the out of season rains from disrupting seed drying. Solar dryer investments can be around $60,000, with an expected payback time of 10 years on the investments, so the current cost of finance makes this investment unattractive.

Farmers can approach DFC but considering the capacity and financial status of cacao farmers, loans with the current conditions and requirements are not feasible or easily accessible. Farmers report that even a $5,000 loan for farm establishment or expansion through DFC requires two guarantors, due to the lack of acceptable collateral.

2.7.4 Water management

Especially in the sugar industry changing rain patterns not only impact production outputs, but the current increasing occurrence of rain during harvest season makes the harvest very challenging. The mud created by the rains makes harvesting a difficult task, as mud mixes with the cane. The processing plant is only able to handle 5% of mud content but is currently receiving up to 12% of mud content with the sugar cane. Investments in drainage could help adapt to this changing situation. The issue remains that **main drainage arteries need to be created so that they can offtake the drained water from the single farmers**. These main arteries should be considered as a public investment or at least be **coordinated under an overall drainage plan**.

With the disruption in precipitation patterns there is also an increased need for irrigation, and there could be synergies between drainage investments and water harvesting for irrigation purposes. Irrigation is mainly used in nurseries, and investments in drainage only happens in the largest farms. Similar financial barriers exist for the citrus industry as for sugar cane. Farmers' land is used as collateral for operational expenses, and there is therefore limited available collateral for additional investments. The high interest rates offered mean that the cost of finance is also an issue. Current interest rates are too high to facilitate investments. The Citrus Growers Association used to have its own revolving fund, financed through the membership fees, where it provided loans at 5%. However, the fund had to be discontinued due to the crisis experienced in the industry.

DFC offers favourable loans for irrigation or Water Drainage, and rainwater catchments.

2.7.5 Insurance

The lack of agricultural insurance is an issue reported by a variety of stakeholders. Farmers and ranchers are pressured financially, and lack the ability to resist shocks, especially with the increasing negative impacts of changing precipitation patterns. There used to be parametric insurance for banana and papaya, but not anymore, and no agricultural insurance is currently offered in Belize. The Ministry of Finance through the Office of the Supervisor of Insurance is in the process of developing and introducing insurance products to Belize for both agriculture and fisheries, where fisheries is currently the most advanced. The products are based on a regional approach for the Caribbean through the Caribbean Catastrophe Risk Insurance Facility. With the New Insurance Act (2023), Belize has also introduced micro-insurance, facilitating the inclusion of the low-income productive sector, although once the insurance products are approved, they will have to be taken up by private insurance companies and offered to the final beneficiaries.

Even though agricultural insurance would be key to ensure protection against climate shocks, there is little local experience and low ability to pay. Hence, even if it were provided, there would be a need for extensive awareness raising. The main challenge in Belize is related to the size of the market. There is simply not enough size or information to develop product-based insurance products, which is why **parametric insurance seems to be the most feasible option**. These insurance products are expected to be established within the next couple of years, although, for the insurance products to be viable for private insurance companies, there is **a need for scale and the willingness to pay the premium**. There are indications that there might be limited knowledge, experience and willingness to pay for insurance products by final beneficiaries, so there will be a need for **a partial grant coverage of the premium in initial phases to ensure enough buy-in and provide time for the insurance to demonstrate its benefits for farmers.**

2.7.6 Sustainable livestock practices

Conversion from conventional livestock farming to climate-smart practices is a priority for Belize. Prioritized practices include electric fencing for pasture rotation management, tree planting and fodder banks, although livestock farmers are reluctant to plant trees, as this is a longer-term activity, and differs from their usual approach to pasture management (Usher, 2024).

The dry season and increasing unreliability of weather patterns impacts the availability of feed for the cattle, increases the vulnerability of livestock farmers and has a negative impact on production. The improvement of pasture management through intensive rotational grazing with the division of smaller paddock sizes using solar panels for electric fencing, can allow faster regrowth of the grass, and improve the availability of feed into the dry season (Usher, 2024).

Investments in silvo-pastoral practices could provide many benefits both in terms of adaptation and mitigation, although livestock farmers, like agriculturists, face the same challenges in accessing finance and providing collateral.

2.8 Regulation impacting the financial attractiveness of climate solutions

There are a variety of issues related to the identified prioritized climate actions where regulation plays an important role in affecting their financial attractiveness.

For Solar PV installations, the lack of dual metering and feed-in-tariff regulation allowing for selling electricity back to the grid is one of the largest identified barriers. Solar PV systems can be further incentivized by the implementation of dual metering, which Belize has started implementing in 2024, according to stakeholder consultations, and as proposed by the 2024 Full Tariff Review Proceedings (Belize Electricity Limited, 2024). **Ensuring the fast implementation of dual metering and ability to sell surplus electricity back to the grid should be a high priority to incentivize private sector investments in decentralized solar PV technologies.**

There are preferential import levies for Solar PV systems, but if batteries for PV systems are imported separately the incentive does not apply. There could be a **differentiation between import duties on standard batteries and batteries for RE systems, which could further support the roll-out of renewables**, especially in the lack of the ability to sell electricity back to the grid, and to further incentivize off-grid electrification.

Energy efficiency is of high priority, but there are currently only a few measures promoting an increased use of EE, limited to labelling of selected appliance classes. Regional energy efficiency building codes have been developed by CARICOM but are not yet written into law in Belize. A voluntary energy efficiency labelling scheme exists for selected appliances, but there is limited awareness about the benefits of energy efficiency. Only two active energy service providers provide energy efficiency services on top of renewable energy services. Demand for energy efficiency services remains low, due to lack of public knowledge of available financing, and risk profile of energy efficiency investments and clients.

Mandated energy audits for large energy consumers and large public and private buildings, together with a registry for authorized energy auditors and certification system for energy service companies, could provide the necessary information for the identification of lucrative EE opportunities, incentives for enhanced private investments and participation in EE projects, and trust in the available energy service providers.

For public transport, e-mobility is hindered by the current short-term nature of Road Service Permits. Private operators will not be willing to invest in e-buses unless they are sure that they will be able to operate until they have recovered their investments and reap the benefits of lower operational costs. However, Belize has received a grant from the EU to procure electric buses, three of which are already operating in Belize City.

Private e-mobility is mainly hindered by the high upfront costs of electric vehicles. Current import duties on vehicles do not incentivize e-mobility, compared to old inefficient vehicles. There are few private electric vehicles on Belizean

roads, even though charging infrastructure is being rolled out by BEL. Differentiated import duties on vehicles could tip the balance towards increased private e-mobility. The same could be applied to energy efficient appliances and technologies, and for selected climate technologies in general.

2.9 Access to finance

There is a demand for climate-oriented solutions, especially for larger and export-oriented businesses but tis demand cannot be met for a number of reasons. First and foremost, the upfront cost of environmental solutions is higher than that of conventional ones, specifically e-mobility, energy efficient technologies and capital expenses for renewable energy systems. Similarly, small communities, especially those with no grid access, which would benefit from RE sources and off-grid infrastructures, are often unable to access sufficient financing.

In general, it was observed that access to finance is a recurrent issue affecting most of the stakeholders consulted but especially MSMEs. If businesses can only use their own equity for investments, the penetration of climate technologies with high up-front costs will be a challenge. The proposed taxation and regulatory changes could encourage businesses to invest in climate solutions, but without increased access to finance from financial institutions, the investments will most probably never become mainstream.

Potential beneficiaries, and especially farmers, raise the issue that the requirements to access finance are intricate, and that both the commercial and development financial institutions require documentation and have processes in place that make it hard and tedious to apply for even small amounts of debt finance. DFC offers preferential loans, but stakeholders report that third parties like ESCOs cannot access the loans directly from DFC, and they need to work through the client/final beneficiary. The requirements and paperwork needed are described as too extensive, and clients can also be hesitant to provide all the requested details. The amount of paperwork for a loan covering energy efficiency and renewable energy measures in existing facilities are described as being as extensive as for a full development project.

There is a need for a clear description of the process, with guidelines and description of the requirements readily available so that companies can go to DFC and other financial institutions already prepared, otherwise the process is too long and tedious. The credit unions also highlighted the lack of education concerning financial products. There is an apparent need for the provision of clear information and guidelines on the requirements to access finance.

The issue of the preponderance of informal businesses and their lack of records of cash flows and assets to show the historical health and performance of the businesses was brought up repeatedly by credit unions and DFC. Many businesses, especially micro and small enterprises, do not register, either for the lack of knowledge and capacity to go through the needed processes or to avoid taxes. Those businesses are not able to apply for finance from banking institutions, and usually have no interest in climate initiatives, which are perceived as not profitable if perceived at all. Along the same line, farmers often have no formalized bookkeeping process, which is detrimental when trying to obtain a loan. The Belize Trade & Investment Development Service (Beltraide) and the Belize Chamber of Commerce and Industry (BCCI) have provided some capacity building to enterprises on these matters, but the availability of information to access finance and enhancement of financial literacy should be in the interest of all financial institutions. Capacity building and assistance in formalizing business and enhancing business management capacities, such as the pilot schemes run by Beltraide and BCCI should be expanded upon.

Most potential beneficiaries lack sufficient collateral; credit unions and banks need collateral for loans, usually land, otherwise equipment which is less liquid. Some experiment with interest rebates on performing loans to reduce the need for collateral. Credit unions usually provide financial services to people that are members and co-owners with a savings history, but some also do banking with third parties which are not members. The Holy Redeemer Credit Union for instance considers going to 50% of unsecured loans against the value of the property provided as guarantee, which reverts to the issue of collateral value.

Many of the potential beneficiaries, especially farmers, but also tourism operators and other business who already have their assets tied up in cover of existing debt do not have the capacity to access additional finance to invest in climate technologies which could enhance the profitability and resilience of their business, because they lack the needed collateral. The possibility of restructuring existing debt with the purpose of enabling investments in climate technologies would further provide an opportunity for enhancing the investment capacity of the private sector.

The main barrier for financial institutions remains clients' and investments' risk profiles. The lack of the required collateral and assets available to act as collateral, and the perceived risk of investment in climate technologies given their relative novelty prevent financial institutions from providing finance for climate investments on a large scale. Here, the provision of guarantees could partially overcome the main barrier of access to finance for formalized private enterprises with sound investment opportunities in climate technologies and practices.

2.10 Cost of finance

Beyond structural issues tied to the country's size and size of the largest part of enterprises and the lack of formalization, Belize suffers from high interest rates for commercial lending. Credit Unions offer interest rates between 9-11% at best, commercial banks around 13%, DFC in a range between 6% and 11%. This situation is further compounded by the high risk of lending for financial institutions, due to lack of collateral and financial illiteracy from small businesses, as well as the limited competitivity of Belizean industry and agriculture on international markets.

The cost of finance is often connected to risk. Risk itself is dependent on collateral, with real estate being deemed the most secure collateral, compared to movable goods. Farmers are not strangers to financial institutions, and farmers also use their land as collateral for investments in recurring operational costs like fertilizers, pesticides etc. so the collateral cannot be used for additional investments. This lack of collateral poses an additional risk factor which drives interest rates upwards, and contributes to a financial landscape inhibiting investment, especially by small businesses.

Credit Unions have little interest in lowering the rates, as there is no strong competition from outside stakeholders, and the risk of lowering the potential revenues from the existing high rates, with the relatively small market dictated by the proportion of people or businesses seeking to access loans.

Given the higher capital costs of mitigation technologies and the long timeframes for recovering the investments of both mitigation and adaptation technologies, the persistence of high interest rates restricts the potential for climate-related private sector investments. DFC's provision of lower interest rates is a step in the right direction, but it needs to be coupled with a clear communication of the requirements and processes to access finance.

The provision of guarantees could lower the risk profile of the investments for banks and credit unions, which should create a push for allowing for the cost of finance to be lowered. Debt restructuring for clients with existing loans, but interested in additional investments in climate action, could also contribute to lowering the cost of the overall financing cost burden for clients and facilitate the needed investments.

Mtouby, Pixabay

3. Feasibility and investment potential in Climate Change Mitigation Technologies

Cost Benefit Analyses have been performed for the prioritized mitigation actions and related technologies. Based on the results, Marginal Abatement Revenue Curves (MARC) have been created to assess investment needs and GHG reduction potential, versus technology costs, revenues or savings. The analysis allows "win-win" mitigation options that would generate positive returns on investment to be identified separately from those that would result in incremental costs. The results of the analysis provide valuable inputs to identify appropriate financial instruments and mechanisms suitable for the effective enhancement of private climate finance flows into these activities, although they are based on limited data sets and assumptions on average project design which do not reflect accurate implementation potential. This is especially true for energy efficiency measures in buildings, which are very case-specific. In addition, the assumed implementation potential has a very large impact on the investment needs, potential positive cash flows, and potential financial and GHG impacts of the prioritized actions. The results of the analysis mainly serve the purpose of providing general information on the attractiveness of the prioritized climate actions for investments by the private sector, as a basis to identify appropriate financial instruments and mechanisms for the enhancement of private sector investments in these measures.

3.1 Investment opportunities in solar technologies

A series of relevant solar technologies have been identified and validated through stakeholder consultations. These stakeholders included representatives from the Ministry of Public Utilities, Energy, Logistics & E-Governance, the Ministry of Sustainable Development, Climate Change & Solid Waste Management, local renewable energy companies, and national distributors such as Belize Electricity Limited. The consultations have further provided in depth information on additional measures, including financial barriers and needs for improved private sector investments in these measures.

The Ministry of Public Utilities, Energy, Logistics & E-Governance, responsible for managing energy production and delivery, provided critical insights into the national energy framework and regulatory environment. The Ministry of Sustainable Development, Climate Change & Disaster Risk Management, which oversees environmental and climate change policies, offered valuable perspectives on the environmental impacts and sustainability of various renewable energy projects (Sustainable Development Belize). Engagements with renewable energy companies and Belize Electricity Limited were essential for understanding the practical and logistical aspects of implementing renewable energy technologies in Belize. These interviews helped identify potential challenges, costs, and benefits associated with each renewable energy option, ensuring a comprehensive and realistic evaluation.

This multi-faceted approach ensured that the data collected were robust, inclusive, and reflective of the diverse perspectives and areas of expertise within Belize's energy and environmental sectors.

3.1.1 Solar PV for distributed Independent Power Producers

The following analysis is based on a 100-kW solar PV system, assuming this could be an average solar PV installation for decentralized power generation purposes. This type of investments would be applicable for land-owners and MSMEs interested in investing in power generation for energy consumption in own operations or for direct sale to the grid.

The initial investment for a 100-kW solar PV system in Belize is around $120,000. The annual energy yield of approximately 160,600 kWh per year corresponds to 74 tCO_2e in emissions reductions and would provide expected annual savings based on the revenue from the sale of electricity (assuming this to be at the same price as consumption) of around $22,189.

