Part I: Project Information

GEF ID
10849

Project Type
MSP

Type of Trust Fund
GET

CBIT/NGI
CBIT **No**
NGI **No**

Project Title
Sustainable Management and Resilient Thinking for our Energy Revolution (SMARTER)

Countries
Barbados

Agency(ies)
UNDP

Other Executing Partner(s)
Ministry of Energy and Business (MEB)

Executing Partner Type
Government

GEF Focal Area
Climate Change

Sector
Renewable Energy

Taxonomy

Focal Areas, Climate Change, Climate Change Mitigation, Renewable Energy, Energy Efficiency, Sustainable Urban Systems and Transport, United Nations Framework Convention on Climate Change, Nationally Determined Contribution, Paris Agreement, Sustainable Development Goals, Influencing models, Strengthen institutional capacity and decision-making, Convene multi-stakeholder alliances, Transform policy and regulatory environments, Demonstrate innovative approache, Stakeholders, Civil Society, Non-Governmental Organization, Academia, Private Sector, Large corporations, SMEs, Capital providers, Communications, Public Campaigns, Awareness Raising, Education, Type of Engagement, Information Dissemination, Participation, Consultation, Gender Equality, Gender Mainstreaming, Beneficiaries, Sex-disaggregated indicators, Gender results areas, Knowledge Generation and Exchange, Access to benefits and services, Participation and leadership, Capacity, Knowledge and Research, Innovation, Learning, Adaptive management, Indicators to measure change, Theory of change, Capacity Development

Rio Markers

Climate Change Mitigation

Principal Objective 2

Climate Change Adaptation

Significant Objective 1

Biodiversity

Land Degradation

Submission Date

7/6/2023

Expected Implementation Start

10/2/2023

Expected Completion Date

10/1/2027

Duration

48In Months

Agency Fee($)

151,414.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount($)	Co-Fin Amount($)
CCM-1-1	Promote innovation and technology transfer for sustainable energy breakthroughs for decentralized renewable power with energy storage	GET	1,593,836.00	11,400,000.00
		Total Project Cost($)	**1,593,836.00**	**11,400,000.00**

B. Project description summary

Project Objective

To strengthen Barbados? institutional and technological capacities to transit towards a resilient, affordable and low-carbon energy infrastructure.

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
1. Institutional strengthening for resilient, low-emission energy planning	Technical Assistance	1. Government capacity for resilient, low-emission energy planning and energy system purview has been strengthened	1.1 Sector policies strengthened for incorporation of bioenergy in Barbados? just energy transition[1] [1] a) Revised set of distributed RE (and bioenergy) grid connection regulations and updated set of feed-in tariffs are endorsed/adopted by GoB (incl. for bioenergy); b) assessment and details on role of bioenergy in the current 100% RE scenario in Barbados? energy policy (BNEP)validates in at at least two workshops 1.2 Enhanced management of distributed renewable energy systems[1] [1] Management and monitoring plan for RE in public buildings, incl. at least one training of government staff	GET	167,205.00	220,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
2. Bioenergy policy and technology	Technical Assistance	2. Enabling conditions for successful bioenergy deployment in Barbados have been created	2.1 Mapping and assessment of possible biomass resources ? conversion ? bioenergy carriers (gas, liquid) and applications (electricity, bio-methane, liquid biofuels) in various sectors[1] 2.2 National dialogue advanced and appropriate national bioenergy policy formulated[2] 2.3 Capacity strengthened for bioenergy technology development and implementation[3] 2.4 National dialogue and information exchange facilitated[4] by a ?bioenergy task force?	GET	309,265.00	405,000.00

[1] One assessment accompanied with two stakeholder workshops

[2] Full draft bioenergy proposal submitted for government endorsement (as part of overall BNEP action plan) validated in stakeholder workshops

[3] Strengthening current curricula at training institutes with bioenergy components (The University of the West Indies (UWI), Samuel Jackman Prescod Institute of Technology (SJPI), the Barbados Community College (BCC) and the Barbados Vocational Training Board)

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
			[4] Bioenergy Task Force established initially as a Technical Advisory committee includes relevant stakeholders from Government entities, local authorities, civil society, local media, private sector, rural populations and meet at least twice a year			
3. Preparation and investment for renewable and biomass-based energy systems	Technical Assistance	3. A pipeline of decentralised RE projects (including bioenergy) has been developed and put into operation	3.1 Investment prospectus of at least 6 renewable energy (RE) projects with a focus on bioenergy business cases 3.2 Detailed design and engineering studies of pilot-scale bioenergy facilities for appropriately chosen biomass feedstock and formation of ?bioenergy pilot plan?[1] [1] Six bioenergy business case concepts developed, of which four with a feasibility study. Of the four feasibility cases, three have reached the business/investment plan stage and at least one is in operation or in construction by EoP. The bioenergy demonstration/pilots will be a superposition of three types business cases : a) Anaerobic digestion for power production, b) Anaerobic digestion for gaseous fuel (bio-methane) production, c) Production of biofuels.	GET	273,693.00	170,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
3. Preparation and investment for renewable and biomass-based energy systems	Investment	3. A pipeline of decentralised RE projects (including bioenergy) has been developed and put into operation	3.3 Implementation of bioenergy demo/pilot facility and increased investment in renewable energy[1] [1] Expected installed power capacity from bioenergy is 0.41 MW and installed solar PV on public facilities is 1.20 MW (with a combined electricity production of 209 MWh annually). These bioenergy pilots/demos together with the anticipated project-induced installation of PV on public buildings will lead to 215,903 tCO2e direct GHG ER over the 20-year period 2024-2035. Production of liquid and gaseous bioenergy is 3.37 million GJ/936,111MWh (lifetime). All this will be achieved with GEF INV support of USD 750,000 and confirmed co-financing of about USD 12 million of which USD 7.38 million is confirmed co-financing	GET	450,000.00	9,280,000.00
4. Knowledge management and information dissemination	Technical Assistance	4. The Project?s knowledge management plans and outreach activities have been implemented	4.1 Scientific, technological, engineering, operational and social experiences with bioenergy development in Barbados, collected, promoted and shared, nationally and within the Caribbean region[1] [1] Including three to four national and regional workshops and elaboration of bioenergy information	GET	184,879.00	325,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
5. Monitoring and Evaluation	Technical Assistance	5. M&E have been implemented	5.1 Monitoring and evaluation	GET	63,900.00	
				Sub Total ($)	**1,448,942.00**	**10,400,000.00**

Project Management Cost (PMC)

GET	144,894.00	1,000,000.00
Sub Total($)	**144,894.00**	**1,000,000.00**
Total Project Cost($)	**1,593,836.00**	**11,400,000.00**

Please provide justification

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
Recipient Country Government	Ministry of Energy and Business (MEB)	Public Investment	Investment mobilized	1,800,000.00
Recipient Country Government	Ministry of Energy and Business (MEB)	In-kind	Recurrent expenditures	1,350,000.00
Recipient Country Government	Ministry of Energy and Business (MEB)	Grant	Investment mobilized	120,000.00
Beneficiaries	National Petroleum Company (NPC)/Barbados Oil Company (BNOC)	Equity	Investment mobilized	4,900,000.00
Beneficiaries	National Petroleum Company (NPC)/Barbados Oil Company (BNOC)	In-kind	Recurrent expenditures	150,000.00
Beneficiaries	BIDC	Grant	Investment mobilized	100,000.00
Beneficiaries	BIDC	In-kind	Recurrent expenditures	30,000.00
Beneficiaries	BAMC	Public Investment	Investment mobilized	500,000.00
Beneficiaries	BAMC	In-kind	Recurrent expenditures	30,000.00
Recipient Country Government	Fair Trading Commission (FTCP)	In-kind	Recurrent expenditures	20,000.00
Other	Caribbeand Centre for Renewable Energy and Energy Efficiency (CCREEE)	In-kind	Recurrent expenditures	50,000.00

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
Other	University of West Indies (Cave Hill campus)	Grant	Investment mobilized	200,000.00
Other	University of West Indies (Cave Hill campus)	In-kind	Recurrent expenditures	100,000.00
Civil Society Organization	Barbados Renewable Energy Association (BREA)	In-kind	Recurrent expenditures	30,000.00
GEF Agency	UNDP	Grant	Investment mobilized	1,900,000.00
GEF Agency	UNDP	In-kind	Recurrent expenditures	100,000.00
Private Sector	Barbados Light and Power Company (BLPC)	In-kind	Recurrent expenditures	20,000.00
			Total Co-Financing($)	**11,400,000.00**

Describe how any "Investment Mobilized" was identified

Co-financing investment (INV) has been identified as a) equipment grant for sargassum seaweed collection (UNDP project, USD 1.9 million), b) investment in solar PV in public buildings (USD 1.68 million), c) investment support by various co-financiers for the Project?s bioenergy pilot/demo activities (USD 5.7 million). Although not confirmed, the private sector will contribute an estimated USD 2.75 million to the realization of the bioenergy pilots/demos (based on estimates in Annex G of Project Doc).

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNDP	GET	Barbados	Climate Change	CC STAR Allocation	1,593,836	151,414	1,745,250.00
			Total Grant Resources($)		**1,593,836.00**	**151,414.00**	**1,745,250.00**

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required **true**

PPG Amount ($)

50,000

PPG Agency Fee ($)

4,750

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNDP	GET	Barbados	Climate Change	CC STAR Allocation	50,000	4,750	**54,750.00**
			Total Project Costs($)		**50,000.00**	**4,750.00**	**54,750.00**

Core Indicators

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)	213000	215503	0	0
Expected metric tons of CO?e (indirect)	210000	329311	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)				
Expected metric tons of CO?e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)	213,000	215,503		
Expected metric tons of CO?e (indirect)	210,000	329,311		
Anticipated start year of accounting	2025	2026		
Duration of accounting	20	20		

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)	881,820,000	4,120,114,000		

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)
Solar Photovoltaic	7.50	1.20		
Biomass	0.25	0.41		

Indicator 11 People benefiting from GEF-financed investments

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female		266		
Male		500		
Total	0	766	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

At the PIF stage, it was assumed that the main emission reduction would come from directly supporting the implementation of about 7.5 MW of on-grid renewable energy (read: solar PV) projects, for which co-finance is confirmed by GOB. The data derives from the UNDP/GEF DREAM project. The justification for inclusion is the facilitation of the implementation of these renewable energy systems by the SMARTER?s project?s capacity and institutional building activities of Component 1 (that builds on and aims to strengthen the results of the DREAM project) . Second, the PIF assumes the establishment of a 250 kW biogas facility (based n biogas production at swine or chicken farms) . The PPG Phase has provided more nuance as to the types of pilots that will receive Program support and their respective direct beneficiaries. First, in the PPG phase, it was noted that a bioenergy programme (which is the core of SMARTER?s activities) should have a larger part of its direct emission reduction attributed to bioenergy technologies. Being linked to Component 1 activities, the position of linking distributed renewable energy systems has been maintained, but in the form of rooftop PV on public buildings at a lower capacity (1.2 MW on 100 public buildings, instead of the PIF?s 7.5 MW). A second difference is SMARTER?s expanded focus, not only on power generation with biogas plants, but encompassing a much wider range of bio-conversion routes (including fermentation, and biodiesel production) as well as potential applications (such as the use of methane biogas to be injected into the country?s gas pipeline system as well as the option of introducing biofuels for transportation). Their potential is recognized, for example, by NPC/BNOC which has started investigations on the possible use of bio-methane and biofuels. Thus, the amount of bio-energy power generation

is still higher than in the PIF (428 kW instead of the 250 kW pilot) but the total power capacity (distributed RE and bioenergy) of 1.61 MW is smaller than the PIF?s 7.5-8 MW. The combined energy generation (202 TJ or 57,000 MWh) of bioelectricity and biofuels is higher than the PIF?s 26,000 MWh per year. Notes on accounting lifetime: - Direct emissions reduction: accounting starts year 1 up to year 24 (project period + lifetime investment, 20 years) - Indirect emissions reduction: accounting starts after the project?s end: 2027-2057 (post-project 10-year period of indirect investments plus max 20 years lifetime)

Part II. Project Justification

1a. Project Description

1a. Project Description.

1) *The global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description)**[1]***[1]*;

1. According to the Second National Communication (2018), Barbados? net greenhouse gas emissions amounted to 1,930 kilotons of CO_2 equivalent (CO_2e) in 2010, which represents less than 0.01% of the global total in that year. Total emissions were 1,984.5 $ktCO_2e$, of which the energy sector was responsible for 74% of the emissions (1457 $ktCO_2e$) and the waste sector 15% (295 $ktCO_2e$). Total removals were 54.5 tCO_2e[2][2]. Of the total emissions, 1,490 kilotons were CO_2 (and 325 $ktCO_2e$) of methane emissions. OLADE gives an estimate of energy-related emissions of 1737 $ktCO_2e$ in 2010, 1575 $ktCO_2$ in 2015 and 1161 kilotons of CO_2e in 2020[3][3]; indicating that emissions are declining over time indicating lower energy intensity of the economy and a beginning penetration of renewables (solar) in the energy supply.

2. Barbados? total primary energy consumption hovers around 15-17 exajoules (EJ) and this level of consumption is about the same level as in the early 1990s. Most of Barbados? energy is imported, although the country does produce crude oil, natural gas, and biomass. Over the period 1990 to 2019, oil products have been the dominant energy type in Barbados. Electricity generation accounts for almost 40% of total fossil fuel imports (diesel and heavy fuel oil), while 40% is consumed by the transport sector. Fuel imports amounted to about USD 250 million, equivalent to about 11% of GDP, in 2018. As a result, energy costs are relatively high in Barbados, as is the case in many Small Island Developing States (SIDS).