Table 4. Summary of costs and benefits for solar PV for power generation in Belize

Solar PVs, large grid, 100 kW			
Costs in US $	Reduction Option	Reference Option	Increase (Red.-Ref.)
Total investment	120.000		120.000
Project life	20		
Lev. investment	11,327		11,327
Annual O&M	2.400		2.400
Annual fuelcost		35.916	-27.594
Total annual cost	13.727	35.916	**-22.189**
Annual emissions (tons)	Tons	Tons	Reduction
Fuel CO2-eq. emission		74	74
Other			
Total CO2-eq. emission	-	74	**74**
US$/ton CO2-eq.			-301,5

General inputs:		
Discount rate	7%	
Reference electricity price	0,21	US$/kWh
CO2-eq. emission coefficient	0,42	tCO2/MWh
Activity: Solar PV		
Size of solar PV	0,1	MW
Investment in Activity	1200	US$/kW
Daily insolation	6	hours
Annual capacity factor	2190	Full time hours
Efficiency factor	0,8	
O&M	2,0%	Of investment
Electricity production	175	MWh
Cost of electricity produced	0,078	US$/kWh
Reference option: No solar PVs		
Electricity production	175	MWh

3.1.1.1 Note on solar agriculture systems

An additional mitigation option which was considered is the development of solar agriculture systems. This option in Belize would mark the country's first foray into agri-solar production. This system combines agricultural practices with solar power generation, providing renewable energy while supporting crop production. The design is inspired by successful projects in Réunion and Mauritius, focusing on shade house and greenhouse-mounted solar systems, ranging from 200kW to 9 MW in installed capacity. These systems not only generate power but also provide benefits like rainwater harvesting and reduced irrigation needs thanks to crop shading.

The price for the solar installations themselves is estimated to be close to that of utility scale solar and would fall within the same range of installed capacity. Additional benefits include:

- Additional revenues from the exploitation of crop lands
- Dual use of land, yielding more value from the same plot surface
- Increased job demand as the system requires both maintenance of the solar system and agricultural work

Due to a lack of reliable field data, the additional benefits of the agricultural systems have not been evaluated at this time, putting them on a par with utility scale solar at this stage. This option can be further explored in the future.

3.1.2 Solar PV for the commercial sector and hospitality

This installation type is applicable to smaller scale installations averaging at 10-kW arrays. These would supplement power generation for consumption in hostels, tourism installations and commercial buildings. They would help alleviate the strain that the tourism sector is placing on the Belizean grid and replace some of the diesel generators currently in use. The initial investment for a 10-kW/day rooftop solar system is estimated at around $21,600. This translates to annual energy production of approximately 16,050 kWh per year, equivalent to 7 tCO_2e in GHG emission reductions, and would provide annual savings of around $1,121.

Table 5. Summary of costs and benefits for solar PV for commercial / hospitality

Solar commercial/hospitality PVs, 10 kW			
Costs in US $	Reduction Option	Reference Option	Increase (Red.-Ref.)
Total investment	21.600		21.600
Project life	20		
Lev. investment	2.039		2.038,9
Annual O&M	432		432,0
Annual fuelcost		3.592	- 3.592
Total annual cost	2.471	3.592	**-1.121**
Annual emissions (tons)	Tons	Tons	Reduction
Fuel CO2-eq. emission		7	7
Other			
Total CO2-eq. emission	-	7	**7**
US$/ton CO2-eq.			-152,3

General inputs:		
Discount rate	7%	
Reference electricity price	0,21	US$/kWh
CO2-eq. emission coefficient	0,42	tCO2/MWh
Activity: Solar PV		
Size of solar PV	10,0	MW
Size of PV	73,8	m2
Investment in Activity	2160	US$/kW
Daily insolation	6	hours
Annual capacity factor	2190	Full time hours
Efficiency factor	0,8	
O&M	2,0%	Of investment
Electricity production	17,520	MWh
Cost of electricity produced	0,141	US$/kWh
Reference option: No solar PVs		
Electricity production	17.520	MWh

3.1.2.1 Energy services in agriculture

The use of solar power generation in the agricultural sector could provide additional benefits compared to solar fields. By integrating solar panels within agricultural landscapes, Belize can maximize land use efficiency and reap dual benefits. This approach offers a valuable additional income stream for farmers, but it also significantly contributes to reducing carbon emissions from fossil fuels. Furthermore, agri-solar production would fit within a distributed solar generation policy, backed up by dual metering infrastructure and feed-in-tariffs. Generation would be distributed over the territory, with farmers selling the energy that they do not use back to the grid, possibly through feed-in tariffs. This approach would bolster the country's commitment to environmental stewardship, directing the agricultural sector towards greener, more sustainable practices.

Finally, the agricultural sector in Belize could benefit from solar irrigation practices. Offering a sustainable substitute for fossil fuels, these systems facilitate the advancement of environmentally friendly irrigated agriculture. In regions lacking dependable energy access, they play a pivotal role in extending electricity to rural areas while simultaneously curtailing irrigation-related energy expenses. This enhances water accessibility for numerous farmers and has the potential to create a positive ripple effect on agricultural yields and livelihoods. Belize enjoys high irradiance levels, and 15% of its economy still relies on agriculture, despite a decreasing trend (World Bank, 2021). Therefore, introducing solar generation for irrigation practices could substantially increase the share of renewable energy in the national energy mix, thus edging Belize closer to its target of 75% renewable energy by 2030, as against 52.9% in 2022.

Finally, the use of batteries in conjunction with solar power would provide the grid with added flexibility and reduce the need for fossil-fuel generation to meet peak loads or during periods of low solar irradiance. This technology goes well with the sparse and scattered population of Belize, which would benefit from distributed generation and storage.

3.1.3 Solar Water Heaters

Solar water heaters provide households, MSMEs and institutions with an in-house hot water supply fuelled by renewable energy rather than grid electricity.

Solar water heaters capture free solar radiation, leading to significant energy and cost savings by replacing traditional electric water heaters, which currently consume a substantial portion of Belize's electricity, especially in the tourism industry.

The initial investment for a 200-litre/day solar water heater is around $2,000. This translates to annual energy savings of approximately 1,656 kWh per year, with expected financial savings of around $100 per year.

Solar water heaters offer a practical and cost-effective solution for reducing energy costs and GHG emissions in Belize. Promoting their adoption through awareness-raising programmes and partnerships with government entities can help increase their uptake and contribute to a more sustainable and energy-efficient future for the country. By incorporating solar water heaters, Belize could effectively reduce its carbon footprint, reduce energy costs, and support the global shift towards renewable energy sources.

Table 6. Summary of costs and benefits for solar water heaters

Solar water heater, residential (1 unit)			
Costs in US $	Reduction Option	Reference Option	Increase (Red.-Ref.)
Total investment	2000		2000
Project life	15		
Lev. investment	220		220
Annual O&M	20		20
Annual fuelcost	183	522	-339
Total annual cost	422	522	**-100**
Annual emissions (tons)	Tons	Tons	Reduction
Fuel CO2-eq. emission	0	7	7
Other			
Total CO2-eq. emission	0	7	**7**
US$/ton CO2-eq.			**-14,3**

General inputs:		
Discount rate	7%	
Activity	1	location
Hot water usage	200	litres/day
Water supply temp	20	deg.C
Thermostat setting	50	deg.C
Specific heat of water	4186,8	Joule/kg/deg. C
Average electricity price	0,205	US$/kW
CO2-eq. emission coefficient	0,350	ton CO_2-eq./MWh
Reduction option: Solar water heater & electrical backup		
Investment	2000	US$
O&M	0,01	
Size of Solar Heater	1,62	m2
Input from the sun	1020	kWh/m2
Production from Solar Heater	1656	kWh
Annual electricity used	891	kWh
Reference option: electrical water heater		
Electricity used	0,025	Gl/day
Annually electricity used	2547	kWh

3.2 Summary of results for solar technologies

The penetration potential for the larger solar PV installation was based on the NDC target of 40 MW utility scale solar power, assuming this would be the acceptable penetration of larger installations, although this would ultimately provide solar PV penetration additional to the 60 MW utility scale solar power installations already planned by BEL by 2028.

Household appliances statistics from 2022 show that 13,721 (12.4%) of the 110,719 households in Belize had a water tank heater. These could in theory be converted to solar water heaters, so this forms the basis for the analysis of implementation potential of solar water heaters in this analysis. The degree of penetration is also in line with the currently proposed 2030 target of 10% in the NDC 3.0 draft targets and actions (Climate Analytics, 2025). In fact, the number proposed here can be considered conservative, as it does not take account of commercial/hospitality installations, or the fact that households can be expected to install hot water in the future.

To estimate the implementation potential for solar commercial/hospitality PV systems the NDC target of 75% renewable energy, including for the tourism sector, was used. There are approximately 830 tourism accommodations in Belize (2020). Assuming 75% of these would implement solar PV (these could also be other types of commercial enterprises), 623 installations are assumed to be the implementation potential. Considering the current implementation rate of solar PV installations proposed under the NDC 3.0 of 4,000 systems by 2030, the number of assumed PV installations by the private sector does not seem to be overestimated (Climate Analytics, 2025).

The overview of key results on investment needs, savings and revenues and emission reductions for each solar technology option is provided in Table 3.

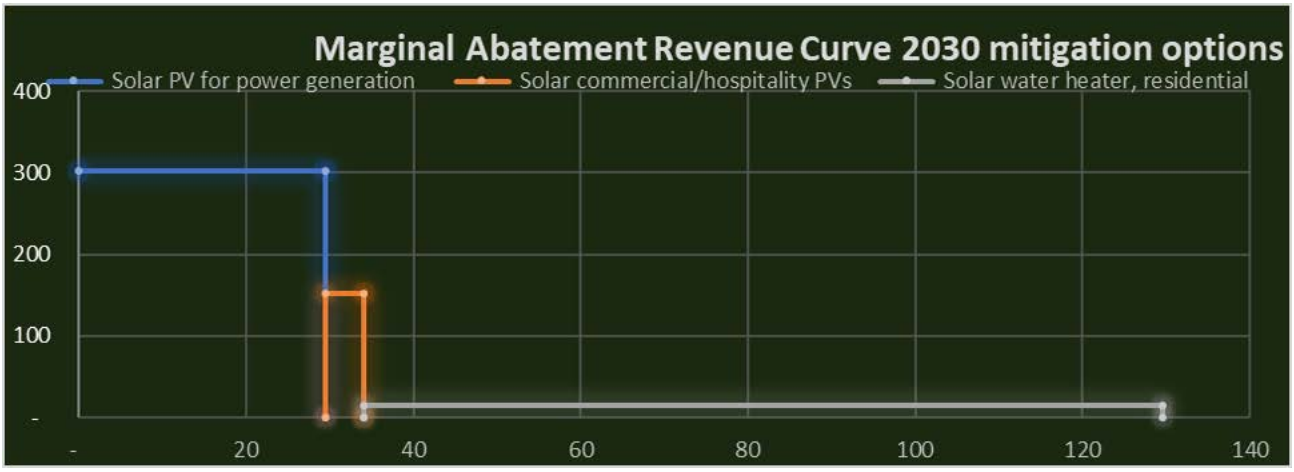
Table 7. Key results of implementation potential of solar technologies

			Emission reduction	Investment	Annual costs	Units implemented	Emission reductions Per option	Electricity saved	Electricity produced
Reduction option	**US$ tCO2e**	**Sub-type unit**	**tCO2e/ unit**	**MUS$**	**MUS$/ year**		**ktCO2e/ year**	**GWh**	**GWh**
Solar water heater, residential	-14.33	1unit-200 l/day	7	27	1.37	13,721	95.57	35	
Solar PV for power generation	-301.54	100 kW	74	48	8.88	400	29.43		70
Solar commercial/hospitality PVs	-152.30	10 kW	7.4	13	0.70	623	4.58		11
Total				**89**	**11**			**35**	**81**

With these assumptions for the implementation potential of solar technologies, aggregate investment needed in solar technologies would be $89 million but providing total annual revenues of $11 million. The renewable energy generated would amount to approximately 81 GWh per year, and there would be 35 GWh in electricity savings. Total estimated annual emission reductions amount to 130 $ktCO_{2e}$.

The MARC for the analysed solar technologies shows that all solar technologies provide positive revenue streams.

Figure 7. MARC for solar technologies



3.3 Investment Opportunities in Energy Efficiency

Data to perform the cost benefit analysis for energy efficiency in buildings came mainly from stakeholder consultations and follow-up data sharing. One energy audit report has been provided for one government building, and results of energy efficiency potential in selected buildings have been provided by a private company which has assessed energy efficiency potential in a variety of types of building, including various government office buildings, hotels and resorts, clinics and small business. Energy efficiency measures envisioned mainly concern lighting and air conditioning (A/C). In addition, an energy efficiency recommendation assessment by DFC for various commercial enterprises, mainly hospitality and smaller industrial facilities in the food manufacturing sector has also been received. This last assessment does not provide enough data to assess energy efficiency potential but provides an overview of relevant energy efficient technologies and interventions for a variety of commercial enterprises, and their respective investment costs.

Electricity rates and service charges[5] are based on customer classification, set by Belize Electricity Limited and approved by the Public Utilities Commission. Baseline investment (CAPEX) has been set to zero, as it is assumed that the buildings already have installed lighting and A/C. Annual operation and maintenance (O&M) costs have been set as 1% the total investment, and set as the same for the reference option, even though older inefficient technologies (the baseline) normally come with higher O&M costs.

Buildings are very complex systems and appropriate energy efficiency measures are very case-specific. It is unclear whether the buildings for which data were used for this assessment are representative of the Belizean building stock. The final building-specific application of energy efficiency measures has a large impact on investment needs, potential positive cash flows, and potential financial and GHG impacts of the prioritized actions. The results should therefore only be taken as guidance for the general feasibility of energy efficiency measures in buildings, while investment decisions should be made based on a thorough analysis for each building. The draft proposed targets for the NDC 3.0 envision the implementation of energy audits in all public buildings by 2028 (Climate Analytics, 2025). These energy audits will greatly contribute to the availability of data to make estimations on implementation potential, investment costs and achievable energy savings and GHG emission reductions.

3.3.1 Public / office buildings

Energy efficiency cost benefit analysis of public and office buildings is based on a sample of three buildings, one of which is also occupied by a private foundation. The buildings' baseline annual electricity consumption varies from 324 MWh to 850 MWh, corresponding to annual costs of between $72,965 and $185,400. Identified potential energy efficiency improvements consist mainly of switching to en-

5 BEL rate scheduled can be found on BEL's website: https://www.bel.com.bz/Rate_Schedule.aspx

ergy efficient lighting and air conditioning; the technologies have an expected lifetime of 18 and 15 years respectively. Most investments in efficient equipment have a very short payback time. In some cases, capital costs are lower than expected annual savings.

It is worth noting that one of the buildings analysed did not include measures targeting A/C, which has skewed the potential electricity savings from this measure negatively but reinforces the need to analyse each building separately and avoid making general assumptions. Most stakeholder consultations regarding energy efficiency measures confirmed that energy efficiency A/C would be relevant for most buildings, and the electricity and financial savings potential could therefore be higher than the average represented here.