3. In recent years there has been a growing interest in decentralised electricity generation, both at the household level (based on increasingly affordable roof-top PV) and also for MW scale distribution or transmission-connected PV generation. This has been encouraged under the Feed in Tariff (FiT) arrangement. the FTC approved a feed-in tariff (FIT) framework for RE technologies for installations

up to 1 MW. FIT tariffs are differentiated by technology and project size, based on their levelized cost of energy (LCOE) and a multiple criteria analysis (MCA) of costs and benefits. Starting in 1974, amid an international oil crisis, Barbados invested in the area of solar water heating (SWH). Currently, there are approximately 50,000 solar water heaters in Barbados, with more than 35,000 domestic installations. With about 100,000 dwelling units in Barbados, this shows a significant penetration by the industry into the domestic market. On the other hand, penetration seems to have reached its peak for some time.

*2) the baseline scenario and any associated baseline projects**[4]***[4]

4. As an expression of the need to continue transitioning the country?s energy sector, the Barbados National Energy Policy (BNEP 2019-2030) sets the goal of 100% renewable energy by 2030. Barbados has embarked on an ambitious plan to introduce renewable energy (RE) generation, energy storage systems and electric mobility to replace fossil-based technologies. Reaching the 100% RE goal will require the installation of 635[5][5]-860[6][6] MW of renewable energy. Net metering has been allowed in Barbados since 2010, and consumers with wind and/or solar self-generation facilities have been able to supply energy to the national grid until recently, via the Renewable Energy Rider and Feed-in Tariff programmes. Until the large utility-scale RE facilities are set up, decentralized PV is likely to become the most significant contributor to the renewable energy mix in the short run. About 15-23 MW is to be provided by biomass and waste-to-energy facilities. Power is mainly produced and distributed by the Barbados Light and Power Company Limited (BLPC, formerly state-owned but privatised in 2010-11).

5. The National Petroleum Corporation (NPC) currently has approximately 21,200 customers of which approximately 1,000 are commercial entities. There is continued demand for piped natural gas for cooking as an alternative to liquified petroleum gas (LPG) influenced by the current pricing mechanism for natural gas and convenience. Similarly, industries use natural gas as the fuel source for their boilers. Barbados? oil and gas sector is concentrated around a few key players, the state-owned National Petroleum Company (NPC) and its daughter company Barbados National Oil Company Limited (BNOC) together with the private fuel distributors Sol and Rubis. In principle, market pricing is adopted, the main exception being natural gas (which is imported/produced along with crude by BNOC and has traditionally been sold at sub-market prices, i.e., prices below competing fuels).

6. There is significant potential to scale up biomass production at a national level during the transition to a 100% renewable energy matrix. Biomass resources can be converted following various

pathways to provide fuel for thermal application or electricity generation or as biofuel for transportation, and other uses.

Biomass resources: bagasse, vinasse and energy crops

7. There were once about 500 plantations on the island. However, over the past decades, sugarcane production has declined from 1.23 million tonnes in 1971 to 81,064 tonnes in 2020. Two sugar factories are still operational today, Andrews Sugar Plantation and Factory in St. Joseph and Portvale in St. James, the latter managed by the public holding comapny Barbados Agricultural Management Corporation (BAMC). Bagasse is the dry, pulpy, fibrous material that remains after the sugarcane stalk has been crushed to extract its juice and is used as a fuel within the sugar industry. Following the production of sugarcane juice by milling the cane stalks, the juice is clarified, concentrated, and centrifuged to produce sugar and a syrup called molasses. Molasses is sent to be fermented in tanks where a liquid known as wine or fermentation wine is retrieved. This wine is centrifuged to recover the fermentation yeast which will be reused, and the liquid portion is sent to be distilled. In rum production, the distillation of wine separates the ethanol from the waste product also known as vinasse, which has a high organic content. The biomass waste products of the sugar and ethanol production processes, such as sugar trash and stalls, as well as vinasse, can be used to produce biogas. The Portvale sugar mill produces electricity from co-generation using bagasse as feedstock (for its own use only). If connected to the main grid, bagasse cogeneration in expanded sugarcane production could be a domestic fuel for power generation.

8. With sugar exports dropping farmers have looked for other opportunities. Producing feedstock (molasses) for the growing rum distilleries is an assured market. Plans have been put forward for a large-scale switch to high-fibre canes for energy purposes (in particular, elephant grass, and king grass) that are currently grown as fodder by farmers, for energy purposes. However, a reconversion to sugarcane or conversion to dedicated energy cropping is unlikely to happen as long as a broader policy orientation on future agricultural land use in Barbados has not taken place (i) with a holistic view of land conservation, (ii) local food production and needs, (iii) labour and employment in the agricultural sector; (iv) land availability.

Biomass resources: crop and animal residues; organic waste and wastewater

9. Significant biomass waste flows are available in the form of food and waste oil residues, animal waste (manure), as well as the organic content in municipal solid waste (MSW) and wastewater. These have the potential to be used as bioenergy in thermochemical conversion (combustion, gasification) and/or biochemical (anaerobic digestion). However, crop residues are a great source of organic matter that can be highly advantageous in maintaining or improving soil quality or, used as animal fodder. Additionally, crop residue can be used to make compost Livestock is part of the local

agriculture industry providing food such as dairy, meat, and eggs for local consumption. Manure can be obtained from dairy farms, beef lots, poultry and pig farms. The manure of farm animals found locally (cattle, pigs, sheep and chicken) may be treated via anaerobic digestion.

10. Some 34,921 tonnes a month passed through the Sustainable Barbados Recycling Centre (SBRC) facility at Vaucluse, St. Thomas (a public-private partnership) and 1,115 tonnes by the different recycling entities (2015)[7][7]. An estimated 44% of the waste going to the landfill is food waste. After recovering materials for recycling, the waste ends up in the Mangrove landfill next to SBRC. The Sanitation Service Authority (SSA) is responsible for the collection and delivery of waste to the Mangrove Landfill. The Vaucluse Biogas Power Plant is a biopower project in Saint Thomas, Barbados, which uses municipal solid waste as feedstock - with gasification as the conversion process to release the energy value of the feedstock. The Barbados Water Authority (BWA) is the entity in Barbados charged with supplying the island with potable water as well as the provision of wastewater treatment and disposal services. Wastewater management happens in two sewage treatment plants on the island ? Bridgetown & South Coast. Both treatment plants discharge the effluent water out to sea.

Sargassum

Caribbean countries, including Barbados, have battled abnormally large influxes of *sargassum* seaweed since about 2011 due to combined oceanic-atmospheric events affecting the marine ecosystem with eutrophication. Sargassum should be removed promptly from the shoreline to avoid vast accumulations of unsightly decomposing seaweed which makes its collection more difficult. Besides producing public health risks, it has an unpleasant smell. The phenomenon has been affecting tourism and fisheries negatively resulting in economic losses. Off- and on-shore collection of Sargassum is the subject of a recently approved regional UNDP project Improving National Sargassum Management Capacities in the Caribbean. Forming a large biomass resource, *Sargassum* forms a potentially large but still unexplored feedstock that can be co-digested with other forms of organic waste (such as manure from sheep farms and vinasse. In Barbados, the University of West Indies (UWI) is exploring the production of bio-CNG (upgraded biogas) to fuel cars from the anaerobic digestion of Sargassum and vinasse. Apart from bio-CNG (replacing fossil fuels) and the increasing electrification of the vehicle fleet (proposed in the BNEP), another sustainable option is replacing fossil fuels (gasoline and diesel) through the increased use of ethanol and biodiesel as transport fuels. Biodiesel can be produced from waste vegetable oil and certain crops, such as rapeseed, soybean, coconut, sunflower and other oily crops. Currently, BNOC is implementing a pilot project with its vehicles fueled by biodiesel (produced from locally collected used cooking oil).

11. Several stakeholders, Barbados Agricultural Management Company (BAMC), Barbados Sugar Industry Limited (BSIL) and private farmers, have been in discussion to establish Grow Energy, a

company aimed at producing sugar cane by-products and biomass energy. Other initiatives have also looked at using biomass feedstock for biomethane generation. A collaboration between Circular Fuels LLC and West Indies Rum Distillery (WIRD) has been proposed to utilize sugar cane residues and other feedstocks like sargassum to generate biogas. The Barbados Investment and Development Corporation (BIDC) recently issued a Terms of Reference (ToR) for the design and installation of a 250 kWh anaerobic digestion plant. The demand for natural gas is likely to grow, mainly due to demand growth in the tourism sector and due to replacing of oil products (to achieve fossil fuel-free status by 2030). To ensure economies of scale and cost efficiencies concerning the size of anaerobic digestion plants and biomethane upgrading facilities, NPC-BPOC envisages a central bio-methanation facility at the BNOC natural gas plant at Woodbourne, St. Philip

12. The UNDP-supported and GEF-financed Disaster Risk & Energy Access Management (DREAM) project helped to bring forward the installation of decentralized PV. Specific terms and criteria for solar PV technology were elaborated under DREAM and incorporated into the licensing process. Since 2021, registration for renewable energy generation is through an online system. However, some regulatory and legislative constraints still exist in Barbados and various bottlenecks affect the throughput time of RE project development processes

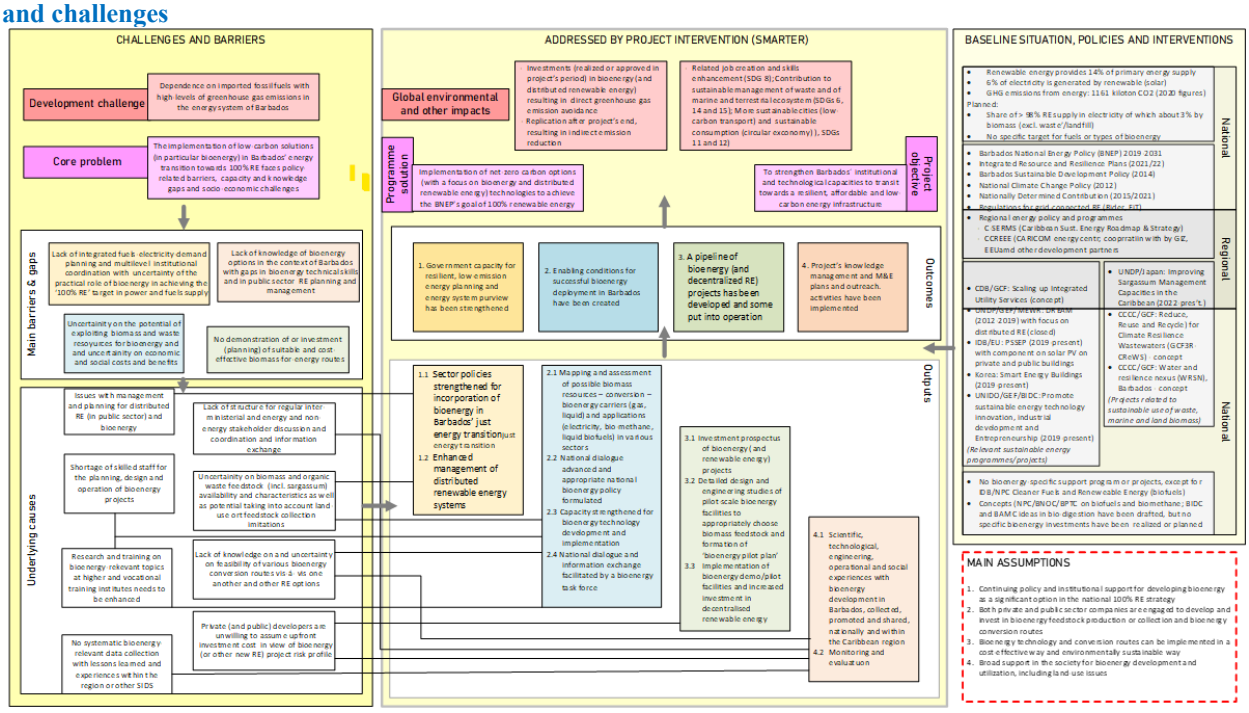
13. Also, despite the before-mentioned significant potential of biomass feedstock and various conversion alternatives, a number of barriers to the development and widespread use of bioenergy options in Barbados remain. Regarding conversion routes (from feedstock to end use), these have been subject to feasibility and pilot project studies for specific feedstock-application combinations but none have been demonstrated yet, except for the bagasse cogeneration. While these studies focus on specific feedstock-application combinations, no holistic assessment has been carried out that compares the potential, costs and benefits of the various feedstock-conversion-application routes vis-?-vis one another and other renewable energy options. Thus, analysis in national planning, such as BNEP, IRRP and transport sector planning is based on assumptions regarding bioenergy from international sources rather than based on Barbadian data. Sector-wide scenario-based planning is needed for the energy sector as a whole to steer the transition from fossil fuels to net-zero carbon alternatives.

14. Bioenergy systems are complex and comprise not only the power plant itself but also the feedstock supply chain, transport and storage facilities, the efficiency of logistics, residue management, water usage, and mitigation of local pollution and nuisance. The availability of feedstock is typically dependent on various providers and its potential and economics need to be realistically assessed. Social impacts and gender considerations as well as trade-offs between economic, social and environmental considerations also need to be carefully weighed. Support for such ongoing R&D initiatives is needed. Barbados lacks a national bioenergy policy covering aspects such as biomass resource mapping, spatial and land-use planning, siting, financial incentives, value chain development, capacity building, and more.