Based on the available data, the following average building energy efficiency project has been calculated:

Table 8. Average energy efficiency measures in public and office buildings

EE in Public Buildings			
Costs in US $	Reduction Option	Reference Option	Increase (Red.-Ref.)
Total investment	42.974	--	42.974
Project life	15	-	-
Lev. investment	4.718	-	4.718
Annual O&M	430	430	0
Annual fuelcost	83854	110535	-26681
Total annual cost	89002	110965	**-21962**
Annual emissions (tons)	Tons	Tons	Reduction
Fuel CO2-eq. emission	125,8	174,9	
Other			
Total CO2-eq. emission	125,8	174,9	**49,15**
US$/ton CO2-eq.			**-446,9**

General inputs:		
Discount rate	7%	
CO2-eq. emission coefficient	0,35	tCO2/MWh
Reduction option: New efficient equipment		
O&M	1,0%	
Lifetime	15	Years
Investment lighting	22.277	US$
Investment AC	20.697	US$
Energy savings lighting	124.335	kWh
Energy savings lighting	23.624	US$
Energy savings AC	16.090	kWh
Energy savings AC	3.057	US$
Total investment	42.974	US$
Annual electricity Saved	140.425	kWh
Annual electricity Saved	26.681	US$
Reference option		
O&M	1,0%	
Annual electricity consumption	499.755	kWh
Electricity cost	97.353	US$
Service charge	900	US$
General sales tax	12.281,68	
Annual electricity cost	110.535	US$

Energy efficiency in public and office buildings offers a good return on the investment. With a CAPEX of $42,974 and annual savings of $21,962, energy efficiency measures in the average building would lead to an annual reduction of 49.15 tCO_2e, at a saving of $446.9 per tCO2e reduced.

3.3.2 Energy efficiency in hotels and resorts

Two data sets on energy efficiency potential in hotels and resorts have been provided. Baseline annual electricity consumption varies from 354 MWh to 828 MWh, and energy efficiency measures consist of energy efficient lighting and air conditioning, both baseline consumption and energy efficiency measures similar to public buildings.

Based on the available data, the following average Hotel/resort energy efficiency measure project has been calculated:

Table 9. Average energy efficiency measures in hotels and resorts

EE in Hotels and Resorts			
Costs in US $	Reduction Option	Reference Option	Increase (Red.-Ref.)
Total investment	64.000	-	64.000
Project life	15	-	-
Lev. investment	7.027	-	7.027
Annual O&M	640	640	0
Annual fuelcost	106849	130044	-23196
Total annual cost	114516	130684	**-16169**
Annual emissions (tons)	Tons	Tons	Reduction
Fuel CO2-eq. emission	164,2	206,9	
Other			
Total CO2-eq. emission	164,2	206,9	**42,66**
US$/ton CO2-eq.			**-379,0**

General inputs:		
Discount rate	7%	
CO2-eq. emission coefficient	0,35	tCO2/MWh
Reduction option: New efficient equipment		
O&M	1,0%	
Lifetime	15	Years
Investment lighting	23.000	US$
Investment AC	41.000	US$
Energy savings lighting	74.213	kWh
Energy savings lighting	14.101	US$
Energy savings AC	47.686	kWh
Energy savings AC	9.095	US$
Total investment	64.000	US$
Annual electricity Saved	121.899	kWh
Annual electricity Saved	23.196	US$
Reference option		
O&M	1,0%	
Annual electricity consumption	591.025	kWh
Electricity cost	114.696	US$
Service charge	900	US$
General sales tax	14.448,00	
Annual electricity cost	130.044	US$

Energy efficiency measures in the average hotel/resort also offer a good return on investment. With an expected CAPEX of $64,000, annual savings expected are $16,169. In terms of emissions, the energy efficiency measures in the average hotel/resort would lead to an annual reduction of 42.66 tCO2e, at a saving of $379 per tCO2e reduced.

3.3.3 Energy efficiency in MSMEs

For small business, only one case was received, even though the DFC's energy efficiency recommendation assessment contains 28 examples of potential investments in energy efficiency measures by various businesses. These examples included energy efficient lighting, A/C, other equipment and electricity generation with solar PV. The case received, which contains enough data for the cost benefit analysis, envisages only energy efficient lighting. It is therefore important to note that the energy efficiency potential in MSMEs has a high probability of being much larger than that indicated below.

Based on the available data, the following costs and benefits for energy efficient lighting for small businesses have been calculated.

Table 10. Energy efficiency measures in MSMEs

EE MSMEs			
Costs in US $	Reduction Option	Reference Option	Increase (Red.-Ref.)
Total investment	8.590	-	8.590
Project life	15	-	-
Lev. investment	943	-	943
Annual O&M	86	86	0
Annual fuelcost	10070	14160	-4090
Total annual cost	11099	14246	**-3147**
Annual emissions (tons)	Tons	Tons	Reduction
Fuel CO2-eq. emission	13,0	20,0	
Other			
Total CO2-eq. emission	13,0	20,0	**6,98**
US$/ton CO2-eq.			**-450,7**

General inputs:		
Discount rate	7%	
CO2-eq. emission coefficient	0,35	tCO2/MWh
Reduction option: New efficient equipment		
O&M	1,0%	
Lifetime	15	Years
Investment lighting	4.500	US$
Investment AC	4.090	US$
Energy savings lighting	19.950	kWh
Energy savings lighting	4.090	US$
Energy savings AC	-	kWh
Energy savings AC	-	US$
Total investment	8.590	US$
Annual electricity Saved	19.950	kWh
Annual electricity Saved	4.090	US$
Reference option		
O&M	1,0%	
Annual electricity consumption	57.000	kWh
Electricity cost	11.688	US$
Service charge	900	US$
General sales tax	1.572,00	
Annual electricity cost	14160	US$

Energy efficient lighting for MSMEs also offers a good return on the investment, with a CAPEX of $8,590 and annual savings of $3,147. Energy efficient lighting in the MSME case provided would lead to 6.98 tCO_2e of annual emission reductions, at a saving of $450.7 per tCO2e reduced.

3.4 Results for energy efficiency measures

The implementation potential for energy efficiency measures in buildings could not be assessed based on analysis of the building stock, types of building and their average efficiency due to the lack of local data. Considering Belize's overall national NDC target of a 10% energy efficiency improvement, including from the tourism sector, the analysis has assumed the achievement of 10% electricity consumption reduction, amounting to 61.9 GWh. These savings could be achievable through the implementation of energy efficiency measures in buildings, e.g. assuming 90 public/office buildings, 350 hotels/resorts and 330 MSMEs implemented energy efficiency measures.

The overview of key results on investment needs, savings and revenues and emission reductions for each measure is provided in Table 7.

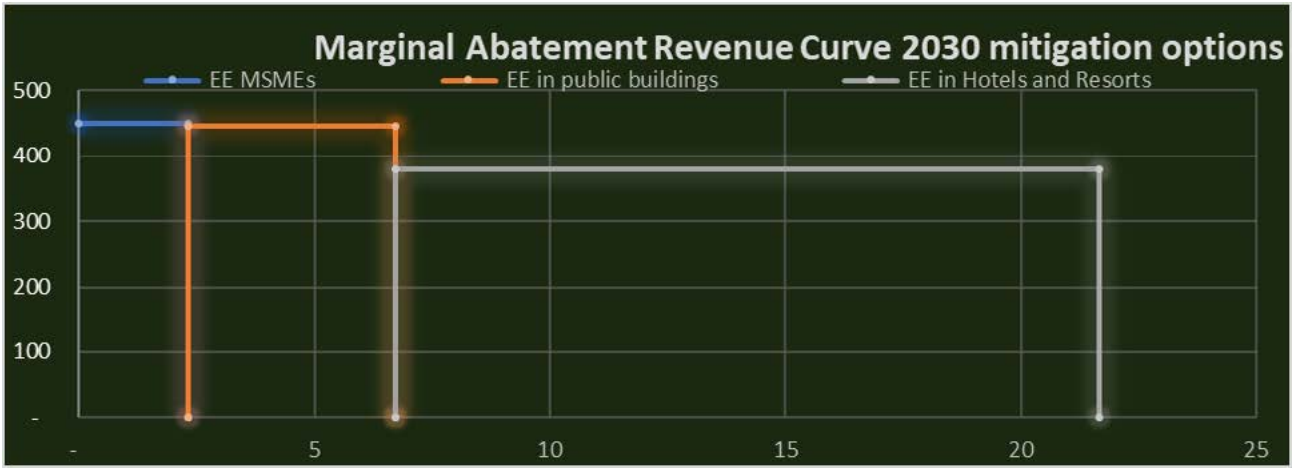
Table 11. Key results of implementation potential of energy efficiency in buildings

			Emission reduction	Invest-ment	Annual costs	Units imple-mented	Emission reductions Per option	Electricity saved
Reduction option	**US$ tCO2e**	**Sub-type unit**	**tCO2e/ unit**	**MUS$**	**MUS$/ year**		**ktCO2e/ year**	**GWh**
EE in public buildings	-446.86	1 average building	49.1	4	-1.98	90	4.42	12.6
EE in Hotels and Resorts	-378.97	1 average building	43	22	-5.66	350	14.93	43
EE MSMEs	-450.68	1 average building	7	3	-1.04	330	2.30	7
Total				**29**	**9**			**62**

With the above implementation potential assumptions of energy efficiency measures in buildings, aggregated investments needed would be $29 million, providing total annual savings of $9 million. The electricity savings would amount to approximately 62 GWh per year. Total estimated annual emission reductions amount to 22 $ktCO_2e$.

The MARC for the analysed measures shows that all energy efficiency measures in buildings provide positive revenue streams.

Figure 8. MARC for energy efficiency measures in buildings



3.5 Transition to e-mobility.

For e-mobility, two different options were considered. One is the introduction of electric buses for public transport, and the other is personalized transport with electric cars. Data for calculating baseline costs of vehicles were obtained from the Department of Transport and supplemented with data from the IEA and the World Resource Institute's Total Cost of Ownership Evaluator where data gaps existed. Data on import costs (including freight, import duties, taxes and fees) were obtained from Caribbean Shipping Agencies. DCF discount rates for e-buses and e-vehicles have been set at 8%, as this was communicated as being an applicable interest rate for vehicle loans. The lifetime of e-vehicles has been estimated at 15 years.

BEL has already installed 11 charging stations in major population centres and is working with the Government to further enhance the network with charging depots for the electric buses that the Government is acquiring in its efforts to transition the public transport system to electric mobility. BEL has also proposed a pricing regime for co-investments in the nationally distributed electric vehicle charging network and for EV charging (Belize Electricity Limited, 2024).

3.5.1 Electric buses

Baseline costs for buses are set as the purchase price of a new bus including freight, import charges and duties. Capital costs for e-buses do not include the cost of the vehicle charger, as this infrastructure is currently being rolled out. Operating costs are based on estimated electricity consumption, maintenance costs, insurance and applicable duties. Data on baseline vehicle efficiency and average distance travelled per day are based on local data. Baseline operating costs are assumed higher due to the cost of fuel and higher maintenance.

The following costs and benefits for the introduction of e-buses have been calculated:

Table 12. E-mobility electric buses

Electric 12m buses (1 bus) in 2030			
Costs in US $	Reduction Option	Reference Option	Increase (Red.-Ref.)
Total investment	316.112	145.088	171.024
Project life	15	15	
Lev. investment	36.931	16.951	19.981
Annual O&M	2.272	4.288	-2.016
Annual fuelcost	9.809	39.365	-29.555
Total annual cost	49.013	60.603	**-11.590**
Annual emissions (tons)	Tons	Tons	Reduction
Fuel CO2-eq. emission	16	67	51
Other			
Total CO2-eq. emission	16	67	**51**
US$/ton CO2-eq.			**-227**

Electricity price based on upper commercial segment of commercial rates 0.43 BZD/kWh

General inputs:		
Discount rate electric	8%	
Discount rate diesel	8%	
Annual distance	62,050	km
Activity	1	Buses
Reduction option: Electric buses		
Investment in vehicle	252,067	US$
Cost of 1 charging station	50,000	US$
Number of charging stations	-	Stations
Size of battery	324	kWh
Investment in battery	198	US$/kWh
Annual O&M	0,7%	of investm.
Electricity consumption	1,36	km/kWh
Total electricity consumption	46	MWh
Reference electricity price	0,22	US$/kWh
CO2-eq. emission coefficient	0,35	tCO2/MWh
Emissions from electricity	16	tCO2
Economic efficiency	0,79	US$/km
Reference option: Normal diesel buses		
Investment in one bus	145,088	US$
Annual O&M	3,0%	of investm.
Diesel consumption	2,50	km/l
Diesel price	1,59	US$/liter
Total diesel consumption	0,02	Mio. liters
1000 l diesel =	36,4	Gj
CO2-eq. emission coefficient	74,1	$kgCO_2$-eq./GJ
Emissions from diesel	67	tCO2
Economic efficiency	0,98	US$/km

The introduction of e-buses offers a positive return on investments, mainly provided by the large yearly savings in fuel costs. However, the baseline capital investment costs are based on the purchase price of a new diesel bus. The attractiveness of the investment in electric buses will probably not be able to compete with used imported buses. Nevertheless, introducing e-buses is expected to lead to a reduction of 51 tCO_2e per year, at a saving of $228/tCO2e. The current approach where the Government is procuring buses and putting their operation out to tender on a two-year basis is a strategy that enables the introduction of e-mobility for public transport, although if the government wishes to attract private sector investment in e-buses, the duration of the operating concession will have to be reconsidered.

3.5.2 Electric cars

Baseline capital costs for cars are set for new vehicles including freight, import charges and duties. Capital costs for electric cars include the cost of a charger, as it is assumed that owners would not only use the available charging infrastructure but would require their own charger as well. Operating costs are based on estimated electricity consumption, maintenance costs, insurance and applicable duties. Baseline operating costs are assumed higher due to the cost of fuel and higher maintenance. Data on baseline vehicle efficiency and average distance travelled per day are based on local data.

Table 13 E-mobility electric cars

Electric cars (1 car) in 2030			
Costs in US $	Reduction Option	Reference Option	Increase (Red.-Ref.)
Total investment	43.757	19.261	24.496
Project life	15	15	
Lev. investment	5.112	2.250	2.862
Annual O&M	458	305	153
Annual fuelcost	383	1.922	-1.539
Total annual cost	5.953	4.477	**1.476**
Annual emissions (tons)	Tons	Tons	Reduction
Fuel CO2-eq. emission	1	6	5
Other			
Total CO2-eq. emission	1	6	**5**
US$/ton CO2-eq.			**277**

General inputs:		
Discount rate electric	8%	
Discount rate diesel	8%	
Annual distance	18.250	km
Activity	1	Cars
Reduction option: Electric cars		
Investment in vehicle	33,007	US$
Investment in charging station	1,000	US$
Size of battery	65	kWh
Investment in battery	150	US$/kWh
Annual O&M	1,0%	of investm.
Electricity consumption	9,0	km/kWh
Total electricity consumption	2	MWh
Reference electricity price	0,19	US$/kWh
CO2-eq. emission coefficient	0,35	tCO2/MWh
Emissions from electricity	0,7	tCO2
Economic efficiency	0,33	US$/km
Reference option: Normal gasoline cars		
Energy consumption	15,0	km/l
Investment in vehicle	19.261	US$
Annual O&M	1,6%	of investm.
Gasoline price	1,58	US$/liter
Total gasoline consumption	0,001	Mio. liters
1000 l gasoline =	74,1	Gj
CO2-eq. emission coefficient	67	$kgCO_2$-eq./GJ
Emissions from gasoline	6,04	tCO2
Economic efficiency	0,19	US$/km

Electric cars do not yield a positive return on investments under the current analysed conditions and with the given assumptions. The option of using electric vehicles could be more attractive if coupled with charging through own renewable energy systems like solar panels. E-vehicles would still contribute to mitigation of GHG emissions, leading to approximately 5 tCO_2e of emission reductions per year, but at a cost of $277/tCO2e. The current proposed target for the draft NDC 3.0 for 2030 of 10% e-vehicle penetration will potentially require additional incentives for its achievement. At the same time, since costs of e-vehicles are decreasing, there could be considerable changes to the potential financial attractiveness of investing in electric cars in the short to medium term, so any incentive structure should be carefully considered and monitored.

3.6 Results for e-mobility

Belize's NDC sets the target of improving efficiency in the public transit system through the deployment of 77 hybrid and electric buses. This target has been used to estimate the implementation potential. Even though the idea is that the first 77 buses will be procured by the Government with support from international partners, it is believed that with regulatory changes, the same number of buses could be implemented through private investments. The bus vehicle fleet is estimated at between 200 and 300 buses across different operators and private companies, thus the real implementation potential is probably much higher. As regards electric cars, the latest available data received show that about 48,000 vehicles were registered as private vehicles, including cars, pickups, motorcycles, vans and others. Currently (2024) there are 30 registered electric private vehicles in the country, most of them being mid-size SUVs, even though the cost benefit analysis showed a negative return on the investment. This indicates that there is at least a drive for e-mobility and potentially also more attractive offers in the market than assumed for the analysis. Regardless of the negative cost benefit analysis results, estimated electric car penetration has been only assumed to be 3,650 vehicles, aligned with the proposed draft NDC 3.0 target for 2030 (Climate Analytics, 2025).

The overview of key results on investment needs, savings and revenues and emission reductions e-mobility options is provided in Table 8.

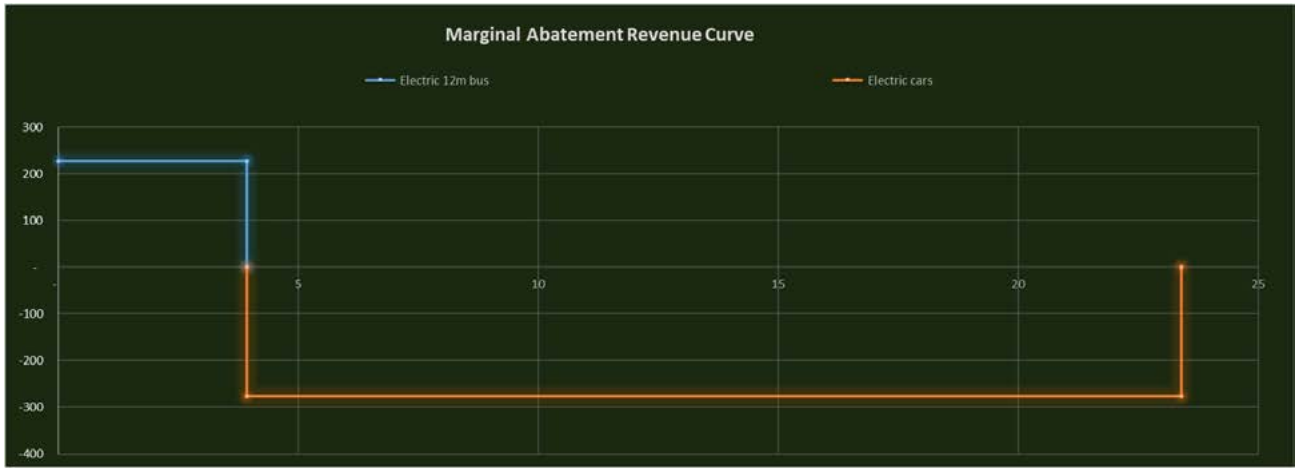
Table 14. Key results of implementation potential of e-mobility options

			Emission reduction	Investment	Annual costs	Units implemented	Emission reductions Per option
Reduction option	**US$ tCO2e**	**Sub-type unit**	**tCO2e/ unit**	**MUS$**	**MUS$/ year**		**ktCO2e/year**
Electric cars	276.69	1 car	5	89	5.39	3,650	19.47
Electric bus	-227.37	1x 12m bus	51	13	-0.89	77	3.93
Total				**103**	**4.5**		

With the above assumptions on the implementation potential of e-mobility options, aggregate investments needed would be $103 million, at a total annual cost of $4.5 million, noting that electric cars would lead to higher costs. Total estimated annual emission reductions amount to 23.4 $ktCO_2e$.

The MARC for the analysed measures shows that electric buses provide positive revenue streams. Electric cars would generate additional costs but still contribute to large amounts of GHG emission reductions.

Figure 10. MARC for e-mobility measures

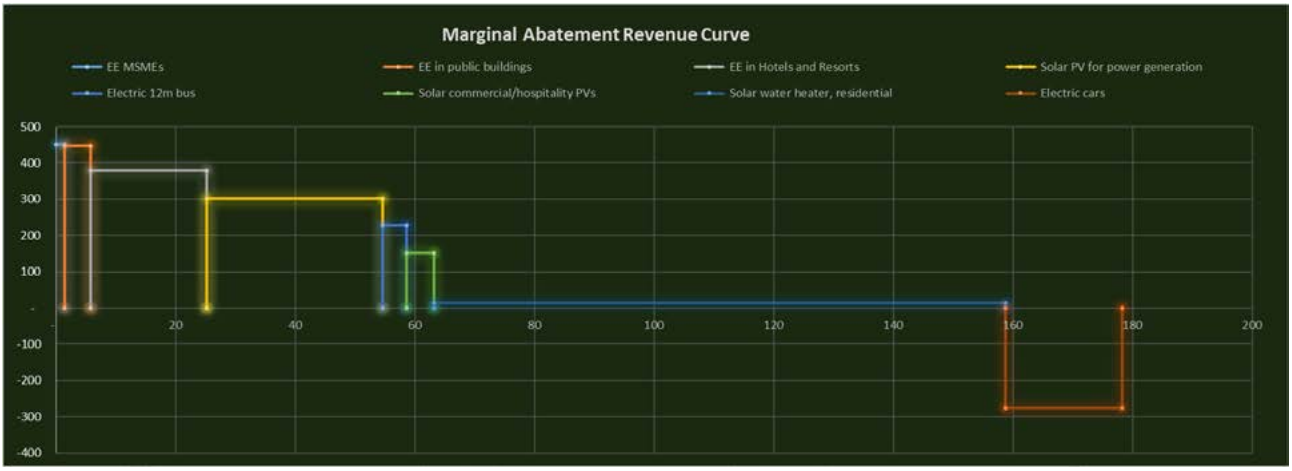


3.7 Aggregate results for selected mitigation measures

The full implementation potential of the prioritized options can contribute to mobilizing $220.6 million of private sector investments by 2030, keeping in mind that all options except electric cars show a positive return on investment, leading to an average $15.13 million of annual revenues/savings. Total renewable electricity produced is estimated at 81 GWh/year in 2030, and potential cumulative energy savings are estimated at 97 GWh/year. The total expected emission reductions are 174.6 $ktCO_2e$ per year.

Figure 12 provides a visual overview of the MARC for all mitigation measures. From the MARC it can be deduced that energy efficiency measures in buildings are the measures with the greatest positive returns for each tCO2e reduced. In this category, energy efficiency in MSMEs has a good revenue/tCO2e reduction ratio, but the overall mitigation potential is not very high considering its assumed implementation potential; energy efficiency measures in hotels and resorts have the highest mitigation potential.

Figure 11. MARC for all selected mitigation options



Solar water heaters are the option with the highest GHG mitigation potential, given the number of potential applications, although the return on investment is modest. All solar PV options produce a positive return on investment, large decentralized PV installations giving the highest returns on investment and having the greatest mitigation potential in the renewable energy category.

Electric cars are the only option that shows additional costs, while having a considerable GHG emission reduction potential.

The selected mitigation measures have the potential to effectively reduce the NDC finance gap. For renewable energy, the expected private sector investments could cover almost 20% of the existing gap, leaving an 80.7% residual funding gap. For energy efficiency, the potential private sector investments could cover more than 33% of the finance gap, leaving a residual finance gap of 69.8%. Finally, investments in electrification of transport, especially those related to the potential investments in private electric cars would eliminate the gap and indeed swing it the other way.

Table 15. Summary of potential mitigation investments and NDC finance gap reduction

Action	Estimated gap (incl. unfunded activities)	Finance Gap in %	Estimated private sector contribution potential	Residual funding gap
Renewable energy	459,036,410	100%	88,900,000	80.7%
Energy efficiency (electricity system and consumption)	87,062,747	94%	29,100,000	69.8%
Energy in the transport sector	14,962,000	21%	102,600,000	-123%

It is worth noting that there is a degree of uncertainty regarding both the cost benefit analysis results and implementation potential. The extensive implementation potential set for solar water heaters might be overestimated. This measure is highly relevant for hotels and resorts, but at least one stakeholder mentioned that many households do not prioritize investments in hot water due to the Belizean climate. The implementation potential for electric cars is based on the national targets, but actual implementation will depend on the financial attractiveness of the investment, which the current cost benefit analysis shows is negative, although prices for electric cars are falling fast, and e-mobility might become more attractive in the short term. Finally, the results of the assessment are based on limited data sets and assumptions on average investments which do not necessarily reflect accurate implementation potential for a variety of isolated investments. This is especially true for energy efficiency measures in buildings, which are very case-specific. The analysis should be revised in line with the tracking of progress of NDC implementation to adjust implementation rate and trends.

Jefferson lucena, Pexels

4. Investment Opportunities in Climate Adaptation and Resilience

According to the literature and stakeholder consultations, the most relevant sector, related to private sector investment to reduce loss and damage and enhance national climate change resilience is Agriculture. There are two main identified challenges related to climate change impacts on the Agriculture sector. The first is the change in precipitation patterns, leading to prolonged periods of drought with decreased and, in the worst cases, loss of agricultural outputs. The second is the impact of increasingly frequent and intense extreme weather events such as hurricanes, with related losses of agricultural outputs and damage to the agricultural infrastructure. The National Agriculture and Food Policy of Belize for the period 2015 to 2030 recognizes the need to respond to the expected impacts of climate change in the Agriculture sector. The *Agriculture Development Management and Operation Strategy*, and the *National Adaptation Strategy to Address Climate Change in the Agriculture Sector* also support adaptation to climate change in water resources management, the need to increase biodiversity for agro-ecological balance and the economic sustainability of agriculture productions systems (National Climate Change Office, 2022). This will not be possible without the involvement and investments of the private sector. *Belize's Fourth National Communication* identifies the need to scale up and leverage finance to implement climate-smart agriculture at the national scale, increase crop resilience to changing precipitation patterns and changes in temperature, while also providing measures targeting drought assistance, and facilitating access to climate-tailored insurance products. Many of these adaptation measures also carry mitigation co-benefits.

Water scarcity is already having profound impacts on the Belizean Agriculture sector. There is no public irrigation and drainage infrastructure in Belize, and even though some private irrigation systems exist for banana and citrus production, only 10% of agricultural land is irrigated, leaving most agricultural practices vulnerable to increasingly unpredictable rainfall (World Bank, 2021). The Fourth National Communication highlights the need to strengthen the implementation of water conservation practices, including water harvesting, storage, temporal transfer, and efficient use of rainfall water.

Small farmers and in particular those located in the sugar cane belt in Northern Belize experience declines in crop yields due to below-average rainfall coupled with short periods of heavy rainfall (CCCCC, 2019). Investments in water conservation practices, including water harvesting and storage, coupled with investments in irrigation systems could provide an effective adaptation measure to ensure the availability of water for irrigation, and for livestock production during droughts. The creation of business models assessing how adaptive water management practices can enhance resilience to shocks, while improving productivity would provide valuable inputs to farmers to assess the costs and benefits related to investing in alternative water management measures such as water capture, storage and irrigation. However, the implementation of such practices requires capital that is seldom available for farmers, and especially small farmers. Access to concessional finance for the implementation of water management related activities should therefore be explored.

In addition to the issues outlined above, related to water shortages and intense rainfall during short periods of time, climate change is also triggering increased crop pests (e.g. froghopper) and associated diseases leading to reduced productivity and crop loss (CCCCC, 2019). Therefore, there is a need for introducing crops resilient to the changing precipitation patterns and changes in temperature, leading to prolonged periods of droughts and increased pests and diseases. Farmers will need guidance and help accessing the availability and applicability of drought resistant crop varieties, associated costs and benefits, and access to concessional finance to invest in new seed varieties and plant species.

The following proposed priority measures hold potential for enhancing resilience through private sector investments for the implementation of adaptation practices or self-investment in own resilience through insurance products. They have been identified by reviewing the literature and from stakeholder consultations as holding out the greatest potential for improvement, although due to the general lack of data available for establishing comprehensive cost-benefit analyses of adaptation options in the local context, most adaptation options present only generically assumed costs and benefits. Local data have been used to the extent possible. The adaptation options analysed consist of the introduction of climate resilient crop varieties, water management for agricultural purposes trough drainage and storage, agricultural parametric insurance and sustainable livestock practices, focusing on rotational grazing. All these options produce economic and climate adaptation benefits, but due

to the uncertainty concerning accurate costs and benefits, it has not been possible to provide detailed information on implementation potential, investment needs, potential savings and revenues and enhanced resilience. It is therefore difficult to assess the financial instruments and mechanisms most appropriate to the effective enhancement of private climate finance flows into these activities.

4.1 Introduction of climate resilient crop varieties

In responding to changing climate with more and more unpredictable conditions and extremes, choosing crop varieties that are resistant to climate change is an important measure to build agriculture business's resilience. Identifying the most suitable variety for a certain crop requires in-depth research and piloting practice which normally runs for extended periods. For example, Belize Sugar Industries Limited (BSI) has been testing several cane varieties in the last decade. The entire research process involves five major stages spanning a minimum of ten years:

- Stage I: initial testing by selected farmers with a wide range of varieties.
- Stage II: selection of approximately 10% of the varieties from Stage I.
- Stage III: evaluation of yield and quality.
- Stage IV: long-term study of the varieties over 2-4 years.
- Stage V: multi-location piloting with selected varieties.

4.1.1 Costs of switching crop varieties

While such experimental practice at society level requires a huge investment in time and money, at the level of the individual agriculture business, a decision on whether to switch the current crop to a new climate-resilient variety will depend largely on the cost and potential investment return of such a change. To provide a more targeted discussion, this study takes sugar cane cropping in Belize as an example.

Table 15 summarizes the potential costs of switching the current sugar cane variety to a new one. Taking all cost items into consideration, it would cost $543 to replant 1 Ha of sugar cane in Belize.

Table 16. Table 15 Cost of replanting sugar cane[6]

Activities	Costs (USD)	
	per acre	per ha
Land preparation	410	166
Planting	690	279
Fertilizing	150	61
Integrated pest management (weed)	91	37
Total cost	**1,341**	**543**

Assuming the proposed draft NDC 3.0 target of 5,000 ha by 2030 with improved agronomic practices on arable sugar land, investment costs would amount to $2.72 million.