3*) the proposed alternative scenario with a description of outcomes and components of the project* [8][8]

15. The **project objective** is ?to strengthen Barbados? institutional and technological capacities to transit towards a resilient, affordable and low-carbon energy infrastructure?. The production and application of bioenergy as a low-carbon solution in Barbados? energy transition towards 100% RE faces significant barriers and challenges including finance, uptake and application as well as sustained innovation and investment. The project seeks to address the remaining challenges and the underlying causes using **four components of interventions** as described in the project?s Theory of Change diagram (see Exhibit 1).

Exhibit 1 Theory of change: how SMARTER?s interventions address identified barriers and challenges



16. There are some deviations from the PIF in terms of the technology focus. In the PPG phase, it was noted that a bioenergy programme (which is the core of SMARTER?s activities) should have a larger part of its direct emission reduction attributed to bioenergy technologies. In Component 1 activities, the position of linking distributed renewable energy systems has been maintained, but in the form of rooftop PV on public buildings at a lower capacity (1.2 MW on 100 public buildings, instead of the PIF?s 7.5 MW). A second difference is SMARTER?s expanded focus, not only on power generation with biogas plants, but encompassing a much wider range of bio-conversion routes (including fermentation, and biodiesel production) as well as potential applications (such as the use of methane biogas to be injected into the country?s gas pipeline system as well as the option of

introducing biofuels for transportation). This is in line with assessments carried out by NPC/BNOC on the possible use of bio-methane and biofuels.

17. Some changes have been introduced as a consequence of the discussions with the project partners and stakeholders in the project design (PPG) phase in the list of outputs. These are summarized in Exhibit 2. The outputs of each component and their activities are described in detail in section 4.1 of the UNDP Project Document. As compared to the PIF, an attempt has been made to give shortage titles to the outputs, while listing activities under each Output provides the necessary detail.

Exhibit 2 Comparison of project design at CEO endorsement and at the concept approval stage

ProDoc / CEO ER	Child project concept (Project Indentification Form, PIF)	Rationale for Change in PIF Outputs/Activities in ProDoc
Objective		
To strengthen Barbados? institutional and technological capacities to transit towards a resilient, affordable and low-carbon energy infrastructure.	To strengthen Barbados? institutional and technological capacities to transit towards a resilient, affordable and low-carbon electricity infrastructure.	A larger part of its direct emission reduction of SMARTER is attributed to bioenergy technologies (and less to PV), corresponding to the focus on bioenergy in the project?s activities. The focus is not only on biogas for power, but encompasses a much wider range of bio-conversion routes (including fermentation, and biodiesel production) as well as potential applications (such as the use of methane biogas to be injected into the country?s gas pipeline system as well as the option of introducing biofuels for transportation). Their potential is recognized, for example, by NPC/BNOC which has started investigations on the possible use of bio-methane and biofuels.
Component 1 ? Institutional strengthening for resilient, low-emission energy planning		

ProDoc / CEO ER	Child project concept (Project Indentification Form, PIF)	Rationale for Change in PIF Outputs/Activities in ProDoc
1.1 Sector policies strengthened for incorporation of bioenergy in Barbados? just energy transition 1.2 Enhanced management of distributed renewable energy systems	1.1 Technical support for reviewing of relevant sector policies to identify opportunities for incorporation of climate resilience criteria and circular economy concepts, and strengthen the energy-water-agriculture-health nexus, including gender aspects. 1.2 Detailing of the management framework for supervision and servicing of renewable energy systems in public sector. 1.3 Technical assistance for updating of MESBE ICT systems in support of energy planning and purview, including decentralised electricity generation and storage systems. 1.4 Outreach and promotional activities to public sector beneficiaries of RE systems (ministries, health, education, sports council).	Outputs 1.2 and 1.3 (PIF) have been merged into one output 1.2 (ProDoc, where they appear as separate activities). Output 1.4 (PIF) has been transferred to Component 4
Component 2 ? Bioenergy policy and technology		

ProDoc / CEO ER	Child project concept (Project Indentification Form, PIF)	Rationale for Change in PIF Outputs/Activities in ProDoc
2.1 Mapping and assessment of possible biomass resources ? conversion ? bioenergy carriers (gas, liquid) and applications (electricity, bio-methane, liquid biofuels) in various sectors 2.2 National dialogue advanced and appropriate national bioenergy policy formulated 2.3 Capacity strengthened for bioenergy technology development and implementation 2.4 National dialogue and information exchange facilitated by a ?bioenergy task force?	2.1 Biomass resource mapping covering the hotel sector, wastewater plants, municipal waste, and agro-industrial residues. 2.2 Preparation of national bioenergy policy including supportive studies and licensing process authorizing construction and operation of grid-connected biomass generators. 2.3 Characterisation of biomass feedstock samples for energy production by qualified laboratories and institutes. 2.4 Strengthening of the in-country technological basis for bioenergy development in Barbados through ?match-making? between Barbadian and foreign experts and institutes. 2.5 Detailed design and engineering studies for pilot-scale biodigester power plant for appropriately chosen biomass feedstock.	Output 2.3 (PIF) is an activity under Output 2.1 (ProDoc), and biomass feedstock sampling may be carried out, if needed, as part of the detailed pilot/demo design study (Outcome 3) The matchmaking of Output 2.4 (PIF) is better placed in Component 4 (ProDoc). Instead, an output 2.3 (ProDoc) has been added engaging Barbadian academic institutions in capacity and skills building. As suggested in the PPG phase, output 2.4 has been added to national dialogue facilitation by means of a ?Bioenergy Task Force? (that will also serve as the Project?s Technical Advisory Committee) providing support to the Board and PMU
Component 3 - Preparation and investment for renewable and biomass-based energy systems		

ProDoc / CEO ER	Child project concept (Project Indentification Form, PIF)	Rationale for Change in PIF Outputs/Activities in ProDoc
3.1 A pipeline of bioenergy (and decentralised RE) has been developed and put into operation 3.2 Detailed design and engineering studies of pilot-scale bioenergy facilities for appropriately chosen biomass feedstock and formation of ?bioenergy pilot plan? 3.3 Implementation of bioenergy demo/pilot facility and increased investment in renewable energy	3.1 Technical assistance to MESBE to accelerate RE pipeline development including authorisation of permits and licenses. 3.2 Pre-feasibility studies implemented for bioenergy business cases to promote circular use of organic resources in Barbados (envisioned: sugar sector; hotels and tourism, agro-industrial residues; and wastewater). 3.3 Training of bioenergy plant operators on process monitoring, safety and operational aspects, feedstock logistics and technical and financial optimization. 3.4 Investment in resilient, decentralised RE power plants by public and private investors. 3.5 Procurement and operation of a first-of-a-kind biodigester power plant (100-250 kW electrical power) at a selected host institute.	Output 3.3 (PIF) is part of the technical capacity building of Output 2.4 (ProDoc). Output 3.1 (PIF) has been split with ?pipeline development? maintained as an ?investment prospectus?, whole permits and licensing should be part of the final stages of project development (Output 3.3, ProDoc) and general aspects part of Output 1.2 (ProDoc). The ?investment prospectus? will consist of bioenergy investment opportunities at different levels: a concept has been formulated (stage 1), a feasibility study has been carried out (stage 2) resulting in a business/investment plan (stage 3) followed by financial closure and construction (stage 4) and commissioning and operation (stage 5). The prospectus will be a living document that will be appended so more opportunities can get assessed. Three bioenergy investments that have reached stage 3 will be supported (as needed) with GEF INV (and counted as contributing to the project?s direct mission reduction). Apart from the bioenergy investments, the strengthened regulations regarding independent RE generation are expected to result in increased solar PV on public buildings (and also counted in direct GHG emission reduction)
Component 4 - Knowledge management and information dissemination		
4.1 Scientific, technological, engineering, operational and social experiences with bioenergy development in Barbados, collected, promoted and shared, nationally and within the Caribbean region 4.2 Monitoring and evaluation	4.1 Collation and dissemination of operational experiences, lessons learned and recommendations for value chain development. 4.2 Scientific, technological, engineering, and social experiences with bioenergy development in Barbados shared within the Caribbean region. 4.3 Formalization of stakeholder agreements and delivery criteria during the inception phase, periodic monitoring and reporting. 4.4 Project MTR and TE carried out and findings shared with stakeholders.	Outputs 4.1 and 4.2 (PIF) have been merged as activities in one Output 4.1 (ProDoc). Outputs 4.3 and 4.4 (inception and subsequent mandatory M&E) have been merged into one Output 4.2 (described in section/question 9 of this CER document)

Project Components, Outputs, Activities

18. The **Project?s objective** is ?To strengthen Barbados? institutional and technological capacities to transit towards a resilient, affordable and low-carbon electricity infrastructure?. In particular, the Project will foster the production and application of bioenergy as a low-carbon solution in Barbados? energy transition towards 100% RE faces significant barriers and challenges including finance, uptake and application as well as sustained innovation and investment.

Component 1 Institutional strengthening for resilient, low-emission energy planning

Outcome	***Outputs***
1. Government capacity for resilient, low-emission energy planning and energy system purview has been strengthened	1.1 Sector policies strengthened for incorporation of bioenergy in Barbados? just energy transition 1.2 Enhanced management of distributed renewable energy systems

Component overview

19. The purpose of this component is to strengthen the capacities of the Ministry of Energy and Business (MEB) to lead Barbados? transition towards a low-emission, resilient, and affordable energy sector. Under the baseline scenario, Barbados will continue progressing towards a more competitive and open electricity sector taking benefit from new technologies for energy generation, transmission and distribution (T&D) and grid operation. The Government of Barbados (GOB), through MEB, will gradually strengthen its role to govern the sector. Notwithstanding, the transition towards a low-carbon electricity sector will unlikely meet the 2030 target if GOB is not supported by international cooperation partners, given Barbados? circumstances as a SIDS. The UNDP-GEF intervention will address various challenges (identified in the preceding Section) and provide support including MEB staffing, skills and ICT infrastructure; technical backstopping during utility negotiations; technical assistance to implement the Integrated Resources and Resilience Plan (IRRP); development of sector regulation including grid code and bioenergy license process; access to new technologies including bioenergy linked with development in other sectors (smart grids, electric vehicles), energy sector digitalization, net-zero fuels; resilient sector development addressing key energy nexus; strengthening of RE technology ecosystems; and access to finance.

Output 1.1 Sector policies strengthened for incorporation of bioenergy in Barbados? just energy transition

Activities:

1.1.1. Assessment of the potential of renewable energy sources (incl. bioenergy) in the planning of energy and electricity and review of relevant sector policies (power, transport, waste, marine, other)

20. Key tasks include support for the analysis of energy sector needs and reviewing energy end-use expansion plans and budgets (investment costs). This will cover prioritization of options (e.g., in transport, the role of electric vehicles versus low-carbon fuels, such as bio-CNG or biodiesel) or choices in the use of energy carrier (bioenergy production for power generation, versus direct use of bio-methane, or liquid biofuels or electricity generated by other renewable sources) as well as regarding the role of bioenergy in grid stabilization and back-up (storage by batteries, hydrogen, bioenergy or other means). A gender assessment of energy-relevant policies will be carried out as part of the broader review of sector policies (see section 4.5). Given women?s lower employment rates in relevant sectors such as energy, transportation, agriculture and construction, they may not benefit directly from project activities without deliberate intervention and or design. Supporting women?s skills, removing barriers to entry or incentivizing women?s interest in the project can aid in helping women benefit directly from employment opportunities.

21. The activity will build on the current IRRP and BNEP scenarios and will provide the information for future revisions of these plans, including the possibilities to expand scenarios from the electricity sector only to the energy sector as a whole (i.e. including gaseous and liquid fuel use in the residential commercial, transport and productive sectors). The main question to answer is what will be the optimal mix of various renewable energy sources in the coming net-zero carbon energy transition. The bioenergy resources and conversion pathway assessment of Output 2.1 will provide the necessary input data for the activity.

Output 1.2 Enhanced management of distributed renewable energy systems

Activities:

1.2.1 Capacity building of MEB-Energy Division of operational competencies for RE licensing and monitoring of distributed electricity generators and (future) independent power producers.

22. Building on the assistance or the deployment of solar PV in public buildings in the UNDP/GEF DREAM project (see Box 13) the SMARTER Project will further assist MEB in detailing the management scheme for public RE assets (i.e., solar PV systems on public buildings) to ensure operational performance and accountability. While government entities such as MEB-GEED can be trained to carry out O&M, alternative management models shall be investigated including concessions to private suppliers. A sustainable operational model covering O&M costs and insurance could be made budgetary neutral by setting aside the electricity expenditures avoided by the installed solar-PV (and other distributed RE) systems. Centralised supervision can enable benchmarking, standardisation of working routines and best practices, and the design of preventive maintenance strategies. This output will closely involve gender-sensitive capacity building and knowledge for end-users and the corresponding Government entities. Gender-sensitive aspects of licensing and monitoring will be also addressed.

1.2.2 Capacity strengthening for energy sector planning and monitoring, including updating MEB ICT systems

23. The GEF project will complement GOB funding to update and enhance available ICT infrastructure including existing and new electricity sector planning tools and GIS platform (location of demand and supply; balancing competing uses for land given that renewable energy generation); and integration with weather forecasting systems. Support will be provided to improve data gathering and processing (including gender and age-disaggregated data)

24. Support will also be provided to enhance the webpages of the current online application system to secure swift processing of licensing applications to avoid delays in RE pipeline development[1]. GEF funding will be oriented to ensure incrementality in activities in progress to formalise the RE IPP industry, i.e., complementing studies on energy production, smart grid and distributed generation and storage studies that may be undertaken by other entities (BLPC) be supported by other development partners (such as IDB).