4.1.2 Benefits of switching crop varieties

The potential benefits of switching crop varieties come from the expected increased productivity. During the above-mentioned project, BSI collaborating with the CCCCC tested 11 sugar cane varieties' performance and adaptability in selected regions. According to the test results, the majority of the 11 tested varieties had a clear productivity increase of 2% -36% compared to the existing variety. Only four tested varieties showed a slight decrease of 2%- 6% of the productivity comparing to a certain type of the existing variety (Table 15) (GCF; CCCCC; BSI, 2022). In practice, this decrease could easily be avoided by not switching the existing varieties.

Table 17. Productivity increase compared to reference sugarcane varieties (GCF; CCCCC; BSI, 2022)

Variety No.	Productivity increase per Ha compared to reference varieties
BBz07015	**25% -30%**
BBz07144	**-6% - 32%**
BBz07155	**16% - 23%**
BBz08353	**2% - 19%**
BBz09592	**3% - 36%**
BBz09612	**-2% - 30%**
BBz09626	**-2% - 30%**
BBz081124	**-3% - 13%**
BBz00759	**21%**
BBz02403	**34%**
BBz02552	**9%**

6 Data obtained from Sugarcane Industry for Research and Development Institute (SIRDI) in July 2024.

While data on switching crop varieties are not available for all types of crops in Belize, the above data clearly show that adopting new crop varieties could increase the climate resiliency and adaptability of a certain crop and hence increase the income of agriculture business owners in the long run. It has not been possible to estimate potential aggregate improved revenues for sugar replanting due to limited data and high level of uncertainty.

4.2 Diversification from monoculture to multiple crops

Globally, monoculture is widely practised, responding to the growing food demand in the past few centuries (Tilman, et al., 2001). However, monoculture often causes problems such as yield decline, soil erosion and additional need for fertilization and other costs (Lehtonen, et al., 2020). Moreover, monoculture practice faces more and more challenges in coping with the changing climate and associated extreme weather events, e.g., droughts, heatwaves or extreme precipitation. To face climate-related risks, and to address the problems caused by monoculture, one adaptation option is crop diversification. Crop diversification could be applied as spatial diversification and temporal diversification. Spatial diversification refers to growing different crops in a given field at the same time; while temporal diversification is the practice of crop rotations or crop sequences on a given plot of land (Hernández-Ochoa, et al., 2022).

Diversified cropping practice can bring environmental and social benefits to the agriculture sector. Environmentally, due to different root structures of different crops, and distribution in the soil, it can enhance energy efficiency by improving total energy input/output ratios by two to four times (Prieto, et al., 2015) (Chappell & Lavalle, 2011). Diversified cropping also increases water resource efficiency due to improved soil cover and soil capacity for water absorption and retention, lower run-off and evaporation (Gómez, Sobrinho, Giráldez, & Fereres, 2009) (Zuazo, et al., 2009). Studies show that crop rotation results in 15-20% higher water volumes percolating through soil hence more groundwater recharge (Rodale Institute, 2015). Moreover, crop diversification creates multiple microclimates which could reverse soil degradation, rehabilitate degraded land and rebuild soil fertility (FAO, 2015). Compared to monocultures, multi cropping practice can reduce the damage caused by pests and diseases (Pellegrini & Tasciotti, 2014) and shows an increase of 15% in biodiversity effects.

Socially, crop diversification provides farming communities with more resilient livelihoods as a self-insurance while facing crop failure or loss of livestock (Gliessman, 2007) (Johnston, Vaupel, Kegel, & Cadet, 1995). Diversified cropping often involves traditional and locally-adapted knowledge and hence contributes to conserving local crop varieties and specialities (Johns, Powell, Maundu, & Eyzaguirre, 2013). Diversified cropping, especially crop rotation potentially also increases farm labourers' employment and can help spread the labour more evenly throughout the year (IPES-Food, 2016).

Economically, according to IPES-Food (2016), so far there are limited comparative data on the long-term productivity of industrial monoculture as against diversified crop systems. Nevertheless, when considering total outputs rather than the specific crop yield of a given plot of land, existing data show that diversified systems in general have higher productivity. For example, total productivity of grassland increases as the number of species grows (Tilman, et al., 2001). Specifically as regards yield harvest, on average, multispecies crops produce 15% - 79% higher outputs or 1.7 times more biomass than monocultures (Picasso, Brummer, Liebman, Dixon, & Wilsey, 2008) (Cardinale, et al., 2007). A study also predicts that food production in Africa could be doubled by diversity farming in 3-10 years (Pretty, Toulmin, & Williams, 2011). The increased productivity is because crop diversification can improve land's resilience to climate risks and pest-related hazards. For example, in Nicaragua, during Hurricane Mitch in 1998, spatial and temporal diversification practices contributed to 40% more topsoil, higher field moisture, 18% less land lost and 69% less gully erosion compared to conventional farms (Holt-Giménez, 2002). In Kenya, maize yields were doubled by multi cropping livestock grass that can trap insects (Khan, Midega, Pittchar, Pickett, & Bruce, 2011).

According to FAO (FAO, 2013), the economic effects of natural disasters can be mitigated through crop diversification, especially in regions that are vulnerable to hurricanes and floods. Given the above advantages i.e., increased productivity, reduced cost of fertilization and water resource, diversified cropping can increase the agriculture sector's resilience to climate risks and thus contribute to more resilient livelihoods with a stable income. Data from the Netherlands show that a 25% higher labour income/ha through multi cropping could be expected.

Consultations with the Citrus Growers' association led to the gathering of information on costs for the use of patents of HBL-resistant citrus tree varieties at $1 per plant, but the HBL-resistant species' productivity and suitability to local climate conditions and the expected impacts of climate change have not yet been assessed.

Due to limited data availability and given the high variety of potential crop diversification practices, it has not been possible to establish precise costs and benefit estimates in the local Belizean context. However, it is evident both from

stakeholder consultations carried out during the project and from literature research that investments in crop diversification have the potential to lead to a wide range of economic and environmental benefits for Belizean farmers, while enhancing resilience to climate change. Farmers should therefore be supported in activities involving crop diversification.

There is currently no proposed NDC 3.0 target specifically relating to crop diversification, but it could potentially be integrated into the existing draft target of 15% in increased penetration of Climate-Smart and Sustainable Agriculture solutions on Belizean farms (Climate Analytics, 2025).

4.3 Water resource management

Water resource management and storage techniques for agriculture are considered as one of the prioritized solutions for climate-smart agriculture. Water storage refers to the practice of harvesting and storing water from non-permanent water sources during the rainy season as a supply during the dry season. Such techniques mitigate farmers' vulnerability to drought hazard and build their resilience in continuing business even during drought periods. Table 16 shows a few examples of water management techniques that were proposed for different crop systems in Belize.

Table 18. Water management measures for crop systems in Belize (CIAT & World Bank, 2018)

Crop	Water harvesting and irrigating techniques
Citrus	**Raised beds to improve drainage capacity (water infiltration)**
Rice	**Water harvesting ponds to increase water availability**
	Water-efficient irrigation
Banana	**Drainage canals and drip irrigation**
Vegetables	**Drip irrigation**

4.3.1 Costs of water management options

Costs for different water storage options (reservoir, tank and well) including the construction costs and operational/ maintenance costs have been collected, to analyse the investment suitability of water management techniques options proposed for Belize. Costs for drainage canals in Belize are not available.

Table 19. Cost of selected water storage techniques in Belize

Storage techniques	Cost items		Cost (USD)
Water reservoir	Construction	Natural pond in 70' diameter without liner	$300
	Maintenance	Annual upkeep	$70 (per year)
Water tank**	Tank*	2,640 Gal/ (10,000 L)	$2,150
		1,320 Gal / (5,000 L)	$836
		660 Gal (2,500 L)	$489
	Construction	Vat Stand	$675 (one time)
Water well**	Construction	Construction cost includes 6" PVC casing for the first 100 feet. USD$53 (plus GST) per foot after 100 feet.	$5,906

*Notes: * Prices for BesTank Water Vat GREY; **No maintenance costs for water tank or well*

In a recent study looking into the potential costs and benefits of applying water management measures in the agriculture sector in three watersheds (Belize River, Rio Hondo and New River) in Belize with gravity canals and water harvesting, the FAO estimated the investment costs for different options at between $2,000 and $10,000 + per hectare, with annual operational costs of between $100 and $1,000.

According to national statistics, the total area under agriculture in 2023 was 123,246 Ha (Ministry of Agriculture, Food Security, and Enterprises, 2025). Assuming the lower range of water management costs estimated by FAO at $2,000/ ha, and assuming 15% of farmers would adopt water management practices, aligned with draft NDC 3.0 targets (Climate Analytics, 2025), approximately 18,500 Ha could implement water management practices, with an estimated total investment of $37 million.

4.3.2 Benefits of water management options

The potential benefits of such water management techniques could be estimated based on the historical and projected data on agriculture losses and damage. The agricultural sector, a major contributor to the Belizean economy, is greatly affected by severe droughts, leading to reduced productivity. According to the Ministry of Agriculture, due to droughts, Belize had a 30% reduction in sugar cane production and a 60%-100% reduction in corn production for the 2019-2020 crop (Department of the Environment, 2024). Belize expects a projected loss of agriculture production of 10% - 20% by the year 2100 (Government of Belize, 2021). Specifically, without irrigation systems, by 2060 sugar cane, cabbage and onion yields are expected to decrease by 17%,

44.3% and 47.5% respectively and maize production would no longer be viable (Sabrie, Loyola, & Monzini, 2024).

According to FAO (Sabrie, Loyola, & Monzini, 2024), both water drainage and storage techniques show profitable potential in the Belizean context. The Internal Rate of Return (IRR) for such applications in different crops were calculated and are shown in Table 12. The analysis results show that the agricultural drainage option (referred to as gravity canals) is suitable for investment for selected crops/plants in selected regions. It is most relevant for vegetable plantations in the Belize River watershed, which shows that all analysed investments in both gravity canals and water harvesting have an IRR above 18%. For the same region, gravity drainage canals could also be considered for corn/beans rotation, where 55% of the investment is considered as suitable. But for other watersheds (Rio Hondo and New River), gravity drainage canals are considered not suitable for investment either for sugar or corn/beans rotation, where IRR is mostly less than 12%. As for the water harvesting option, except for vegetable planation in the Belize River watershed, it does not seem like a suitable investment for other crops (sugar and corn/beans rotation) in any of the three watersheds.

Table 20. Suitability of agriculture water management techniques

Watersheds	Techniques	Crops	Internal Rate of Return (IRR)
Belize River	Gravity canals	Vegetable	• 100% have an IRR of more than 18%
		corn/beans rotation	• 55% have an IRR of more than 18% • 29% have an IRR of between 12%-18% • 16% have an IRR of less than 12%
	Harvesting	Vegetable	• 100% have an IRR of more than 18%
		corn/beans rotation	• 100% have an IRR of less than 12%
Rio Hondo	Gravity canals	Sugar	• 18% have an IRR of between 12%-18% • 82% have an IRR of less than 12%
		corn/beans rotation	• 13% have an IRR of between 12%-18% • 87% have an IRR of less than 12%
	Harvesting	Sugar	• 100% have an IRR of less than 12%
		corn/beans rotation	• 100% hectares have an IRR of less than 12%
New River	Gravity canals	Sugar	• 8% have an IRR of between 12%-18% • 92% have an IRR of less than 12%
	Harvesting	Sugar	• 100% have an IRR of less than 12%

*Note: *IRR < 12%: unsuitable for investments; 12% < IRR<18 %: suitable for investment with more analysis required; IRR>18 %: priority areas for investments.*

*** The analysis is based on economic costs and benefits excluding social, institutional and indirect benefits.*

It should be noted that due to data limitation and the generic nature of this analysis, the results of this discussion are subject to the specific cases with clearly defined geographic location and boundary, as well as determined type of crops. It has therefore not been possible to estimate potential aggregated benefits from the investments in water management.

4.4 Climate-related insurance

In some cases, investments in adaptation technology and practices might not be enough, as it can be expected that vulnerable farmers and livestock producers will still be exposed to increasingly frequent and severe climate events. Private investments in the form of insurance can provide framers, fisheries and livestock producers with a lifeline in the events that crops or outputs fail due to climate-related events. Insurance consists of a market-based approach where the insurer de-risks the production outputs in case of climate events affecting production. Climate-tailored insurance products targeting farmers, fisheries and livestock producers do not exist in Belize, and even regular insurance is commonly not available to farmers. Therefore, there is a need to assess producers' willingness to pay, while sensitizing the insurance industry and assessing its needs to enable the provision of innovative insurance products related to climate change. Gaps might be closed by attracting support from the international community and re-insurers with a longer track record in assessing climate-related risks.

Agriculture parametric or weather-index insurance products refer to insurance policies that issue payouts based on pre-determined triggers of a given hazard event, such as excess rainfall or drought. The pay-outs are pre-calculated based on risk models and hence could be made very quickly after the hazards. They differ from traditional insurance policies which require individual assessments of losses and damages. Agriculture parametric insurance is considered as a typical risk transfer measure especially for small agricultural business owners and could provide rapid compensations for them to respond to damage and loss to their livelihood. Taking flood index insurance as an example, a study on 22 flood adaptation measures in San Pedro Sula, Honduras, based on cost-efficiency criteria for adaptation/risk reduction shows that it is an efficient option which can serve as an interim protection while grey measures (drainage system, water collection, flood-proofing houses and building dams) are implemented (UNU-EHS & Frankfurt School of Finance & Management, 2021).

In developed countries, more than 40% of the direct losses caused by climate disasters are insured, while this number is less than 10% in middle income countries and less than 5% in low-income countries (Munich RE, 2024). In the Caribbean

and Central America, the CRAIC project *Climate Risk Adaptation and Insurance in the Caribbean* was initiated to develop weather-index based policies to help vulnerable, low-income individuals recover from hurricanes and tropical storms. The key product promoted by the project is the Livelihood Protection Policy, a weather-index insurance product against heavy rainfall and strong winds. The project took Belize as one of the prioritized countries for phase II of 2016-2019, where total payouts of $216,073 were triggered by excess rainfall from tropical cyclone Earl in August 2016 in Belize (CCRIF, 2019).

There used to be parametric insurance for bananas and papayas in Belize, but no agricultural insurance is currently offered (Gomez, 2024). The Ministry of Finance through the Office of the Supervisor of Insurance is in the process of developing and introducing insurance products to Belize for both agriculture and fisheries, with fisheries currently being the more advanced. The products are based on a regional approach for the Caribbean through the Caribbean Catastrophe Risk Insurance Facility. The process is currently waiting for the definition of the risk profile of Belize, which will have a final impact on the cost of the insurance.

Insurance products are expected to be established within the next couple of years. However, for the insurance products to be viable for private insurance companies, there is a need for scale and the willingness to pay for the premium of final beneficiaries. Experience indicates that there might be limited knowledge, experience and willingness to pay for insurance products.

For an individual farmer, the decision on whether to pay for such insurance policy is based on the cost- benefit ratio of premium payment. While there are no data on the cost of such insurance policy for individual farmers in Belize, references could be made to a similar context. For example, the LPP launched in Saint Lucia and Jamaica in 2013 has a premium costing up to 13% of the maximum policy payout. In Saint Lucia, an annual premium of $48 provides coverage of up to $370 (the lowest level of coverage offered). And in Jamaica, an annual premium of $53 provides coverage of$400. The maximum coverage available on a policy is $4,000 but policyholders can purchase more than one policy. In Saint Lucia, as a result of excess rainfall from tropical cyclone Matthew in September/October 2016, 31 small farmers received total payouts of $102,000 with an average of $3,290 per policyholder (CCRIF, 2024).