Component 2 Bioenergy policy and technology

Outcome	***Outputs***

2. Enabling conditions for successful bioenergy deployment in Barbados have been created	2.1 Mapping and assessment of possible biomass resources ? conversion ? bioenergy carriers (gas, liquid) and applications (electricity, bio-methane, liquid biofuels) in various sectors 2.2 National dialogue advanced and appropriate national bioenergy policy formulated 2.3 Capacity strengthened for bioenergy technology development and implementation 2.4 National dialogue and information exchange facilitated by a ?bioenergy task force?

Component overview

25. The project component aims to enable Barbados to successfully exploit sustainable biomass resources for energy generation and promote the circularity of agricultural and other organic waste streams vis-?-vis other sources of renewable energy as well as among alternative uses of bioenergy. Unlike wind and solar, biomass for energy has a modest place in the 100% RE target as formulated in the BNEP 2019-2020, and IRRP. Biomass is a dispatchable energy technology and therefore could be a key element in reliable renewable electricity production. Where electrification of an energy end-use is not possible or viable as an option, bioenergy in the form of gas or liquid may be one of the few alternatives (together with new technologies such as hydrogen and derivative fuels) for natural gas (bio-methane) or transport fuel (biodiesel or bio-ethanol). However, these alternatives are far from well-defined yet in current energy policies and plans,

26. To generate more data informing decisions in bioenergy planning, the Project will support the mapping of the potential biomass resources with an assessment of the pros and cons of various conversion routes and end-use combinations (summarised in Box 4). Potential risks and issues will be mapped and considered as part of a feasibility study. Risks related to community health and safety, labour and employment, pollution, waste as well as gender-specific risks will be addressed by site-specific ESIAs. In a land-scarce country like Barbados, risks may also include competition over land to produce food, threats to other livelihood activities and expensive storage solutions.

27. Technical assistance to MEB to implement the licencing process for bioenergy is instrumental to allow projects to interconnect to the grid. This licensing should be gender-sensitive and offer opportunities that are inclusive of age, gender, ability and geographic distribution. Concerning licensing and permits, the Project will compile evaluation criteria (including gender-sensitive criteria) and term sheets, differentiated per type of bioenergy. Without standards and certifications, it is difficult to assure the quality of services and products within the sector. The Project will promote the adoption of international standards, adapted to the Barbadian situation and feedstock.

28. While combustion of biomass is a mature technology in the region (and has widely been applied for heat production by sugar mills), gasification and thermolysis (for dry biomass) and bio-digestion (for wet biomass) are more complex and these technologies are not well-known in the Eastern Caribbean region. The Project will support strengthening national training and R&D institutes to be able to offer training of (candidate) operators and technicians (in collaboration with technology suppliers). Business managers will need to be trained on operational aspects including feedstock logistics, compliance with safety procedures and regulations, as well as the commercial-financial aspects of bioenergy business operation. SMARTER aims at gender-balanced training activities with women?s equitable participation that fulfils specific balance criteria (as outlined in the Results Framework).

Output 2.1 Mapping and assessment of possible biomass resources ? conversion ? bioenergy carriers (gas, liquid) and applications (electricity, bio-methane, liquid biofuels) in various sectors

Activities:

2.1.1 Integral bioenergy resource mapping and assessment of conversion & end-use options

29. The starting point is the mapping of biomass streams in the country. This component will assist the country to complement available information, mapping existing biomass streams and assessing the potential, costs and benefits of various feedstock-conversion-application combinations in various demand scenarios. Cost aspects and suitability of (foreign) technologies under local conditions will be reviewed, as well as land constraints, logistics, effects on employment and social and environmental externalities. Apart from their use for energy purposes, the value-added of biomass resources or its residues (e.g., fertilizer,) will be assessed as well as their environmental role (e.g., wastewater and water treatment). This activity will further evaluate the opportunities for local production or import of biomass feedstock in view of the constraints related to Barbados? limited land availability and will provide recommendations for policy design.

30. The assessment will build on earlier feasibility studies or undertaken assessments trying to integrate their results to consider costs, benefits, and options from a holistic point of view:

1. Define and streamline the roles and responsibilities of all the relevant stakeholders needed to implement and promote biomethane and biofuel production

2. Assess biomethane and biofuels potential considering indigenous feedstocks, biomass and conversion technologies, and alternative end-uses vis-?-vis other technologies (solar/wind and hydrogen storage in power generation; electric vehicles in transport; conventional fossil fuels)

3. Assumptions on feedstock availability include considerations such as whether or not energy crops are included, removal rates for the extraction of agricultural residues, and the potential to collect waste streams such as manure or organic wastes from the food and beverage industry as well as the marine environment (Sargassum). Any potential social and environmental risks from collection, transport, use and disposal will also be considered (see also Annex L on SESP).

4. Consider constraints such as land area (including agricultural land and tree cover), climate suitability, population and livestock number and projections trends on how these may develop over time. Assessment of pros and cons of local feedstock production versus trade (feedstock import or biofuel imports)

5. Establish guidelines and frame a proper financial cost-benefit analysis of biogas/biomethane/biofuels projects for different types of end-uses (power, gas, liquid fuel)

6. Conduct an overall socio-economic assessment and costs- benefits analysis (including investment needs, employment effects, social inclusion and affordability) as well as the environmental implications (positive or negative)

7. Assessing the social acceptance of biogas/biomethane/biofuel projects (land use, local pollution, employment); and

8. Gender aspects (see section 4.5)

2.1.2 Characterisation of biomass feedstock samples for energy production by qualified laboratories and institutes.

31. Biodigester technology is essentially mature but requires adjustment of biochemical processes as well as material choices in accordance with local availability and climate conditions. The UNDP-GEF Project aims to become a catalyst for biogas technology development in Barbados. In support of bioenergy policy making and resource mapping, the Project will finance the characterisation of biomass samples by specialised providers of such service. The goal is to get feedstock characteristics based on local data sets - beyond internationally published literature - as composite feedstock can vary widely in its bioenergy production potential. In addition, further understanding of the barriers and unique conditions in handling and processing these feedstocks should be based on local conditions and

standards; although, Barbados can benefit from advances in other countries related to the treatment of by-products of the anaerobic digestion process (for removal of pathogens).

Output 2.2 National dialogue advanced and appropriate national bioenergy policy formulated

Activities:

2.2.1 Policy analysis and formulation of bio-energy policy

32. Bioenergy development needs an adequate policy that anticipates land and water use aspects, organic waste management, utilization of agricultural and agro-industrial residues, opportunities for the circular economy, employment and the development of a local ecosystem in support of bioenergy technology. While the exact outline of the bioenergy policy will be determined by stakeholder consultations (organised through a bioenergy task force) and the results of the supportive study of Output 2.1, the bioenergy policy may include the following elements:

? Objective and goals of the policy and position within overall BNEP 2019-2030 and integrated energy planning.

? Feedstock options (municipal waste, wastewater, sugarcane and crops, seaweed), conversion technologies (thermochemical, biochemical, other), fuel types (gas, liquid) and application (injection in the natural gas system, electricity generation or as vehicle fuel).

? Environmental aspects (marine environment, waste and residue management), value chain development and non-energy alternative uses of biomass. Physical planning and land use and water issues.

? Social-economic issues (including employment, gender[2]). Adaptations to energy infrastructure (transport, import/export, storage).

? Production costs and pricing of biofuels and bioenergy end-use technologies; and definition of feed-in tariffs[3]

? Governance structures, legislation, and regulations (permits, licenses, standards and quality control; health and safety; enforcement), [4] including strengthening multi-sectoral coordination of entities and regional cooperation in the Caribbean region

? The need for incentives supplementing market mechanisms to get the transition started[5]

? Marketing and demand stimulation; stakeholder consultations[6]

? Research and development and capacity strengthening

? Roadmap for implementation of the policy with targets, demonstration activities, budget and sources of financing; monitoring and evaluation

2.2.2 Supportive studies and technical assistance on legal-regulatory aspects of bioenergy investments.

33. The Project will support the bioenergy formulation process by providing input to the discussion in the form of gap analysis, best practice reports, and suggestions for delivery models to make sure that the probable consequences of any decision taken for the overarching policy framework are evaluated and well understood. In particular, SMARTER will provide technical assistance to MEB to streamline the regulations and permit approval process to accelerate bioenergy pipeline development (including authorisation of land-use, environmental, grid connection or fuel supply permits and licenses), using the experiences on legal-regulatory aspects coming out of the pre-feasibility studies of Output 3.1.

34. Similarly, the possible use of biofuels (biodiesel and ethanol) raises questions on norms, regulatory measures, and standards in the storage and distribution of these fuels. In this respect, the SMARTER project will contribute to the development of quality and certification standards for bioenergy services and personnel. This activity will be undertaken by the cluster in close partnership with BREA, the Barbados National Standard Institute (BNSI), CCREEE and the CARICOM Regional Organization for Standards and Quality (CROSQ), based in Bridgetown, Barbados.

Output 2.3 Capacity strengthened for bioenergy technology development and implementation

Activities:

2.3.1 Assessment of technical skills needs for job creation and formulation of capacity building plan

35. 33. An analysis of the needs of private and public entities for technical, skilled labour well as renewable energy business operations and management will be conducted through a survey. This

survey will identify current gaps in bioenergy capacity and training needs at university-level and vocational training in view of the landscape of the emerging bioenergy job market, including also an assessment of capacity needs for mainstreaming gender equality and women?s empowerment outcomes in bio-energy production. The baseline assessment will support the further definition of the results framework across the project and inform all four components and also allow for gender and age analysis. The capacity needs assessment will result in a set of gender-sensitive recommendations for training and education, governance and planning as well as technical skills and abilities in bioenergy production, conversion and application.

2.3.2 Strengthening the capacity of education and vocational training

36. The University of the West Indies (UWI), Samuel Jackman Prescod Institute of Technology (SJPI), the Barbados Community College (BCC) and the Barbados Vocational Training Board will be important partners for the Project component on capacity building. The SMARTER Project will facilitate the training of experts throughout the project duration by making use of train-the-trainer approaches and partnerships with educational institutions and course modules that can be incorporated into their educational programmes (see Box 12). The MSc in Renewable Energy Management was previously offered by the Department of Pure and Applied Sciences at UWI. development. This MSc has now been suspended but is expected to be restarted as a MSc in the Centre for Resource Management and Environmental Studies (CERMES) Department at UWI Cave Hill. The Project can support the implementation or design of course modules on bioenergy either in the MSc or in the present BSC biology and chemistry curricula.

37. The Project will strive at enhancing impact by mobilising its partners to build human resources at the regional scale by seeking cooperation with R&D and training institutes in the Caribbean region. To create synergies and make use of co-funding arrangements, the national activities will be coordinated with the regional capacity-building activities of CCREEE (and its development partners, such as the German GIZ) and LEDS LAC, a network of organizations and individuals working in the promotion, design and implementation of low-emission development strategies (LEDS) in Latin America and the Caribbean.

2.3.3 Training of bioenergy staff on process monitoring, safety and operational aspects, feedstock logistics and technical and financial optimization

38. The Project will offer training of (candidate) operators and technicians in collaboration with national training institutes and technology suppliers, as part of the above-mentioned technical and

managerial or through specialised training workshops on specific topics (geared towards implementation of the activities of Outputs 3.1 and 3.2, and, as defined in the capacity assessment of activity 2.3.1). Similarly, business managers will need to be trained on operational aspects including feedstock logistics, compliance with safety procedures and regulations, and financial aspects of plant operation. Training under this activity specifically on safety and operational aspects will be informed by the SESP analysis and any related assessments carried out during the life of the project.

Output 2.4 National dialogue and information exchange facilitated by a ?bioenergy task force?

39. A range of stakeholders (see Exhibit 5) from the government and public sector, private sector, consumers and NGOs involved may not have the same interest, or in the case of companies, may compete with each other rather than cooperate. There is a need for ?co-opetition? by means of a formal network (platform) between, national government ministries, academia, industrial associations (e.g., Barbados Investment Development Corporation, Barbados Chamber of Commerce and Industry, Barbados Renewable Energy Association, Barbados Biogas Association, private developers and industry, transport sector, financing institutions, as well as NGOs and foundations.

40. The Project will support the establishment of a ?bioenergy task force? that includes all relevant stakeholders from Government entities, local authorities, civil society, local media, private sector, rural populations, and others. Initially set up as the Project?s ?technical advisory committee? (see section 7), the Committee will morph into a ?task force? (i.e. with an official institutional status) that will continue after the Project ends to continue the national dialogue and guide the formulation and subsequent implementation of the ?bioenergy policy?. The dialogue platform will have an important function to identify and find solutions for policy and regulatory issues which limit private sector participation (to be addressed in the proposed bioenergy policy, see Output 3.2) and to discuss the prioritization of biomass-for-energy pathways. Within the ?task force,? working groups can be formed on specific topics, such as biogas, biofuels, regulations and standards, financing services, etc. This can also entail consulting women organisations to get their input on matters as needed as well as ensuring the presence of gender experts in the task force itself (e.g., the Project can strive at having 30% of this taskforce is comprised of women). In doing so, the task force should include women bioenergy experts and women and men gender experts as well as representatives of relevant NGOs, identified through the stakeholder engagement that informed this proposal.

41. To maximise communication and information sharing between the participants and facilitate regular meetings, the Task Force will need to have a small secretariat to be hosted physically by one of the participating entities as well as a ?bioenergy? website. It it is proposed that the Task Force will organise a forum or event on bioenergy on a recurrent basis[7].

Component 3 Preparation and investment for renewable and biomass-based energy systems

Outcome	*Outputs*
3. A pipeline of bioenergy (and decentralised RE) has been developed and put into operation	3.1 Investment prospectus of renewable energy (RE) projects with a focus on bioenergy business cases 3.2 Detailed design and engineering studies of pilot-scale bioenergy facilities to appropriately choose biomass feedstock and formation of ?bioenergy pilot plan? 3.3 Implementation of bioenergy demo/pilot facility and increased investment in decentralised renewable energy

Component overview

42. The objective of this component is to assist the GOB to accelerate bioenergy pipeline development and stimulate investments in bioenergy technology and production to contribute to the national goal to reach a 100% RE matrix by 2030. Assuming that SMARTER will be implemented for four years (likely, 2023-2027) the projects in the pipeline will likely be in various stages of development in the project cycle.

1) Project concept (with or without a basic pre-feasibility study), see Output 3.1

2) Projects with a feasibility study (including detailed design and financial proposal), see Output 3.2

3) Projects in operation, under construction or financially closed, see Output 3.3

Output 3.1 Investment prospectus of bioenergy (and renewable energy) projects

Activities:

3.1.1 Pre-feasibility studies implemented for bioenergy business cases of feedstock/conversion/end-use combinations

43. The SMARTER project will carry out a series of pre-feasibility studies for relevant RE project cases, focussing on bioenergy power systems. These case studies will help project proponents develop bankable proposals compliant with applicable regulations and safeguards and eligible for the electricity generation licence. Identified business cases that may be developed under the Project?s time horizon

include among others sugar cane co-generation (bagasse), biogas generation from sugarcane/distillation residues, wastewater, organic content in municipal waste, sargassum) at small-scale (in a hotel or animal farm) or larger scale (for more centralised biogas/bio-methane or biofuel production).

44. The pre-feasibility study will follow a standard type of content, including:

? Business case and context; site description

? Feedstock supply, storage and transport, costs

? Bioenergy production facility design and operation description

? Bioenergy demand

? Estimates of investment cost, O&M cost and benefits (including non-energy, such as fertilizer sales)

? Impact estimation (environmental, employment, safety and health) and sales framework (e.g., fuel quality requirements, grid connection requirements, licensing and permits; land and water)

? Financing needs and sources;

? Project partners, organizational setup and project development plan

? Local environmental impacts and socio-economic aspects (including gender-sensitive employment, and social inclusion)

? Risk assessment

45. The activity will be linked with Output 2.3 to allow young professionals to gain practical experience in carrying out technical and socio-economic feasibility and project design activities. The pre-feasibility assessment will be closely linked with Output 2.1, profiting from the overall bioenergy assessment and, providing special data and info coming out of the pre-feasibility as credible Barbadian input data.

3.1.2 Formulation of bioenergy investment prospectus

Building on the pre-feasibility assessments of activity 3.1.1, the first experiences with the pilots/demos undertaken in Output 3.1 (or others, such as BNOC?s biodiesel pilot) an investment prospectus will be

formulated as a basis for scaling up bioenergy investments in line with the targets set in the new bioenergy policy (Output 2.2), and as a separate supplement to the bioenergy policy?s roadmap. The activity does not have to be built from scratch in its entirety but can leverage assessments done[8] or proposed to be undertaken.

46. It is expected that some of the proposed bioenergy business cases identified will result in investment agreements that by the end of the SMARTER project will be in three stages of development: a) designed with financial closure and under implementation or construction, b) designed with financial closure or under negotiation, c) concept proposed and/or under design.

3.1.3 Assessment of issues and options and recommendations for bioenergy financing

47. Important questions are how to attract investors to produce biofuels (and other renewable sources) and what are the main funds to finance the transition and necessary investments needed? A review of experiences with development and commercial banks (in the region) and the impact of bioenergy incentives (as indicated in the bioenergy policy, (Output 3.1) will be carried out. The project will also assess experiences in blended financing and de-risking instruments (venture capital funds, soft loans, debt and partial risk guarantees, minimum revenue guarantees, and project insurance) as well as non-traditional instruments (e.g., crowd and blockchain funding). This assessment will consider gender and access to financing in terms of ensuring a socially inclusive and gender-responsive approach.

48. As the Project does not have the intention to set up a separate financing facility, the Project will seek cooperation and build on existing programmes (such as the Smart Energy Fund II of IADB-EU; see section 5 on ?incremental cost reasoning?) that can provide grants and loans to small and medium-sized enterprises for renewable energy and energy efficiency investments). The assessments and investment prospectus can establish the conditions for bioenergy investment and development proposals that could be submitted to GCF-accredited entities (UNDP, development banks and/or others).

Output 3.2 Detailed studies of pilot-scale bioenergy facilities to appropriately choose biomass feedstock and formulation of ?bioenergy pilot plan?

Activities:

3.2.1 *Develop a ?bioenergy pilot plan?*

49. The PMU will lead and develop, in close collaboration with other stakeholders, a detailed ?bioenergy pilot plan? for advancing the pilot(s). Once prepared, the project?s Bioenergy Pilot Plan will first be reviewed for clearance by UNDP (CO and BPPS NCE), and then shared with the Project Board. This activity should be implemented in year 2, after the finalisation of the pre-feasibility analysis of 3.1.1 and the general bioenergy assessment of activity 2.1.1.

? Clear objective for the pilot(s)
? The ownership structure (owned by public or private enterprise or a combination thereof)

? The proposed type of pilot(s), which can include: (i) anaerobic digestion, (ii) biofuel production, (iii) thermal conversion with different biomass feedstock (agricultural and animal husbandry residues, food waste, wastewater, vinasse, crops, used or virgin vegetable oils, seaweed, other) and source (domestic, imported or a combination) as well different applications (power and/or heat generation or use as gaseous and liquid fuel)

? Site-specific assessments and other requirements (e.g., waste and residue management; alternative feedstock uses; value-added by-products) and stakeholder involvement

? The project?s approach to ensuring minimal concessionality for the level of GEF INV support to the pilot(s) (when there are private sector beneficiaries)

? Review of the Implementing Partner?s (IP?s) modalities for transfer of GEF INV support to the pilot(s), ensuring they are aligned with UNDP?s policies and financial rules

50. Regarding the latter, where there is private sector engagement in the pilot(s), a competitive tender process will be executed and issued in a Call for Proposals. Under this activity, the PMU (working with specialist engineering, financial, procurement, and legal expertise, as needed) will formulate a ?bioenergy pilot plan?, describing the (tendering) process including requirements, specifications and evaluation criteria. The Call for Proposals itself should be launched before the end of Year 2. Submissions to the tender will be competitively assessed against evaluation criteria (engineering, financial), with the PMU supported by appropriate expertise, while taking into account environmental, social and gender aspects.

3.2.2 Detailed design and engineering studies and business plan formulation of pilot-scale bioenergy facilities

51. The ?bioenergy pilot plan? will be advanced through a more detailed design and engineering study with a business plan. In addition to the elements of the pre-feasibility study, the full feasibility study and business plan will follow the pre-feasibility study outline but will add detailed engineering design and detailed input list and budget, financial and economic cost-benefit analysis, administrative-management setup and financial proposal (equity, loans, grants) with financing sources. The activity is linked with the feedstock sampling of activity 2.1.2 in case a detailed analysis of the feedstock or bioenergy conversion residues and by-products is needed. On an as-needed basis, the Project team can provide financial support (e.g., support hiring international bioenergy experts and national institutes) to design the operational conditions and design parameters, and formulate a business plan (plus financing plan) so that the bioenergy facility can be exploited commercially, once in operation.

Output 3.3 Implementation of bioenergy demo/pilot facilities and increased investment in decentralised renewable energy

52. The plan will list pilots that are to be implemented during years 2 to 4 and are eligible for some GEF INV support that will be granted depending on size and on an as-needed basis, ensuring minimal concessionality.. The GEF contribution (INV) will cover part of the initial investment cost. Several business cases have been analysed on feedstock inputs, investment and operating costs and the levelized cost of energy (LCOE) covering several sizes as well as applications (power generation, natural gas substitution or liquid biofuel). During the PPG (project design) phase of SMARTER, several business cases were analysed (presented in Annex G of the UNDP Project Document). A summary description of the possible bioenergy pilot projects is presented in Exhibit 3.

53. Some GEF funding will be made available for co-investment in the proposed bioenergy pilot/demo systems to complement co-finance resources. Opportunities will be sought to use GEF funds for highlighting a relevant energy nexus and making a difference in enabling posterior replication of a given business case. One condition of providing GEF INV support will be the willingness to provide technical, financial and operational data; validate the underlying pilot(s) assumptions and business case; (iii) track performance in terms of inputs utilisation and output delivery and (iv) generate insights and lessons learned to share all non-confidential information.

Pilot/demo projects and the project?s Social and Environmental Safeguards Planning (SESP)

54. Pilot and demonstration activities that receive investment support from the Project are required to comply with all the relevant national standards of the country as well as UNDP standards on social and environmental safeguards, gender equality[9] and stakeholder consultation. In support of this, specific guidance and inputs have been developed for the program on SES as well as a Gender Action Plan and Stakeholder Engagement Plan which will accompany this Project Document (see the Annexes J and K of the UNDP ProDoc). The guidance outlined in the SESP will be incorporated and considered in developing the environmental and social impact assessments and management plans for pilot/demonstration projects. One way to ensure a gender balance is to thrive for at least a 25-30% participation of women, who should be involved at various levels of the pilots/demos (decision-making, administrative-financial, operational).

55. A critical consideration is the need to ensure environmentally sound management of residues left after biomass conversion as well as the positive impacts of proper handling of waste streams with organic content and to ensure community security as well as health. The responsible handling of waste streams and residues should be clearly documented, budgeted, and monitored in compliance with national and UNDP SES requirements and national requirements. As a result, specific social-environmental assessments will be carried out for specific demo projects, for example, depending on the type of bioenergy projects, a focused ESIA will also be carried out to ensure that not-so-obvious issues including potential resource-use conflicts (e.g. land and water) are planned for.

Exhibit 3 Pilots and demos and expected GHG emission reduction

A number of business cases for various biomass feedstock – conversion route – application combinations, have been assessed, based on own analysis and information available in literature or provided by stakeholders during the project design (PPG) phase. The profiles presented are tentative regarding the number, size, expected electricity or fuel production, source of biomass feedstock. In fact, even the 'bioenergy pilot plan' may not be able to fully define the pilots until the developers' proposals are selected after the Call for Proposals. In order to be able to make an estimate of the expected direct greenhouse gas emission reduction of the pilot, it is assumed that the eventual bioenergy demonstration/pilots will be a superposition of one or more od business cases (described in Annex G of the UNDP ProDoc) that can be grouped in three types:

a) Anaerobic digestion for power production
b) Anaerobic digestion for gaseous fuel (bio-methane) production
c) Production of biofuels

Direct emission avoidance estimates (from investments committed during 2024-27)			
Energy production or conversion	*PV*	*Bioenergy*	
Final energy product	*Electricity*	*Electricity; fuel*	
Biomass feedstock	n.a.	Animal dung Food waste King grass Sargassum Vinasse; UCO	
Description case (Annex G)	Annex H	Annex H	**Total, direct**
Power (kW)	1,200	410	**1,610**
Electric energy (kWh/year)	1,839,600	8,623,856	**10,463,456**
Fuel (m3, gas or litre, liquids; per yr)			
Fuel replaced (GJ per year)		168,337	**168,337**
Useful by-product		fertilzer, glycerol	
Investment (USD)	1,680,000	8,452,875	**10,132,875**
Sargassum collection		1,900,000	**1,900,000**
Total	1,680,000	10,352,875	**12,032,875**
Annual GHG avoidance (tCO2/yr)	1,453	12,475	**13,928**
Cumulative GHG	10,338	205,165	**215,503**
Annual GHG reduction, PIF	10,060	1,200	**11,260**
Cumulative GHG reduction, PIF	201,206	12,000	**213,206**
GEF INV support		450,000	**450,000**
Confirmed co-fin	1,680,000	5,700,000	**7,380,000**
Employment creation	32	164	**196**

All the business cases (as well as the case of E10 production and supply to the filling station system) are described in the UNDP ProDoc'sAnnex G. These have been used, as a basis for estimating the indirect emission reduction of the SMARTER project (see Results framework in the Annex A and calculation methodology presented in Annex H of the UNDP ProDoc).

A summary of characteristics of the SMARTER bioenergy pilot/demo activities, and direct GHG emission reduction is given in the table on the left. The methodology for estimation of the GEF indicators (including greenhouse gas emissions reductions) with the calculated SMARTER project targets are given in the UNDP ProDoc's Annex H. The direct emission reduction is estimate is the same as Indicator 1) in the results framework table (see Annex A) of this CER document. It should be noted that feedstock supply options, expected power or fuel production and investment needs are indicative and final figures will be based on the feasibility and design studies of the Output 3.1, while the final investment decision will be taken after successful conclusion of these studies.

- *The investment contribution for the pilots may be done through a procurement modality. However, depending on the ownership/ operation type of pilot, other options will be discussed between UNDP and the Implementing Partner, in particular when targeting private sector beneficiaries. Such options could involve, for example, providing a CAPEX subsidy to private companies through a performance-based payment type modality or through other instruments aligned with UNDP Policies and Procedures. The proposed investment mechanism resulting from the pre-feasibility studies for the definition of the bio-energy pilot plan should be reviewed and approved by UNDP Country Office and Regional Technical Advisor.*

Component 4 Knowledge management and information dissemination

Outcome	*Outputs*
4. The Project?s knowledge management and M&E plans and outreach activities have been implemented	4.1 Scientific, technological, engineering, operational and social experiences with bioenergy development in Barbados, collected, promoted and shared, nationally and within the Caribbean region 4.2 Monitoring and evaluation

This project component will establish the Project?s knowledge management framework (KM), implement outreach activities and stimulate intra-regional networking on bioenergy in the Caribbean region.