The draft NDC 3.0 targets propose the ambition under loss and damage to examine opportunities for wide crop insurance to cover all Belizean farmers (Climate Analytics, 2025). Assuming a similar premium to that of Saint Lucia would apply in Belize, and that the lowest premium of $48 would apply to all 13,000 farmers (Ministry of Agriculture, Food Security and Enterprise, 2024), farmers' total yearly investment in insurance would amount to $624,000 ($3,120,000 for the five years to 2030), although investments will depend on the actual availability of insurance products. For insurers to offer products, there will be a need for scale and for farmers to be willing to pay. Insurance-related challenges and recommendations are discussed in more detail in Sections 2.7.5 and 7.4.

4.5 Climate-smart livestock practices

Conversion from conventional farming to climate-smart practices is a priority climate action in Belize. Livestock production is one of the fastest growing activities in the agriculture sector, also receiving special attention in the NDC and proposed targets for the NDC 3.0. Silvo-pastoral practices considered by the sector stakeholders revolve mainly around electric fencing for pasture rotation management in the short term (e.g. up to 2030), and tree planting and fodder banks in the longer term. although livestock farmers are reluctant to plant trees, as this is a longer-term activity, and differs from their usual approach to pasture management (Usher, 2024).

Pasture management is the top priority because it relates to the availability of cattle feed. The increasing unreliability of weather patterns, especially prolonged dry seasons, impact the availability of feed for cattle and increase the vulnerability of livestock farmers. Longer droughts and dry periods have had a negative impact on production. The easiest climate action to take in the short-term is to improve pasture management through the division of smaller paddock sizes using solar panels for electric fencing, which ensures better management of the pastures, allowing faster regrowth of the grass, and improving the availability of good pastures into the dry season (Usher, 2024). This enables livestock to remain on pasture for longer.

4.5.1 Costs of electric fencing for rotational grazing

Regular paddock sizes in Belize range between 8-20 ha (20-50 acres). With electric fencing, they can be split into smaller paddocks, allowing for efficient rotation management. The animals are kept in the smaller paddock for a maximum of two days and then moved to the next paddock, allowing the grass to rest and recover. This approach also contributes to building soil carbon. In addition, since more grass is available, the farmer can have more animals per acre, increasing the farm's productivity without having to deforest. It is a mitigation measure in terms of preventing deforestation, while adapting to the changes in climate, allowing the grass to survive and recover more easily, also during the dry season.

Considering the investments in electric fencing, the costs vary with different farm sizes, with larger farms achieving lower costs per acre (see Table 19).

Table 21. Estimated cost of electric fencing for livestock paddock rotation in Belize (Usher, 2024)

	Size (acres)	CAPEX USD/ acre	CAPEX USD/ ha
Small farm	<50	175	71
Medium farm	50-100	125	51
Large farm	>100	75	30

Another option is the establishment of live fences based on trees and bushes, including leguminous plants that can be used as forage. Investment costs range between $10and $16/Ha (Usher, 2024). However, this action requires more time for the plants to grow to the needed size. It could also be implemented in combination with electric fencing. Assuming the draft NDC 3.0 targets of bringing 5,000 Ha of livestock systems under improved management, investments could amount to $255,000 for electric fencing.

4.5.2 Benefits of rotational grazing

Due to the lack of data in the Belizean context, it has not been possible to estimate the economic benefits of rotational grazing. However, rotational grazing allows livestock producers to better manage their pastures and improve the availability of feed for the livestock. The higher productivity of the pastures based on rotational grazing as opposed to continuous grazing also allows an increase stocking rate (units per acre) in the farms. A study in the US on dairy farms concluded that intensive pasture rotation, where pasture areas were divided into six paddocks per farm on average, provided livestock farmers with a higher gross return, compared to continuous grazing pastures, $52/ha, and $30/ha respectively (Cunningham & Hanson, 2024). Assuming higher returns of approximately $20/ha, the investment in electric fencing can potentially have a short return on investment, although, since economic benefits are very context-specific, no conclusive numbers can be provided here. Farmers should in any case consider the benefits of enhanced resilience to drought, and support should be provided to facilitate investments in rotational grazing and farm water management.

4.6 Explore new technologies for income diversification and enhanced resilience

In addition to the priorities and main adaptation related activities identified above, there could be room for the identification of alternative technologies for income diversification and enhanced resilience, which would further be identified through the stakeholder consultations on the ground.

One specific technology is the expansion of existing aquaponics systems. Aquaponics provide a system of aquaculture in which waste produced by farmed fish or other aquatic creatures provides nutrients for plants grown hydroponically. The plants in turn purify the water, providing a service for the thriving of the fish/aquatic creatures. Increased use of aquaponics can help in addressing challenges identified in both agriculture and fisheries, addressing water shortage and providing scalable production alternatives.

4.7 Aggregated results for selected adaptation measures

The adaptation benefits in terms of enhanced resilience and reduced loss and damage are hard to quantify with a reasonable level of certainty, including farms' improved production and profitability of selected measures. Nevertheless, the available literature and data show that all the selected adaptation measures have the potential to provide more monetary benefits than investment costs and are all considered highly relevant for private sector investments.

Investments in water management, including water drainage and storage are the largest investment among the proposed measures, and the largest coverage in terms of hectares. Electric fencing is the measure with the smallest investment needs. Total investments in the adaptation measures analysed would amount to approximately $43 million (see Table 20).

Table 22. Summary of potential investments and coverage of selected adaptation measures

Measures[7]	USD	Coverage / beneficiaries	Unit
Climate resilient sugar cane replanting	2,720,000	5000	ha
Water management	37,000,000	18500	ha
Livestock electric fencing	255,000	5000	ha
Insurance	3,120,000	13000	farmers
Total investments	**43,095,000**		

7 Costs and benefits for crop diversification are not included due to limited data availability

Looking into how these private sector investments would contribute to closing the NDC finance gap, it can be seen that the remaining investments needed in climate-smart agriculture would be more than halved from 63%, leaving a remaining finance gap for climate-smart agriculture of 26% (see Table 21). This includes insurance as this was classified under agriculture actions in the NDC Resource Requirement Report (Government of Belize; NDC Partnership, 2021). Electric fencing for livestock represents the smallest investment contribution until 2030 and only reflecting 2.55% of the remaining finance gap for the Sustainable crop production and livestock management action line, it would not lower the observed finance gap for this specific action line considerably.

Table 23. Summary of potential adaptation investments NDC finance gap reduction

Action	Estimated total cost to meet target	Estimated gap (incl. unfunded activities)	Finance Gap in %	Estimated private sector contribution potential	Residual funding gap
Climate-smart agriculture	113,474,000	72,000,000	63%	42,840,000	26%
Sustainable crop production & livestock management	41,306,164	10,000,000	24%	255,000	24%

Ronald Plett, Pixabay

5. Enhance access to affordable finance for private investments in climate action

There is liquidity in the Belizean financial sector, but investments are hindered by the risk profile of clients and investments, lack of the required collateral and securities and lack of formalization of MSMEs. The additional and relatively high CAPEX required for climate action constitutes a barrier for investment by the private sector. Belize's small market size limits economies of scale in purchasing climate technologies. Commercial entities prioritize investing in their core business, and investments in climate action are not a priority, unless directly aligned with the core activities, products or services offered or required. In addition, many farmers and private enterprises that might have access to some collateral are already indebted to local financial institutions, to finance operations, inventory and inputs to farms (e.g. fertilizers, seeds etc.). Assets are often tied to existing debt and therefore not available as collateral for new loans. In short, although both renewable energy and energy efficiency investments show a positive return on investment, the lack of the required collateral and the cost of finance prevent enterprises and individuals from making the needed investments.

The same is true of farmers and livestock producers, who are unable and/or unwilling to invest in many crucial climate change adaptation practices/techniques due to the unavailability of the initial capital needed to do so. Farmers prepared to shift to practices resilient to climate change might also face an additional challenge in the form of lower production levels during the initial period immediately after the implementation of adaptation measures, such as replanting sugar cane, crop diversification and introduction of climate and pest-resilient crop varieties. When these adaptation measures are implemented, farmers will experience lower production levels during the first years, before the newly planted crops become as productive as and eventually more productive than the previous crops. This lower income during the first years after the investment is an additional barrier to investment, and to debt repayment. As a result, adaptation measures remain seldom implemented, and farmers' production and operations remain highly vulnerable and exposed to climate hazards. This carries potential negative consequences for their livelihoods, well-being, food security and the economy of Belize, given the importance of the agricultural sector.

There are three main instruments that can be offered to overcome the challenges described above:

- Concessional loans with lower interest rates to lower the cost of finance
- Concessional loans with longer grace periods to allow time for farms' productivity to improve
- Provision of guarantees to enable access to finance

The need for these financial instruments varies between the actions, the size and nature of the investment and stakeholders responsible for implementing the measures. Table 22 provides an overview of the need for the three instruments based on these parameters.

Table 24. Summary of potential adaptation investments NDC finance gap reduction

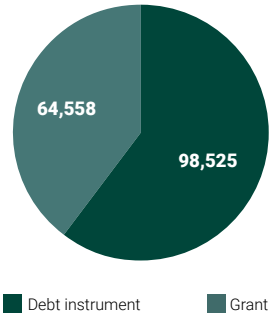
Sector	Action	Agents deploying the investment	Expected financing sources				Need for low-cost finance	Need for longer grace periods	Need for guarantees
			Commer. FI	Corp.	Households	Domestic public sector			
Renewable energy	Solar PV for distributed IPP	Private companies, landowners	High	High			Medium		Medium
	Solar PV for the commer. sector and hospitality	Private companies, hotel/ resorts	High	High			High		Medium
	Solar Water Heaters	Hotel/ resorts, households	Medium	High	High		Medium		Low
Energy efficiency	Public / office buildings	Private companies, ESCOs	High	High	Medium	High (potentially)	High		High
	Hotels and resorts	Hotel/ resorts, ESCOs	High	High			High		High
	Energy efficiency in MSMEs	MSMEs, energy service providers	Medium	High			High		High
Transport	Electric buses for public transport	Private operators	High	High		High (potentially)	High		Medium
	Electric cars	Businesses, households	High	Medium	High	Low	High		Low
Agriculture and livestock	Climate resilient crop varieties	Farmers	High	High			High	High	High
	Diversification from monoculture	Farmers	High	High			High	High	High
	Water resource management	Farmers	High	High		Medium	High	Medium	High
	Climate insurance	Farmers, livestock producers		High		High (potentially)	High		High
	Climate-smart livestock practices	Livestock producers	High	High			High	Medium	High

The following strategies are aimed at improving access to the three financial instruments that can in turn provide access to finance for climate-related investments.

5.1 Enhance access to climate finance from the international community

Belize has already taken important steps towards mobilizing climate finance from the international community. With the establishment of the Climate Finance Unit in 2022 housed within the Ministry of Finance, Economic Development and Investment, Belize has a dedicated hub for matters related to climate finance. This includes translation of climate actions and plans into strategies, projects, and proposals for funding, acting as coordination body with all national stakeholders, and as a knowledge and expert repository. The CFU has tracked the climate finance related support received between 2018 and 2022, amounting to 33 projects for a total funding amount of $125,730,949 (National Climate Change Office, 2024). Looking at the same data provided by the OECD DAC Climate Finance statistics for information on support provided by developed countries and multilateral funds to Belize, we can see that approximately $163,082,000 have been reported as climate finance provided to Belize.

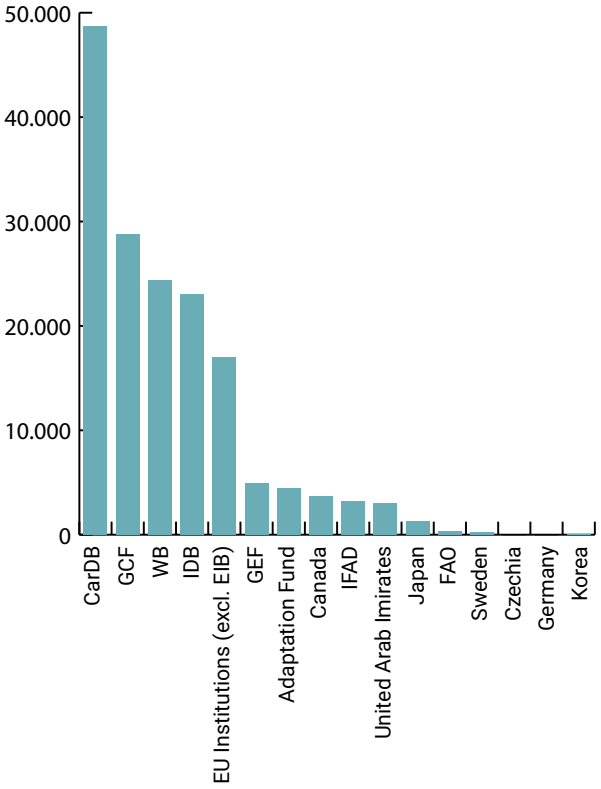
Figure 12. Climate related development finance by financial instrument (USD thousands) (OECD, 2024)



As can be seen in Figure 13, support received has been predominantly debt based, making up more than 60% of financial climate finance received. Belize expressed the need to stress grant funding rather than relying on debt instruments, to reduce the financial burden on Belize and improve its capacity to implement climate action (National Climate Change Office, 2024). However, it is usually easier to mobilize debt instruments at scale. Of total global climate finance flows in 2022, only 6.1% were grants (Climate Policy Initiative, 2024). In this regard, Belize has a relatively good track record in attracting grants. At the same time, zooming in on the debt component, most climate finance related debt received (almost 80%) was classified as not highly concessional or not primarily developmental debt. This illustrates that there is scope for finding ways to access debt finance with a higher degree of concessionality, which will be addressed in the next Chapter 5.2.

Looking at the international climate finance support providers, the Caribbean Development Bank is the largest source of finance, followed by the Green Climate Fund (GCF), World Bank, Interamerican Development Bank and the EU, followed by the remaining Climate Finance Mechanism vehicles, the GEF and Adaptation Fund. Canada is the largest bilateral donor followed by the United Arab Emirates and Japan.

Figure 14. Climate finance sources between 2018-2022 (USD thousands) (OECD, 2024)



5.1.1 Potential additional international sources of climate finance relevant for the prioritized actions

In addition to leveraging existing relations, Belize has established relations with bilateral and multilateral donors and DFIs and identified potential expansion to other bilateral and multilateral initiatives. The following initiatives have been prioritized based on the focus on private sector investments and related prioritized climate actions in Belize.

Table 24. Funds and initiatives relevant to the prioritized actions.