Output 4.1 Scientific, technological, engineering, operational and social experiences with bioenergy development in Barbados, collected, promoted and shared, nationally and within the Caribbean region

Activities:

4.1.1 *Match-making Barbadian stakeholders and foreign knowledge institutes and technology suppliers*

56. To ensure technical availability, a national ecosystem should be created offering design skills, maintenance and equipment and laboratory services as well as collecting and sharing technical, economic and financing information. Rather than starting from scratch, the SMARTER Project aims to tap into the global resource base by ?match-making? of Barbadian stakeholders and foreign knowledge and research institutes (to support the capacity strengthening of local research and training institutes, see Output 2.3). A gender-sensitive approach is encouraged.

57. Second, the match-making activity will endeavour to systematically interlink Barbadian bioenergy entrepreneurs (and other key actors in sustainable development) with entrepreneurs, investors, venture capitalists and financiers (from other islands, the international level and the diaspora). This will encourage the establishment of joint ventures, foreign investments as well as business-to-business partnerships on the priority bioenergy business cases (identified as part of Output 3.1). Here, close cooperation will be sought as well with the sustainable energy hub of BIDC and other partners (BREA, BBA, CCREEE).

58. Local stakeholders include UWI, BBA, BAMC, BIDC, BREA, and BNOC. CCREEE?s presence in Barbados can be a valuable asset to build synergies as bioenergy. The Project will seek synergies with national agencies involved in bioenergy in the Caribbean countries as well as regional organisations (CCREEE, OLADE) and international development and other partners (IDB, OLADE,

UNIDO, IRENA, LEDS LAC, GIZ). Local stakeholders should also include the Bureau of Gender Affairs and the University of the West Indies Institute for Gender and Development Studies (see

4.1.2 *Collation and dissemination of operational experiences, lessons learned and recommendations for value chain development.*

59. The SMARTER project will support the collation and dissemination of operational experiences, lessons learned and recommendations for bioenergy development and applications in the region. The experience of Barbados will also be of interest to other countries in the region. The Project will support the development of at least one ?insight brief? capturing (in an accessible format) selected key highlights from the pilot/demo or other successful national project activity. The ?insight brief? can cover any activity of the project and take the form of a written brief or video brief. At the end of the Project, a comprehensive end-of-project assessment and lessons learned study will be commissioned (from UNDP co-financing) with detailed recommendations for post-SMARTER action. The brief will include gender and socially sensitive promising practice and recommendations for value chain development

4.1.3 *Outreach and promotional activities to public sector beneficiaries of RE and bioenergy systems (ministries, health, education, sports council), private sector and residential custome*r

60. The Project will organise bioenergy promotional events and business-to-business meetings and will conduct workshops and seminars to create awareness and provide accurate information on the application of bioenergy in various end-uses as well as on the pros and cons of bioenergy in terms of improved environmental impacts (water, air quality, marine environment), as well as on the socio-economic cost-benefits). Here, the role of bioenergy in overall energy planning can be clarified and links of bioenergy with land use the circular economy, climate resilience and gender will be stressed.

61. There have been criticisms of getting correct information from government authorities in terms of applying for and implementing domestic and commercial RE solutions. The awareness program offers the opportunity to explain the process to citizens, including FiT benefits, tax benefits, financing and pay-back based on electricity use savings, incentives, etc. and to do so in a gender-sensitive and socially inclusive way including the use of language as well as images in ways that meet the UNDP and GEF Gender Policy requirements.

Output 4.2 Monitoring and evaluation

62. This Component will ensure compliance with all mandatory monitoring and reporting requirements of UNDP and the GEF, including the following specific outputs (described in more detail in Section 6). This project component will establish the Project?s knowledge management framework (KM) and assist the GOB in establishing project oversight and monitoring systems, including the Environmental and Social Management Framework (ESMF) and resulting Management Plans (if required), the Gender Action Plan (GAP), the Mid-Term Review (MTR), and the GEF Terminal Evaluation (TE). The MTR and the TE will consider gender as part of the evaluation criteria in keeping with GEF and UNDP guidelines.

Activity 4.2.1 Gender-sensitive M&E and Reporting, including (i) Conducting inception workshop and preparing report, (ii) Ongoing M&E, (iii) Mid-Term Evaluation and (iv) Terminal Evaluation

63. This Component will ensure compliance with all mandatory monitoring and reporting requirements of the GEF, including the following specific outputs (described in more detail in Section 6), a) Conducting inception workshop and preparing the report, b) Ongoing project monitoring of Results Framework indicators, c) Annual progress reporting, d) Conduct a Mid-term review (MTR) of the project, e) Conduct a Terminal Evaluation (TE) of the project

Activity 4.2.2 Final project results and lessons-learned reporting

64. The experience of Barbados will also be of interest to other countries in the region. At the end of the Project, a comprehensive end-of-project assessment and lessons learned study will be commissioned (from UNDP co-financing) with detailed recommendations for post-SMARTER action. The Project will support the development of a final report? as well as an ?insight brief? capturing (in an accessible format) selected key highlights from the pilot/demo or other successful national project activity as an easy-to-read summary that can cover any activity of the project and take the form of a written brief or video brief. This activity will be under the UNDP grant co-financing (while activity 4.3.1 is implemented with GEF funding).

4) Alignment with GEF focal area and/or impact program strategies;

The program is aligned with Objective 1 of the Climate Change Focal Area to ?Promote innovation and technology transfer for sustainable energy breakthroughs?, through CCM 1-1 - Promote innovation and technology transfer for sustainable energy breakthroughs for de-centralized renewable power with energy storage. It also contributes to GEF-7 Programming Directions to accelerate ?the speed and scale of sustainable energy investment in developing countries?, to develop ?innovative business models that go beyond business as usual? and to foster innovation. Although submitted as part of GEF-7, SMARTER can be aligned with GEF-8 integrated programmes, such as Green and Blue Islands and the programme on Sustainable Cities.

5) *Incremental cost reasoning*

65. UNDP has contributed in the past with the DREAM project[1] and is committed to continuing support to the GOB with the present SMARTER project. The seaweed *Sargassum* can be potentially a biomass feedstock for energy, while the off-shore and on-shore collection of *Sargassum* will diminish an increasing marine environmental problem. The regional UNDP/Japan project ?Improving National Sargassum Management Capacities in the Caribbean? is an important baseline activity providing co-financing for *Sargassum* collection in Barbados[2].

66. The Project builds upon a set of baseline programs, which demonstrate GOB ownership as well as the sustained support by international agencies including the European Union (EU) and the Inter-American Development Bank (IDB). See Box 13 in the UNDP Project Document for details of the projects summarized below:

? *Public Sector Smart Energy Programme* (PSSEP), financed by IBD (USD 24.8 million, loan) and EU (EUR 5.8 million, grant). Implementation period: 2013-present

? *Smart Energy Building*, financed by the Republic of Korea (USD 3 million). Period: 2019-present

? *Deployment of Cleaner Fuels and Renewable Energy,* IDB (IDB: USD 34 million). Ongoing

? *Sustainable Energy Investment Programme (Smart Fund II)*, financed by IBD: USD 30 million, loan) and EU (EUR 13.26 million, grant). Period: 2019-present

? *Supporting Energy Transition Implementation and Smart Energy Technology Expansion in Barbados.* IBD: USD 0.55 million (grant). Period: 2019-present

? *Promote sustainable energy technology innovation, industrial development and entrepreneurship in Barbados*, implemented by UNIDO with GEF (USD 1.78 million) and other financing (USD 12.9 million)

The following projects are funded by the Green Climate Fund (GCF):

? *3R-CReWS* (implemented by CCCC), GCF: USD 39 million and co-financing: USD 10 million (approved in October 2022)

? Scaling up the deployment of Integrated Utilities Services (IUS) to support energy sector transformation (GCF and co-financing: USD 43.5 million, under preparation with the Ministry of Finance:

67. GEF funding to strengthen MEB is expected to make a difference here to ensure renewable energy project development in general, while respecting a due diligence process in compliance with all identified safeguards and best practices. This approach will strengthen Barbados? position as a landmark for the energy transition and create an example to follow for the Caribbean community. The Government aims at achieving 100% RE by 2030, which will require a concerted effort by all partners. GEF grant funding will enable GOB to develop a number of actions to assess, develop, implement and promote bioenergy. Bioenergy is typically not covered at all by the grants and concessional loans under the baseline program, mentioned above[3]. Bioenergy is mentioned as a future energy carrier in the IRRP (2011) for power generation but no specifics are given on biomass feedstock resources. No study or assessment has so far resulted in concrete bioenergy investments or facilities

68. In Component 1, GEF funding is requested to enhance MEB?s delivery capacities and upgrade ICT infrastructure and skills (delivery skills) for sector planning and handling of RE project applications. GEF funding is expected to reduce the throughput time of RE investment proposals under the baseline, thereby accelerating the uptake of RE capacity. GEF incremental action is further required to help GOB in cross-sectorial coordination and to expand the current integral resource and resilience analysis of the power sector to encompass all energy end use, in particular the role of bioenergy therein.

69. To be able to calculate properly the role of bioenergy in the ?100% RE? economy, a thorough and comparative assessment of feedstock options, and possible feedstock to end-use conversion routes is needed, together with an analysis of its potential to replace fossil fuels in power generation and natural gas (in the pipeline system and in the transport sector). The GEF support in Component 2 shall enable Barbados to master bioenergy technology and build a supportive ecosystem relevant to energy

and environmental perspective. This support will enable cross-linkages with tourism, waste management, transport and the agriculture (sugar cane and food production) sectors.

70. GEF incremental action will address barriers related to capacity constraints and will contribute to de-risking investment in decentralized RE systems (such as rooftop PV on public buildings). GEF support further entails a set of project concepts and pre-feasibility studies of bioenergy business cases (such as anaerobic digestion for power generation or supply of bio-methane to the pipeline system or bio-CNG as well as biodiesel, bio-ethanol for transport). In the absence of the enabling conditions to develop a biomass energy sector in Barbados, such studies are not likely to become full business plans with a positive investment decision in the baseline. Private investors tend to look at solar PV and wind which are regarded as having lower risks than bioenergy options, which are not wide applied yet in Barbados or the Caribbean region. Thus, GEF grant funding is an enabling factor to build momentum for the above-mentioned bioenergy systems and to support some of the capital cost of the selected pilot/demos (based on an approved business/finance plan). Successful demonstration of the technology (Component 3), plus the adoption of a bioenergy policy (in Component 2) including linkages to waste management, land-use management, gender, employment and circular economy, need to be in place to provide a robust environment for bioenergy upscaling in Barbados. The GEF project is designed to support building these conditions, including support for information collection and dissemination and knowledge management (Component 4)

6) global environmental benefits (GEFTF) and GEF indicators

71. The SMARTER Project contributes to the following GEF-7 Core Indicators:

? Core indicator 6: Greenhouse Gas Emissions Mitigated captures the amount of GHG emissions expected to be avoided through the GEF project?s investment in bioenergy. It should be measured above a baseline value. Mitigation benefits include:

? Direct emissions reductions attributable to the investments made during the project's supervised implementation period, totalled over the respective lifetime of the investments (215,503 tCO_2)

? Indirect emissions reductions that could result from broader adoption of the outcomes of a GEF project plus longer-term emission reductions from behavioural change, business modes and capacity development in the post-project period. Broader adoption of a GEF project proceeds through several processes including sustaining, mainstreaming, replication, scaling-up and market change (329,311 tCO_2)

? Sub-indicator 6.4: Increase in installed renewable energy capacity per technology captures the increase in renewable energy generation or storage capacity and is disaggregated by type of renewable energy technology (biomass for fuel or electricity generation, solar photovoltaic, other) ? (1,610 kW)

? Core indicator 11: Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment captures the total number of direct beneficiaries including the proportion of women beneficiaries. Direct beneficiaries are all individuals receiving targeted support from the project (766 people, of which at least 306 women).

72. The reader is referred to Annex H on how these indicators are calculated for the SMARTER Project.

Exhibit 4 Project results expected at PIF and CEO Endorsement

Project GEF-7 Core Indicators	Expected at PIF	Expected at CEO Endorsement
Greenhouse Gas Emissions Avoided (metric tons of CO2e) ? cumulative (20 years lifetime of investments)	213,000 (direct) 210,000 (indirect)	215,503 (direct) 329,311 (indirect)
Energy substituted (cumulative) - electric energy (in GJ) - gaseous and liquid fuels (in GJ)	245,000 MWh (882,000 GJ)	4,120,114 (GJ) * 753,369 GJ (209,269 MWh) * 3,336,745 GJ
Increase in installed renewable energy capacity ? biomass for power (MW)	7.75 MW * 7.50 MW (solar PV) * 0.25 MW (bio-power)	1.61 MW * 1.20 MW (solar PV) * 0.41 MW (bio-power)
Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment Units of measure: number of people	Not determined	Total direct: 766 (of which 306 women) - through direct employment (FTE): 196 (of which 78 women) - through capacity building: 570 (of which 228 women)

For details on assumptions and calculation methods, the reader is referred to Annex H of the UNDP Project document as well as Annex G of thjs CEO Endorsement/approval document.

7) innovativeness, sustainability and potential for scaling up. ?

Sustainability

73. The sustainability of the outcomes of the SMARTER project is deemed highly probably given the strong baseline initiatives and MEB?s increasing capacity to lead the energy sector, supported by several multi- and bilateral agencies. Policy instruments, regulation, data collection, and supervision tools will strengthen GOB?s capacity to take control of sector planning, increase cost-efficiency and reduce dependency on fossil fuels. RE systems (mainly solar) have been operating satisfactorily. The remaining barriers and challenges will be addressed by the SMARTER project to enhance sustainability for existing and future installations and improve monitoring of performance.

74. Most renewable energy (including bioenergy) technologies have higher upfront capital costs (CAPEX). Securing financing for investment in the energy transition towards ?100% RE? is challenging given the limitations posed by the state budget. The Fair Trading Commission (FTC) highlights the importance of assuring the affordability of electricity and fuels for low-income, vulnerable citizens in the future. With a view to long-term environmental and social sustainability, project activities will pay attention to the social impact of RE systems including opportunities for employment creation along the value chain (bioenergy production, system operation, digitalization solutions) protection of sensitive areas, and opportunities to strengthen the position of women, including access to energy and participation in decision-making processes and consultations.

75. The GOB licencing process, under MEB?s mandate, shall ensure the technical, economic, social and environmental sustainability of proposed RE generators. The GEF project will provide knowledge, data, and criteria to deliver an adequate licencing regime for bioenergy systems. The Project will draw on experiences, technical standards, guidelines and best practices from other countries to be adapted to the local context. Given the incipient status of biomass-to-energy conversion technology in the country, the long-term feasibility of such systems cannot be fully guaranteed.

76. To enhance the attention bioenergy is receiving in academic and training institutions, GEF resources will be used to augment the status of bioenergy as a permanent feature in relevant courses (physics, chemistry, management, other) of these institutions. As different stakeholders may have different interests, it is important that coordination and consultations between stakeholders take place in a neutral body, for which purpose a ?bioenergy task force? will be set up with GEF support at a suitable

organization or institution that will also host a bioenergy-dedicated website. Thus, the Project will determine the boundary conditions for sustainable operation and ensure a due diligence process. The presence of capable stakeholders including CCREEE and UWI are enabling factors for building a robust bioenergy value chain in Barbados.

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Innovativeness

77. Barbados can benefit from using its advanced ICT systems for supervision and monitoring distributed electricity generators to build the required business infrastructure, including for example the use of blockchain technology and other digitalization solutions that will be assesSed by this project. As such, Barbados? energy transition may bring along new opportunities for digitalization for sustainable development through business-to-business (B2B) services, ICT systems and high-quality job creation in general. Smart energy management solutions are innovative for Barbados and have the potential to induce substantial energy savings and emission reductions through the optimisation of operations and behavioural changes.

78. Second, the Project is innovative for Barbados as it introduces dispatchable bioenergy technology (notably biodigesters) and applies in a range of novel applications (e.g. bio-CNG). Alongside the technological aspects to be mastered, business models will be finetuned to enable sustainable operation of the various biomass-to-energy conversion routes. The GEF project further anticipates circular approaches to biomass valorisation (bio-economy principles) and strengthening of the integrated nexus of energy with agriculture, water and waste management, among others. Thus, bioenergy will become a necessary integral part of Barbados to transit towards a 100% RE electricity sector by 2030.

79. The Project?s planned investments in gender mainstreaming will enable greater consistency and application of a gender lens to bio-energy planning and production as well as innovative gender mainstreaming approaches. Engagements with UWI on bio-energy research, technology innovation as well as gender mainstreaming are also entry points for sustained innovation as an investment in this sector burgeons.

Potential for scaling-up

80. The Project seeks to create enabling conditions for upscaling of investment in bioenergy (and renewable energy in general). The investment will increasingly rely on private stakeholders (including the utility BLPC) to meet the established target of 100% renewable energy, as mentioned in the Barbados National Energy Policy (BNEP). The investment potential in Barbados is demonstrated by the volume of loan instruments being negotiated by the GOB with development finance institutions to expand renewable capacity in the country.

81. Regarding electricity generated from sustainable energy sources, studies underpinning the BNEP aim at about 750 MW of renewable energy capacity, of which about 340 MW of solar and 23 MW of bioenergy/waste-to-energy capacity. These capacities could generate about 1400 GWh annually (of which 750 GWh is solar and 92 GWh of bioenergy/waste). Distributed solar PV (including rooftop PV on public buildings) of 100 MW could generate about 150 GWh annually.

82. How biomass replaces fuels for heat or motive application is not defined yet in the Barbados energy policy. The analysis undertaken as part of the formulation of the SMARTER project indicates that bioenergy could contribute almost 20% of the primary energy supply as part of ?100% RE? (in comparison to about 2% currently) by the year 2040. Annex G in the UNDP project document describes a number of bioenergy options (business cases) that contribute to achieving the before-mentioned share of bioenergy in the primary energy supply:

? Biogas for power generation in smaller facilities (e.g. pig farm and/or crop residues) or for use as CNG-replacement in natural gas vehicles (from animal manure, vinasse, sargassum)

? Biogas for power generation or replacement for mineral natural gas in larger facilities with various feedstock, such as animal manure, crop residues, vinasse (from ethanol production) and seaweed (*Sargassum)*

? Production of biodiesel (from used cooking oil or imported feedstock)

? Production of bioethanol (linked to producing vinasse for biogas production and use of bagasse in combined power-generation)

The table in Exhibit 5 gives an estimate of the potential biogas (as fuel or for power generation) and biofuels (bio-diesel, bio-ethanol). The estimates take into account the feedstock availability (domestic

production and land availability limitations) as summarised in Exhibit 6. Regarding the demand side, the biomass-for-energy potential is based on demand projection (made for IRRP) and estimates of demand for electricity (provided for by biomass and renewable energy, including electric vehicles) as well as fuel needs for heating and transport energy (provided for by domestically produced biofuels or other imported fuels).

Exhibit 5 Estimated bioenergy scaling up by 2040 (electricity and fuels generated from biomass)

Generation / conversion	*Anaerobic dig.*	*Anaerobic dig.*	*Anaerobic dig.*	*Extraction*	*Extraction*	*Fermentation*	*CHP*	*Anaerobic*		**Bio Pilots,**
Final energy product	*Electricity*	*Electricity*	*Bio-methane*	*Biodiesel demo*	*Biodiesel B20*	*Ethanol E10*	*bagasse*	*Bio-CNG*	**Total**	**SMARTER**
Biomass feedstock		Animal dung Food waste King grass Sargassum	Animal dung Food waste King grass Sargassum Vinasse	Used cooking oil (UCO)	UCO Soybean oil	Sugarcane Molasses	Sugarcane	Sargassum Vinasse	Various feedstock	Various feedstock
Power (kW)	36	820					2,518		**3,374**	410
Electric energy (kWh/year)	283,824	17,247,712					25,337,181		**42,868,718**	8,623,856
Fuel (m3, gas or litre, liquids; per yr)			15,205,957	870,000	6,762,000	16,813,584		2,231,687		
Fuel replaced (GJ per year)			544,373	32,244	250,613	354,200		85,474	**1,266,904**	168,337
Useful by-product	fertilizer	fertilizer	fertilizer	glycerol	glycerol	vinasse		fertilizer	**various**	various
Annual GHG avoidance (tCO2/yr)	224	5,107	29,941	2,436	18,934	38,517	20,016	5,898	**121,072**	12,475
Cumulative GHG (20 yrs)	1,448	32,973	598,811	38,976	302,938	616,265	129,227	94,363	**1,814,999**	205,165

Note:

Own elaboration (see Annex G in UNDP Project Document). The column on the right gives the potential contribution of the SMARTER bioenergy pilot/demo project to the overall bioenergy potential.

83. Also about 2,211 terajoules (TJ), in the form of biofuels for transport (501 TJ, generated biodiesel from used cooking oil and bio-ethanol and bio-CNG replacing gasoline) and generation of bio-methane (1318 TJ, through anaerobic digestion of suitable biomass feedstock) to generate electricity and to replace natural gas in the pipeline network (see Exhibit 7)

Exhibit 6 Biomass feedstock production 2040

Feedstock '(in ton per year)	Maximum potential	Amount needed
king grass	449,195	173,862
food waste	91,120	92,418
pig manure	32,850	37,413
chicken manure	10,987	4,380
vinasse	1,547,883	597,984
vinasse (w/o E10)	553,124	157,680
sargassum	100,375	100,163
vegetable oil for biodiesel **	1,001	7,850
sugarcane for E10	120,000	120,000
Land use (hectares)	5,813	4,324
- king grass	2,428	940
- sugarcane for E10	1,846	1,846
- sugarcane - other	1,538	1,538
Currently used (sugarcane)	2,160	
Available for farming	10,000	

Source: own estimates. For details, see Annex G of the UNDP Project Document

Exhibit 7 Energy balance 2040, assuming a substantial role of bioenergy

(in terajoules, TJ)	Fossil or alternative fuels	Biomass	Renewable energy	Distrib RE	Electricity	Total
Production		1,808	5,169	813		7,79
Import	3,330	403				3,73
Export						
Stock	0					
Supply	3,330	2,211	5,169	813	0	11,52
Transformation, electr	0	-893	-5,169	-741	5,641	-1,16
Own use and distr. Losses	0	0	0	0	515	51
Final use	3,330	1,318	0	72	5,126	9,84
- Transport	0	501			1,660	2,16
- Residential	512	214		40	1,118	1,84
- Industry and agriculture	2,393	51			833	3,27
- Commerc., instit., other	497	552		32	1,515	2,56

[1] The Disaster Risk & Energy Access Management (DREAM) project (GEF: USD 1.55 million and co-financing) provided support for a) strategic plans and licensing regime approved for accelerated RE development (grid stability, (distributed) solar PV planning and licensing; ICT), b) institutional and technical capacity and awareness strengthened for clean energy development, for feasibility, installation assistance for solar PV demo projects. Its final evaluation (2019) provides some recommendations for post-project follow up that have been addressed in the design of Component 1 of SMARTER

[2] GEF budget: GEF: USD 1.78 million. Co-financing: Other: USD 12.9 million. The project will a) provide in-water and onshore equipment to remove and collect large quantities of sargassum from territorial waters and coastal areas of five (5) Caribbean countries; b) develop sargassum management plans using the latest aerial and spatial technologies to monitor and improve coastal ecosystem conservation and integrated coastal zone management, c) strengthen capacities and skills to effectively utilize sargassum removal equipment, d) providing a platform for regional dialogue, communications, sharing experiences and lessons learnt

[3] IDB has provided some support for the initial assessment of using bio-methane in the pipeline system and bio-diesel. The GCF-supported 3R-CReWS has an activity on linking wastewater treatment with energy.

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[1] Current application time is between 60-120 days

[2] Including, for example, women?s role in leadership and decision-making, employment and business opportunities, gender-sensitive monitoring, gender-responsive budgeting and financing

[3] This includes the includes issues of affordability as well as user needs and access to bioenergy technology

[4] Regulatory aspects include safety, occupational hazards and air pollution from particle emissions. Without standards and certifications, it is difficult to assure quality of services and products within the sector. This barrier will need to be addressed either by developing indigenous programs for standards or adopting standards commonly adopted internationally.

[5] Incentives including grants and tax benefits can help mitigate upfront capital costs, moreover if the environmental benefits of organic waste processing in biomass plants, and the creation of employment along the value chain, are taken into account

[6] See also Stakeholder Engagement Plan (annex K in UNDP Project Document)

[7] This could be part of the Barbados Sustainable Energy Conference that is organized annually in November

[8] For example, NPC?s

[9] Where possible, the team composition for each should consist of at least 25% women, who are involved at various levels of the projects.

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[1] See also Section 2 in the UNDP Project Document

[2] Due to abandonment of managed lands (plantations), forest and grassland conversion and removals from soils

[3] Source: sielac.olade.org

[4] See also Section 3 in the UNDP Project Document for more details

[5] BNEP; of which 205 MW solar plants and 105 MW distributed) and on- and off-shore wind (300 MW). To be able to absorb the variable solar and wind supply, the grid would need battery storage of about 200 MW (68 MW decentralised and 132 MW centralised).

[6] The Integrated Resource and Resilience Plan (IRRP, 2021) has slightly different figures with about 860 MW of installed renewable energy capacity by 2030 (of which about 23 MW installed bioenergy capacity)

[7] *Barbados Waste Characterization Study* 2015, Ministry of Environment and Drainage; Simmons & Associates

[8] See also the Section 3 on strategy and theory of change in the UNDP Project Document and the detailed description of outcomes and outouts in Section 4.1

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

1b. Project Map and
Geo-coordinates.
Please provide geo-referenced information and map of where the project interventions will take place.
The project is country-wide and exact project locations are yet to be identified during site selection and assessment. Names and coordinates cannot be added yet


ATLANTIC OCEAN
North Point
Salmond
Fitfield
The Spout
Greenidge
Hope
Content
SAINT LUCY PARISH
Durham
Cove Hill
Cuckold Point
Paul's Point
Bramfield
Alexandra
Boscobel
Rose Hill
Mont Brevitor
Speightstown
SAINT PETER PARISH
Belleplaine
SAINT ANDREW PARISH
SAINT JAMES PARISH
SAINT JOSEPH PARISH
Bathsheba
Holetown
SAINT THOMAS PARISH
Pothouse
SAINT JOHN PARISH
Consal Point
Belle Point
Ragged Point
The Char
Steward Hill
SAINT PHILIP PARISH
Robinsons
SAINT GEORGE PARISH
Six Cross Roads
The Crane
Black Rock
SAINT MICHAEL PARISH
BRIDGETOWN
CHRIST CHURCH PARISH
St. Patrick
Gemswick
Needham's Point
Hastings
Worthing
Oistins
Kendal Point
South Point
Inch Marlowe Point
Grantley Adams International Airport
ATLANTIC OCEAN
CARIBBEAN SEA
Anguilla (UK)
Saint Martin (Fra. + Neth.)
Saint Barthelemy (Fra.)
Saba (Neth.)
St Eustatius (Neth.)
Basseterre
ATLANTIC OCEAN
ANTIGUA AND BARBUDA
Barbuda
Antigua
Saint John's
SAINT KITTS AND NEVIS
Montserrat (UK)
Guadeloupe (France)
Basse-Terre
Pointe-à-Pitre
Lesser Antilles
DOMINICA
Roseau
Martinique (France)
Fort-de-France
CARIBBEAN SEA
Castries
SAINT LUCIA
SAINT VINCENT AND THE GRENADINES
Kingstown
Bridgetown
BARBADOS
GRENADA
Saint George's
80 km
ATLANTIC OCEAN
CARIBBEAN SEA
VENEZUELA
COLOMBIA
GUYANA
National Capital (98,000 in 2006)
main city
other main city
other city
BARBADOS
0 km 1.5 3 4.5 km
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1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

1. SMARTER is not a child project.

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities

Private Sector Entities Yes

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

A.1 Stakeholder engagement plan

Introduction

This Stakeholder Engagement Plan (SEP) defines how SMARTER will identify and engage key stakeholders, and integrate their inputs into project implementation and risk management. Implementation of this plan will provide stakeholders with meaningful access to dialogue and decision-making in the development and implementation of the project. By providing channels for all stakeholders, including the disadvantaged and vulnerable, effective stakeholder engagement helps to ensure understanding, acceptance, and ownership of the project, thereby strengthening its benefits and sustainability.