Fund	Description	Administrator	Financial instruments
Energy Transition Accelerator Financing Platform (ETAF)	ETAF facilitates funding and de-risking services for projects subject to the credit and risk guidelines and approval processes of ETAF Funding Partners. The platform is open for commercially feasible projects demonstrating a high degree of readiness, located in IRENA member countries (or in accession). The platform supports various types of clean technologies such as renewables (power generation and end-users), energy conservation and efficiency, electrification of end-users (heating and cooling, e-transport), and sustainable bio-energy.	IRENA	
AgroLAC 2025 Multi-donor Trust Fund	Specifically, this platform aims to promote projects related to food and crops of value-added commodities, livestock, fisheries, agroforestry and those related to institutional capacity and governance. The fund is part of IDB's NDC Invest Platform, a one-stop shop of the IDB Group to help countries access resources needed to translate national climate commitments into investment plans and bankable projects.	Inter-American Development Bank (IDB)	Grants, Loans (concessional and market-rate)
Climate Investment Funds (CIF)- Pilot Programme for Climate Resilience (PPCR)	The Pilot Programme for Climate Resilience (PPCR) is one of three targeted programmes that make up the Strategic Climate Fund (SCF) of the Climate Investment Funds (CIFs). It supports national governments in integrating climate resilience into development planning across sectors and stakeholder groups. It also provides funding to put these plans into action and pilot innovative public and private sector solutions to pressing climate-related risks.	World Bank	Grants, Loans (concessional and market-rate) Other
Access to Energy Fund	The Access to Energy Fund is jointly initiated by the Dutch government and FMO in 2007 to support private sector projects aimed at providing long-term access to energy services in emerging markets and developing countries. The fund can directly invest in or lend to a project or motivate a wider range of investor interest.	FMO Netherlands Development Bank on behalf of the Ministry of Foreign Affairs	Grants, Equity, Loans
Canadian Climate Fund for the Private Sector in the Americas (IDB) -Phase II	The Canadian Climate Fund for the Americas (C2F) aims to catalyse private sector investment in climate change mitigation and adaptation in Latin America and the Caribbean. The fund co-finances the IDB Group's private sector climate projects in Latin America and the Caribbean that need concessional financing to be viable.	Inter-American Development Bank and IDB Invest	Loans (concessional and market-rate) Other
InsuResilience Investment Fund (IIF)	The InsuResilience Investment Fund (IIF) provides Private Debt and Private Equity investments to improve access to and the use of insurance in developing countries. The specific objective of the fund is to reduce the vulnerability of micro, small and medium enterprises (MSME) as well as low-income households to extreme weather events. It provides loans to, and makes equity investments in, financial institutions and insurers in these countries, enabling them to offer insurance to their clients against the impacts of climate change. The Fund also provides technical assistance e.g. for product design and development and – temporarily and to a very limited extent only – subsidies to reduce the premium payments for the end-clients.	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH	Loans, Equity
Mitigation Action Facility	The Mitigation Action Facility, evolved from the NAMA Facility in 2023, a grant-based multi-donor fund providing technical support and climate finance for ambitious mitigation projects with an aim of decarbonizing key sectors (energy, transport, and industry) of the economy and society.	Mitigation Action Facility	Grants

5.1.2 Enhance direct access to non-grant-based finance from international climate finance sources

Currently, Belize only has one direct access entity that can engage with the UNFCCC Financial Mechanism. The Protected Areas Conservation Trust (PACT) is both a National Implementing Entity accredited by the Adaptation Fund, and a Direct access Accredited Entity of the GCF. PACT is only accredited to access grants up to $10 million and cannot provide on-lending or blending finance. The Caribbean Community Climate Change Centre is a regional accredited entity which is based in Belize. It is accredited to manage projects of between $10 million and $50 million but can also only manage grants and cannot blend or on-lend finance to final beneficiaries. This limits the amounts of climate finance that can be accessed and leveraged by the international community directly without going through other accredited intermediaries, which ultimately raises the cost of finance.

DFC is currently seeking accreditation by the GCF and has the capacity to manage loans and do on-lending. Having direct access to GCF financing with high concessionality conditions will enable DFC to offer on-lending and/or blending

for loans, equity and/or guarantees at a lower cost than is currently possible through intermediaries. DFC should therefore continue pursuing these efforts, enabling direct access to the GCF. DFC direct access could also assist in capitalizing national financial mechanisms to offer lower cost finance (lower interest rates), loans with longer grace periods, and guarantees, enabling access to finance for private investments that are currently not possible due to lack of collateral.

5.2 Creation of a national revolving fund to provide low-cost finance and longer grace periods.

Belize should aim to establish a national fund/Trust that could provide low-cost debt for investments in climate action. Such a fund/Trust could initially be capitalized through Government funds and international support providers. The Guyana REDD+ Investment Fund (GRIF) established in 2010 is an example of a national fund which has implemented private sector targeted projects, providing low-cost finance and grants for SMEs[8]. DFC already plays a key role in providing concessional finance at lower costs, and already offers lines of credit for all the mitigation and adaptation prioritized measures described in Chapters 3 and 4. DFC accesses loans from international climate finance providers, mainly the Caribbean Development Bank, and provides on-lending to final beneficiaries in Belize. However, the use of intermediaries ultimately increases the cost of finance, which could otherwise be provided at a lower cost. The fund would ideally be hosted by an entity which has achieved accreditation by the major climate funds (i.e. GCF and Adaptation Fund), including for on-lending.

The fund should be of a revolving nature, continuously recycling capital as loans are repaid, allowing the fund to be self-sustainable over time. The absence of intermediaries would contribute to lowering the cost of finance, the only expenditures being the administrative costs and losses of the fund. These expenditures should be matched by the interest and fees charged to borrowers, ensuring the revolving fund is self-sustainable. In addition to lowering the cost of finance, the fund would also have the capacity to offer longer grace periods for investments in activities that involve a delay before benefits materialize.

The fund/Trust could be structured with a combination of equity financing, debt financing, and blended finance mechanisms to cater to a range of projects of different sizes and risk profiles. It could provide Equity, Debt or Blended Financing. Equity financing would be used to enable large-scale climate infrastructure projects such as utility scale renewable energy plants (solar and wind), and larger projects in agriculture, or eco-tourism resorts. Equity investors may include impact funds or even venture capitalists looking for both financial returns and climate impact. Debt financing would focus on providing loans at concessional rates and/or conditions for medium-sized projects such as rooftop solar PV, energy efficiency upgrades for buildings, climate-smart agriculture etc. This could be managed by local commercial banks with co-financing from the Fund/Trust. Blended financing could use concessional capital (from international climate funds/donors) to de-risk investments for local financial institutions (banks and credit unions). For example, with the provision of guarantees to support higher-risk projects/lenders which lack collateral to invest in climate action and cannot access loans from local financial institutions.

The Government of Belize could act as a seed capital investor or contribute with tax incentives, and policy support for private sector engagement. The government would also oversee the fund's compliance with national climate goals for enhancing private sector investments in climate action. Local private sector entities, international private sector firms, impact investors, climate-focused investment funds, and development financial institutions could also contribute capital to the fund. Similarly, international organizations, such as the GCF, and other donors could provide additional concessional financing or technical support to ensure that the fund is effective and operational. In addition, there are a variety of climate-related projects and programmes implemented in Belize which bring in some form of support for financing activities in the private sector, e.g. the GCF financed project *Building the Adaptive Capacity of Sugarcane Farmers in Northern Belize* which seeks to support replanting, water drainage and irrigation and a variety of other activities aligned with the prioritized measures for private investments described in this document. All support lines from these separate projects which target investments by the private sector could be channelled through the same fund, and thus also contribute to its capitalization. Finally, local banks and credit unions could also participate, both as investors and as channels for lending and facilitating financing for smaller enterprises.

To ensure transparency and proper management, the fund could have a Governance Board with representatives from the government, the private sector, financial institutions, and civil society organizations. The board would be responsible for overseeing the fund's strategic direction, approving investments, and monitoring outcomes. The fund could have

8 The GRIF project Micro and Small Enterprise (MSE) Development and Building Alternative Livelihoods for Vulnerable Groups

a dedicated investment committee responsible for reviewing proposals and making investment decisions. The committee would consist of experts in climate finance, environmental sustainability, and Belizean market dynamics.

5.3 Provision of guarantees to improve access to finance for climate investments

Many of the potential beneficiaries of credit for investments in climate action lack sufficient collateral. Credit unions and banks need collateral for loans. Especially farmers, but also tourism operators and other business who already have their assets tied up in existing debt do not have the capacity to access additional finance to invest in climate technologies which could enhance the profitability and resilience of their business. The main barrier for financial institutions remains the clients', and investments' risk profiles. The lack of collateral and assets available to act as collateral, and the perceived risk of investment in climate technologies given their relative novelty prevent financial institutions from providing finance for climate investments on a large scale. Here, the provision of guarantees could partially overcome the main barrier of access to finance for formalized private enterprises with sound investment opportunities in climate-related activities.

The government should strive to establish a credit guarantee mechanism, offering guarantees to local banks and credit unions for loans to private sector investors in climate action. The guarantee mechanism could be capitalized by international donors, ideally backed by the government. Such a guarantee could be embedded in the same fund structure as described above. The guarantee mechanism would help to mitigate the financial risks for local financial institutions, which might see the projects as risky, either due to their non-familiarity with climate technologies and measures, or to the client's, lack of history with the financial institution or lacking the necessary collateral.

The guarantee could be provided for a fee, covering the fund's administrative costs and losses, allowing its replenishment and long-term sustainability. The amount of the fee could also be geared to the level of risk associated with each project. High-risk projects would attract higher guarantee fees or premiums to cover the potential costs of defaults or claims. In any case, although contributing to the cost of finance, the guarantee will ensure a lower risk for the financial institution, thus keeping the cost of finance low and ideally below market rate, if dedicated concessional lines of credit are utilized, e.g. through existing DFC credit lines or through the proposed established fund.

The guarantee will enable banks to provide loans to commercial enterprises that currently do not have the required collateral to be considered for a loan.

Financial de-risking will enable financial institutions to gain experience with the prioritized climate measures and technologies, documenting the reliability of the investments with reduced risks. This will in turn contribute to attracting new investors who may have been hesitant to enter the market.

Risk assessment methodologies would need to be developed to ensure that guarantees are issued based on the specific risks involved in each project. This would include assessing the technical viability of the project, estimating the financial risk, considering potential cash flow issues, loan repayment capacity, and other financial indicators, and evaluating environmental and operational risks, particularly the likelihood of natural disasters, policy changes, or performance failures.

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6. Capacity Building and Stakeholder Engagement

The predominance of informal businesses, and the lack of records of cash flows and assets to show the historical health and performance of businesses, have been brought up repeatedly by credit unions and DFC. Many businesses, especially micro and small enterprises do not register, either for the lack of knowledge and capacity to go through the needed processes or to avoid taxes. These businesses are consequently unable to apply for finance from banking institutions. Similarly, farmers often do not have formalized bookkeeping, which is detrimental when trying to obtain a loan. In addition, many farmers and private sector enterprises are not fully aware of the benefits of the prioritized climate measures and lack capacity to implement the related technologies and practices.

The focus should therefore be on establishing climate projects with financial support from government and the international community for implementing the following recommendations:

- Increase the formalization of the private sector, especially for micro and small enterprises and enhance the business-related capacities for bookkeeping and the financial literacy of private enterprises and capacities to present investment proposals and interact with financial institutions
- Provide training through extension services and farmer field schools to improve capabilities for implementation of climate-smart agricultural practices
- Promote energy audits and the use of energy service companies to invest and implement renewable energy and energy efficiency projects.

6.1 Improve the formalization of the private sector

Beltraide and the Belize Chamber of Commerce and industry (BCCI) have in the past provided capacity building to enterprises on formalization and sound business practices. These should be expanded upon. The government should look for funding for establishing more permanent and recurrent programmes. The provision of capacity building could be dependent on businesses' formal registration to promote the formalization of the sector.

The programme should provide business formalization support, assisting businesses with guidance on registering businesses with the Trade & Companies Register, Social Security Board (SSB), and Belize Tax Service. It should host workshops on meeting legal and regulatory requirements, including business permits, tax obligations, and labour laws, and create partnerships with financial institutions to showcase tailored banking and financing options for newly formalized businesses.

The programme should also enhance financial literacy and record-keeping by providing basic accounting training, introducing bookkeeping, cash flow management, and the drawing up of financial statements, which could be supported by training on using simple accounting software and mobile apps for financial tracking. The provision of training on business management and growth strategies should also form part of the training, including assistance in developing solid business plans to attract finance and submit loan applications. The programme would also benefit from incorporating sessions with the local financial institutions guiding the local businesses on the process of submitting loan applications.

6.2 Extension services and farmer field schools

Developing capacities to implement climate resilient agricultural and livestock production practices will enhance the general production levels of the target population, improving their ability to respond to and recover from climate-related impacts. The proposed capacity building activities are already partly implemented in Belize through government and donor funding, although the establishment of capacity building activities aligned with the prioritized climate action through extension services and farmer field schools (FFS) would be needed to further promote private investment in these activities.

The Ministry of Agriculture already provides agricultural extension service, building capacity among agricultural producers, women, and youth of the rural areas of Belize through its District Agriculture Offices[9] in Cayo, Belize, Corozal, Orange Walk, Stann Creek and Toledo. These offices could serve as the hubs for the development and implementation of FFS to build awareness among target populations of climate-smart practices and investments and prepare them to make best use of the newly available financial support mechanisms. In addition to the offices, SIRDI could host sugar cane dedicat-

9 An overview and contacts to the offices can be found here: https://www.agriculture.gov.bz/district-offices/

ed field schools, as already implemented as a component of the "Creating a Sustainable Sugarcane Industry in Northern Belize'' project financed by the IDB. The farmer field schools could be established in collaboration with first mover farms which have implemented climate-smart practices.

The following activities should be considered:

4. Develop FFS curriculum in coordination with local associations and Research and Development Institutes (including local academic institutions), Beltraide and BCCI in collaboration with DFC, credit unions and District Offices of the Departments of Agriculture to develop and deliver financial literacy training

5. Deliver FFS programmes on (i) climate-smart agriculture and livestock practices, and (ii) financial literacy training, to target population.

    (i) FFS programme focusing on climate-smart agriculture and livestock practices to be delivered by the agricultural research and development institutions.
    (ii) FFS programme focusing on financial literacy training to be provided by Beltraide and BCCI in collaboration with DFC, credit unions and District Offices of the Departments of Agriculture.

6. Identify four model farms (two crop production and two animal production farms) aimed at testing and showcasing the benefits of the proposed interventions to the target populations. Use model farms as part of farmer field school programmes.

7. Provision of extension services aimed at assisting farmers and livestock producers in making best use of the proposed intervention by selecting the most effective and efficient new set of practices (suitable for their specific contexts). To be provided through the district offices of the Departments of Agriculture, who are currently responsible for providing agricultural extension services in Belize.

Implementing these activities would ensure that farmers and livestock producers are trained in climate-smart agriculture and livestock practices and made more aware of the available financial mechanisms and the advantages they present, allowing them to make informed decisions on their participation, and also giving them the skills needed to engage with financial institutions. As farmers become more informed, gain useful experience and financial knowledge, they will choose to take advantage of the available technologies and financial offers, and thus invest in farming and livestock production practices to improve the resilience of their operations.

6.3 Promote energy audits and the use of energy service companies

Energy efficiency in buildings is among the prioritized measures with the best return on investment, although energy efficiency still requires relatively high capital investments, and the relatively high cost of finance further hinders investment in energy efficiency by facility owners. The same is the case for private investment in solar PV. Private enterprises also mostly invest their available capital in their core business. Some investments in solar PV occur, especially off-grid or for Environmental, Social and Governance (ESG) concerns, especially in export-oriented businesses and tourism industry, but energy efficiency is often overlooked.

In the public sector, investments in energy efficiency are constricted by the corresponding institutions' annual budgets, and energy efficiency efforts remain in the domain of energy conservations through the use of voluntary soft measures, like switching off lights. The Ministry of Finance pays the electricity bills for public institutions (except for statutory bodies), so the institutions do not have a direct incentive to invest in renewable energy and energy efficiency.

The barriers mentioned above for both the private and public sector could be overcome by procuring energy service under an energy performance contracting (EPC) shared savings scheme where Energy Service Companies (ESCO) would invest on clients' behalf and be repaid through energy savings, agreeing with their clients on the sharing of the energy savings attained.

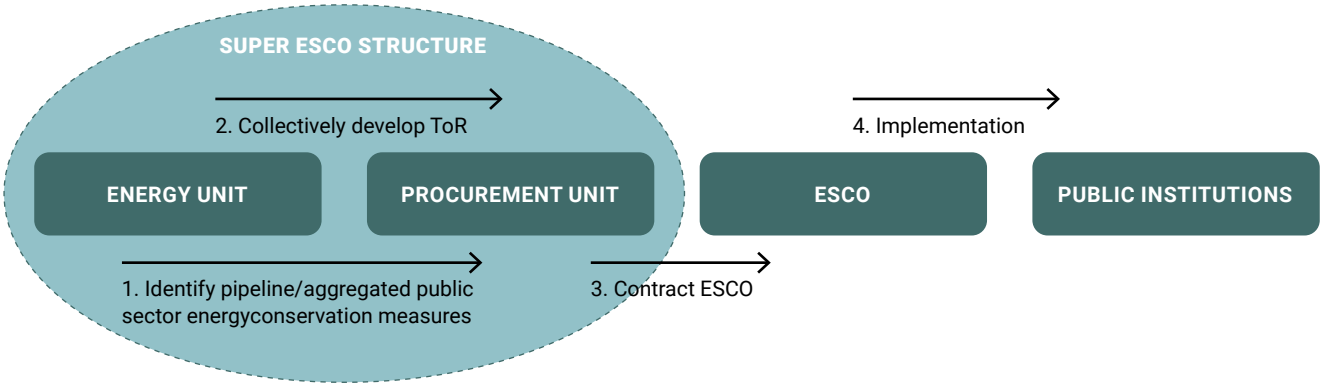
Figure 15. ESCO shared savings model (International Energy Agency, 2024)

There are currently only six energy service providers that offer renewable and energy efficiency services in Belize. Only one of these provides energy audits and implements energy efficiency measures, and none of them qualifies as an ESCO, with the needed capacity to invest on clients' behalf and implement EPC. Five have been identified as potential ESCO candidates (Development Finance Corporation, 2022). For ESCO projects, DFC already offers favourable loans, but prospective ESCOs might still lack the required collateral, and could benefit from the guarantee structure mentioned in Section 5.3. In any case, there is currently nothing preventing the private sector from engaging in EPC approaches, except the availability of ESCOs with the needed capacities in Belize. While the ESCO market in Belize is not well developed, there are in addition to the ESCOs present in Belize, ESCOs in the region that could potentially respond to calls for proposals.

Alternatively, BEL could also take on the role of ESCO, investing on the client's behalf, and being repaid through energy generated or saved. BEL already offers the installation of solar PV systems on larger commercial customers' rooftops through a leasing model. BEL's connection with the clients and established bill payment system could be a facilitator for expanding the scope to household level third party investments in solar technologies, like solar water heaters and smaller PV installations.

Public procurement of ESCO services could also be an effective strategy to attract foreign private sector investments for climate action in Belize, while ensuring long term savings in public expenditures related to energy. In Mexico there are several active ESCOs, and there is an active ESCO association[10]. In Trinidad and Tobago, the National Energy Corporation is establishing itself as a SuperESCO, the national entity coordinating the procurement of ESCO service. A similar Super ESCO structure could be considered in Belize. It could be managed by the Energy Unit under the Ministry of Public Utilities, Energy, Logistics and E-Governance, which could perform or coordinate the procurement of energy audits and ESCO services in public buildings in coordination with the Procurement Unit under the Ministry of Finance. Public institutions currently unable to invest in energy efficiency due to limited budget will be able to engaged in EPC with ESCOs, paving the way for private sector energy efficiency investments in public facilities.

Figure 16. Proposed public procurement structure for ESCO services



As DFC has already embarked on promoting ESCO implementation frameworks and financing through its energy efficiency and renewable energy loans, it could with government support, enhance awareness raising efforts to mobilize start-ups and encourage organizations to embark on EPC.

The government should also consider attracting international support to address capacity building needs for local professionals regarding design and follow-up on energy efficiency projects in the manufacturing, commercial and services sector. It should attend to the training needs of persons involved in procurement for them to master EPC contracts as well as capacity building needs for energy auditors to enable them to conduct investment grade energy audits. In addition, a suite of capacity building measures is required, ensuring that the financial institutions are able and willing to make use of the financial mechanism proposed, and end clients are willing and able to invest in renewable energy and energy efficiency measures:

- Review of public procurement rules to allow procurement of ESCO services
- Training of public officials on ESCO service procurement
- Development of contracting modalities for ESCO procurement for the public sector
- Training of energy service providers on monitoring and verification to enhance ESCO capacities
- Training of energy auditors to perform investment grade energy audits, requiring technical training in essential technologies
- Training of the finance sector and staff on assessing loan requests to enhance technical capacity and assessing risk of renewable energy and energy efficiency projects.

10 See Mexican Association of Energy Efficiency Companies AMENEER: https://www.ameneer.org/

Michael Hamann, Pixabay

7. Policy, Regulatory and Pricing Mechanisms for Private Climate Investments

Policies and regulations send signals to markets as well as regulating them, signals that ultimately influence investments of the private sector. Therefore, looking at current regulatory barriers and the creation of enabling policy and regulatory environments is highly relevant in terms of improving private sector investments in the prioritized measures.

7.1 Enabling policy and regulatory environment for renewable energy

Belize already has strong policies relating to renewable energy and energy efficiency, embedded in climate targets and strategies, and aligned with energy sector plans. There are also preferential import duties for Solar PV systems. However, the regulatory environment still lacks some central regulation that needs to be in place to allow for widespread investments and installation of decentralized solar PV systems. There is first and foremost a need for clear legislation requiring BEL to buy back surplus power generated by decentralized renewable energy sources, and related tariff structures. There are although plans to implement dual metering as proposed by the 2024 Full Tariff Review Proceedings (Belize Electricity Limited, 2024). Dual metering allows the implementation of feed-in-tariffs and allows households and businesses to connect their solar energy systems to the grid, and sell surplus electricity generated. Dual metering will not only encourage the widespread installation of solar PV but also empower consumers to lower their energy bills while promoting sustainability. By integrating dual metering and feed-in-tariff policies, Belize can incentivize solar energy adoption, create a more resilient and distributed energy infrastructure, and reduce the strain on conventional power sources.

One detail related to the regulatory environment concerns the reduced import duties on solar PV systems. In the case where batteries are imported separately, the reduced import duties do not apply, even though the batteries might be used in conjunction with the PV systems. This differentiation might disincentivize battery replacement or expansion in conjunction with PV systems. In general, the various components related to decentralized renewable energy systems should be subject to the same incentive structures. Especially while there is no clear regulation for selling electricity back to the grid, there should be a differentiation between taxation for standard batteries and batteries for systems which could further support the roll-out of renewables.

7.2 Enabling policy and regulatory environment for energy efficiency

There are regional energy efficiency building codes developed for the Caribbean, although these still need to be written into law. There is also an energy efficiency labelling scheme for selected appliances, but it is only voluntary. While there are ambitious targets for energy efficiency, energy audits and the implementation of energy efficiency measures are not mandated. The lack of enforcement of energy efficiency regulation and lack of clear mandated implementation instruments inhibits the achievement of Belize's large energy efficiency potential.

The introduction of mandated energy audits, at least for large energy consumers and large public and private buildings would be a first step towards raising awareness of energy efficiency and savings potential. This could be coupled with a public or industry led registry of authorized energy auditors and clear guidelines and requirements for energy audits hosted by the Energy Unit. This would enable the streamlining of audit methods and increase trust in the audit results. DFC already has a registry of available energy service providers in Belize and their capacities, also as ESCOs. The registry should be maintained and ideally transition towards a public registry with formal accreditation to enhance trust in the energy service providers' and ESCOs' competencies, to create trust in the technical ability of the ESCOs.

7.3 Enabling policy and regulatory environment for e-mobility

The Government of Belize has proven very successful in attracting support for the introduction of e-mobility for the public transport sector, although it can hardly be expected that all future e-buses will be provided through donor support. Government purchase of e-buses is also a large expenditure and a de facto subsidization of private operators. The main regulatory barrier for investments in e-buses by operators is the current length of Road Service Permits – two years, which does not provide enough security as to ability to repay the initial investment. Extending Road Service Permits to a period of eight years might be necessary to make investments in public e-mobility attractive for private operators. This should be coupled with a consideration of the available cost of finance for the operators. If finance is

provided through a concessional credit line, the length of the road permit could be shorter than eight years.

Investments in private e-vehicles face tough competition from the large influx of used cars from Mexico and the US. If private e-mobility is to be incentivized it would be wise to revise import duties on vehicles, making them dependent on fuel efficiency.

7.4 Enabling policy and regulatory environment for agriculture

There are a variety of support initiatives for the agriculture sector in Belize, although there are some government-led activities that could further facilitate investments, especially in water management and insurance. Needed investments in drainage have been identified, to adapt to the changing rain patterns and improve productivity in agriculture, especially in the sugar sector. While farmers could invest in drainage infrastructure on their own farms, there is a need for a national plan for main drainage arteries and ideally also water storage pools, to offtake and provide water back to single farms.

Agricultural insurance has been identified as one of the most important needs for enhancing the resilience of Belizean framers and securing their livelihood. However, Belize's size is a barrier to developing and offering product-based insurance products. The government should establish a clear policy on the provision of insurance products for farmers in Belize, and use experience from the region, e.g. from St. Lucia and Jamaica, with parametric insurance. In addition, it could strategically engage with insurers, donors and support providers e.g. the InsuResilience Investment Fund (IIF) to explore opportunities for support and subsidized premiums in the uptake of the insurance products, until there is enough of a data and knowledge base to properly assess risks and price the products.

Ronald Plett, Pixabay

8. Monitoring and Reporting Private Sector Investments in Climate Action

Through the Initiative for Climate Action Transparency Belize has established an online measurement, reporting and verification system for climate action. In addition, it has embarked on enhancing its transparency capacities on climate finance and is in the process of exploring the development of a tagging system for the government budget and support initiatives. Belize should also consider the tracking of private sector investments in climate finance. To enable such tracking will be difficult, as there is no centralized system that would enable such a feature. A starting point could be the interaction with the financial institutions. As tracking and reporting "green" investments is becoming more common, it would be good for the Climate Finance Unit in collaboration with the National Climate Change Office to start liaising with the national financial institutions for the application of a taxonomy for climate finance and reporting on climate-related investments to the national online system. This way, the government of Belize could start tracking part of the financial contribution from the private sector towards climate action.

The overall key indicator related to private investment in climate action is defined as *Belize dollars (BZD) invested in climate action by private sector entities*.

Some data could be sourced by national financial institutions, but this would require the agreement on a taxonomy to tag the portfolio of the financial institutions. Taxonomies are classification systems distinguishing activities, assets, or project categories that contribute to climate, social, environmental or otherwise sustainable goals with reference to certain thresholds or targets (ICMA, 2020). UNEP has issued a common framework for sustainable finance taxonomies with a focus on Latin America and the Caribbean[11], setting out principles for the establishment of such a taxonomy, with a focus on the Caribbean region. A Central American Regional Taxonomy is also under development and could be used as inspiration for Belize. The taxonomy should ensure that the climate actions prioritized for private sector investments can be captured.

The data provided by the financial institutions could be coupled with data from the Statistical Institute of Belize, BEL and Department of Transport with data on vehicles, appliances and PV and solar water heater installations, which could provide insight into equity financed renewable energy, energy efficiency technologies and private e-mobility. This way each type of climate measure that has been prioritized could be tracked, and related investments could be estimated. The whole data sets could be reported into the online measurement, reporting and verification system for climate action, and would greatly enhance Belize's climate finance transparency efforts, while enabling the rate of improvement of private sector investments in climate action, towards closing the NDC finance gap.

11 The framework can be found here: https://www.unepfi.org/publications/common-framework-for-sustainable-finance-taxonomies-for-latin-america-and-the-caribbean/

Hat3m, Pixabay

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Annex I

List of stakeholders consulted

Monday 29 January 2024
- Meeting with Ministry of Sustainable Development, Climate Change and Disaster Risk Management. National Climate Change Office (NCCO)
- Meeting with the Climate Finance Unit
- Meeting with Ministry representatives

Tuesday 30 January 2024
- Meeting with public sector financial institutions
- Meeting with UN Resident Coordinator's Office (RCO
- Meeting with Sugar Farmers Association
- Meeting with Belize Sugar Industries

Wednesday 31 January 2024
- Meeting with Belize Tourism Industry Association
- Meeting with Belize Chamber of Commerce and Industry (BCCI)
- Meeting with Credit Unions

Thursday 1 February 2024
- Meeting with Citrus Growers Association

Thursday 1 February 2024
- Meeting with Toledo Cacao Growers Association at the Maya House of Cacao

Wednesday 7 February 2024 – Online consultation
- Meeting with Development Finance Corporation

Monday 18 March 2024 – Online consultation
- Meeting with Ministry of Infrastructure, Development and Housing

Monday 18 March 2024 – Online consultation
- Meeting with Ministry of Finance- Office of the Supervisor of Insurance

Wednesday 20 March 2024 – Online consultation
- Meeting with Energy Service Companies

Thursday 18 April 2024 – Online consultation
- Meeting with Belize Livestock Producers Association

Wednesday 1 May 2024 – Online consultation
- Meeting with Heritage Bank

Wednesday 8 May 2024 – Online consultation
- Meeting with Pro Solar

Friday 12 July 2024 – Online consultation
- Meeting with Belize Electricity Limited (BEL)

Tuesday 10 – Thursday 12 December 2024 – In person training on climate finance and proposal development
- National Climate Change Office
- Caribbean Community Climate Change Centre
- Social Investment Fund
- Ministry of Tourism and Diaspora Relations
- Citrus Growers Association
- National Climate Change Office
- Ministry of Infrastructure Development & Housing
- Belize Sugar Cane Farmers Association
- Energy Unit, Ministry of Public Utilities, Energy, Logistics and E-Governance
- Progressive Sugarcane Producer Association
- Development Finance Corporation
- Ministry of Economic Development
- Sugar Industry Research and Development Institute
- Social Security Board
- Toledo Cacao Growers Association
- Belize Sugar Industries / ASR
- Beltraide
- GoGreen Ltd.
- Development Finance Corporation
- Belize Livestock Producers Association

Tuesday 17 December 2024 – Online consultation
- Meeting with Belize Enterprise for Sustainable Technology (BEST)