Stakeholder engagement is an end in itself, ensuring that no one is left behind and that disadvantaged and vulnerable project stakeholders have a voice in project development and implementation. It is also a means for improving project design, identifying and managing risks, and ensuring transparency, accountability and integrity. In this light, one important purpose of this plan is to provide feedback and monitoring mechanisms to ensure the project is achieving its intended results and identifies potential unintended consequences. The development and implementation of the SEP are part of the UNDP

Social and Environmental Safeguards (SES) requirements. Hence, the presented SEP will be reviewed and updated during the social and environmental assessment processes (see also Annex L)

Purpose and objective

The enhancement of the commercial viability and social acceptability of bioenergy systems depends on the level of flow of information between stakeholders from the private sector, public companies and government decision-makers. This flow will guarantee that the decisions made are well-informed and constitute the best use of resources to serve the best interest of the country and beneficiaries. The flow will also guarantee that investors, developers and social groups are actively engaged in the development of regulations governing the energy sector before they become legally binding and are allowed to utilize their technical expertise in the formulation of national plans and laws aiming to increase bioenergy development and application. Hence, this SEP is developed to ensure tripartite engagement of public entities, private sector actors, and representatives of beneficiaries in all stages of pilot development and overall project implementation.

Project preparation

As part of the project development phase, and in addition to the desk review and data collection exercise, the PPG team of National and International Consultants identified key stakeholders and engaged with them in a series of in-person and online meetings, during the PPG international consultant?s mission to Barbados, and thereafter by the PPG gender and social safeguards consultant (see list of stakeholders met on the next page). The purpose of these meetings was to share information about SMARTER, to seek first-hand information on baseline conditions and needs, and to scope out potential project activities and partnerships. The discussions also aimed to identify the gaps that SMARTER seeks to fill, especially in the presence of several projects targeting energy access and renewable energy development financed by development partners besides UNDP and the GEF.

The consultations served to accomplish the following:

? Validate the findings of the SESP.

? Identify additional risks to be considered in the SESP.

? Clarify the potential roles of stakeholders.

? Identify capacity needs.

? Validate the recommended mitigation measures.

Last but not least, a stakeholder workshop was organised in Barbados (with presential and online attendance by various stakeholders) on October 2022.

List of stakeholders met in PPG phase:

Meeting date	Organisation
24 Oct 2022	UNDP Country Office Ministry of Energy and Business (MEB)
25 Oct 2022	Barbados National Standards Institute (BNSI) Government Electrical Engineers Department National Petroleum Corporation (NPC) / Barbados National Oil Company Ltd (BNOC)
26 Oct 2022	Ministry of Environment and National Beautification Barbados Agricultural Management Corporation Ministry of Transport, Works and Water Resources / Barbados Water Authority Fair Trading Commission Inter-American Development Bank (online)
27 Oct 2022	University of West Indies (UWI) Barbados Renewable Energy Association (BREA) Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE)
28 Oct 2022	Online stakeholder workshop (hosted by MEB)
16 Jan 2023	MEB ? NRB (National Resources Department)
17 Jan 2023	MEB ? ECREU (Energy Conservation and Renewable Energy Unit) MEB ? PEU (Project Execution Unit)
18 Jan 2023	MEB ? PPRU (Programme Planning and Resources Unit)

19 Jan 2023	MENB ? SSA (Sanitation Services Authority) Future Centre Trust
20 Jan 2023	MEND ? EPD (Environmental Protection Department
24 Jan 2023	Barbados Environmental Conservation Trust

Project inception and implementation

The project will effectively engage the stakeholders involved in the project to get their support and guide the project implementation to achieve higher results.

? The project outreach proposed includes a project website (to continue as the Bioenergy Task Force?s website), media (print/audio-visuals), workshops, training, etc.

? The PMU and the Project Board will ensure that the Gender Action Plan recommended by the project is pursued and implemented. The various groups especially women will be engaged during the consultation meetings, prioritized to avail of the programme, and be included in the different capacity-building programs. The project will also ensure that SMARTER will be closely coordinated with the activities of NGOs, government bodies and development partners\

? Meetings, monitoring visits, surveys, and written communications will be used to receive feedback to continue the ongoing dialogue as well as during implementation.

? The project will follow a participatory approach in decision-making by engaging all the relevant stakeholders. Government agencies, NGOs, CSOs, and private sector actors will be actively involved during the project implementation. Special attention will be paid to ensure that PWDs are included not just in terms of information-sharing but also in terms of employment and livelihood benefits. Communications approaches will also consider the needs of PWDs including blind and deaf persons.

A detailed list of stakeholders and their involvement in particular project outcomes and outputs are given in Box 22. The key indicator for the engagement of each group of stakeholders is their practical involvement in implementation and dissemination.

Category	Stakeholder or group
Government and public sector	? Ministry of Energy and Business (MEB) ? Ministry of Environment and National Beautification (MENB) ? Ministry of Transport, Works and Water Resources (MTWW) ? Ministry of Agriculture and Food Security (MAFS) ? Fair Trading Commission ? National Petroleum Company (NPC) ? Barbados National Oil Company Ltd. (BNOC) ? Barbados Agricultural Management Corporation (BAMC) ? Export Barbados? ? Barbados National Standards Institute (BNSI)
Multilateral and bilateral development partners; Financial institutions	? Inter-American Development Bank (IDB) ? Caribbean Development Bank (CDB) ? Caribbean Community (CARICOM) ? CCREEE ? Caribbean Community Climate Cente (CCCC) ? UN agencies (UNDP, UNIDO, UNEP, other) ? International Renewable Energy Agency (IRENA) ? LEDS LAC Low-Emissions Resilient Development Strategies ? Development Bank of Zambia; Pension Fund ? Commercial banks
NGOs, universities;	? UWI and other higher educational institutes; vocational training centres ? Non-governmental organisations (women, youth, environment, social)
Private sector and sectoral associations	? Barbados Light and Power Company Ltd. (BLPC) ? Fuel suppliers (Sol Group, Rubis) ? Barbados Sugar Industry Ltd ? Barbados Renewable Energy Association (BREA)

Category	Stakeholder or group
Direct beneficiaries	? Electricity and fuel consumers (residential, commercial, industry, transport, agriculture) ? Waste handling and processing companies ? Recipients of the project?s training and awareness-raising

SMARTER has not yet selected any pilot or demonstration activity (Outcome 3). These localities will be selected in the first year as part of the formulation and implementation of a ?bioenergy pilot plan? (Output 3.2) At that point, the project will identify and connect with all local stakeholders, including both partners and beneficiaries.

Engagement methods and communication mediums

The following list presents the main engagement mediums to be utilized by the project team during implementation to ensure continuous engagement and active participation of stakeholders.

1) *In-person meetings*:

o Consultation workshops: These workshops will have a pre-structured agenda which will be designed to present a specific result/report and discuss with stakeholders the best way forward. These workshops will also be an opportunity to gain consensus from stakeholders on a specific action plan prior to proceeding with implementation. Therefore, stakeholder consultation meetings and workshops are included in the project design as part of the main activities to be carried out by the consultants in charge of each output.

o Interviews and focus group discussions: These will be conducted with different groups of indirect beneficiaries, with special attention to ESPs and NGOs, to overcome their generally low participation capacity and ensure that their input is integrated into the different stages of project implementation. The Project Manager will be responsible for ensuring that these interviews and focus groups have been conducted by the responsible consultants, as appropriate.

o Community-based consultations: These consultations will focus on the pilot locations to identify and discuss stakeholder concerns within the community environment, but will also extend to neighbouring villages and communities. The Social Safeguards and Gender expert (PMU staff member) will be responsible for conducting these consultations on a regular basis and reporting findings, recommendations and concerns to the Project Manager.

2) *Written communication:*

o Emails: Emails will be used as the main tool for organizing meetings, i.e. sending invitations to participants, sending the meeting minutes after the meeting, etc.

o Letters: Being the formal method for communication and conveying messages between public parties, letters will be requested by the project team and provided by the relevant authority, as appropriate.

o Survey forms: Several activities under the project implementation strategy constitute undertaking a needs assessment or other types of analyses, with some requiring a survey to collect information. The responsibility for the surveys is that of the consultant undertaking the analysis. However, the Safeguards and Gender expert will be responsible for supporting the project consultants with the sampling process and surveying procedure to ensure that the results are as representative and inclusive as possible.

o Project brochures and manuals to present the results of specific studies and outcomes of certain activities.

3) *Online meetings and phone calls:* Virtual communication is sometimes preferred since it is quicker and easier compared with email and letters, and is a viable alternative to in-person meetings. Online applications and telecommunication tools will be used throughout project implantation to facilitate the work and ensure the project team have easy access to stakeholders, and vice versa.

Although the mode of communication may vary according to task and participants, all consultations and engagement activities will be undertaken with the goal of ensuring full participation of relevant stakeholders, whereby all participants will be provided sufficient notice to prepare well and provide input for the project. Moreover, SMARTER will also use all possible opportunities, i.e. workshops, meetings, training and awareness events, to promote diversity and gender balance. Balanced representation of relevant stakeholders will be ensured by reaching out to both men and women and different groups through appropriate communication mean and encouraging their participation, noting the most socially and culturally acceptable language and method of communication for each group of stakeholders.

Government stakeholders such as NRD (MEB) and EPD (MENB) note good practice and success that is relevant to the SMARTER project as follows:

? NRD notes their success in the usage of various media to disseminate information about project activities to ensure different demographics are captured in the stakeholder engagement process.

? EPD notes that Town hall meetings are used by developers as part of their stakeholder engagement and are highly effective for the dissemination of project activities to affected communities.

Public disclosure of information

Project-affected, marginalized, and disadvantaged stakeholders at the pilot location will be identified during site selection and assessment, including persons with disabilities and other disadvantaged groups as per the list of stakeholder groups provided above. For each group, the following assessments will be conducted as part of the stakeholder engagement activities, taking into account their involvement in each project component:

? Identify limitations for understanding project information and participating in the consultation process (e.g., language differences, lack of transportation, accessibility of venues, disability, etc.)

? Develop measures to support and accommodate engagement, e.g., provide information in accessible formats, choose convenient locations for consultations, ensure venues are accessible, provide transportation to meetings, change the time of meetings to accommodate needs, provide facilitation and explain complex issues and terminology, provide support workers for assisting participants with disabilities, provide simultaneous interpretation (including sign language). The project will also make sure that regular information on project activities, possible disruptions to life and any noisome activities are communicated well in advance. The deployment of measures in practice for physical development planning will be used as relevant.

? On the national level, methods to receive feedback and to ensure ongoing communications with stakeholders (outside of a formal consultation meeting) will be developed as part of the project?s knowledge management and dissemination plans (to be developed as part of the implementation of Component 4).

Diversity, inclusion and gender-balance

The inclusion of women and other relevant groups will be made possible through enhancing opportunities, improving access to resources, making their voices heard and ensuring respect for their rights. The process of identification of these groups and their representatives and engaging them through the various project activities is achieved using two approaches:

1) Conduct context-specific gender analysis using gender and mini-grid analysis framework and develop participatory action plans at the community level at locations where pilot projects and productive use will be supported. The analysis will be sensitive in scheduling community-level meetings selecting appropriate times and locations, giving deliberate attention to the participation of diverse groups to listen to their voice and applying appropriate language that fit the audience level. It will also explore the existing status of the different groups their roles, responsibilities, opportunities, and deprivations and seek participatory solutions in their engagement as consumers and actors at various levels of the mini-grid value chain. Women?s unpaid care work and triple burdens will need to be considered in terms of ensuring their participation in such analysis and consultation.

2) At every stage of the project implementation the project team will make a specific effort to make sure opportunities are created and accessed by women and other vulnerable groups while implementing

institutional-level capacity-building training, policy-level discussions, access to education and financial opportunities

BECT notes that community approaches prove to be useful in bringing communities on board with projects. Providing information and education on aspects of projects can increase community buy-in. Building relationships with communities through involvement in the circular economy is beneficial to projects by creating interest and stakes in the project?s success and enhancing the livelihoods of communities through increased economic activities. The Fisheries department and fisher communities would be an important group to consult with regard to harvesting sargassum that could be used in bioenergy production.

Moreover, sensitisation and training for interacting with persons with disabilities would be necessary for project actors. Noting that ministries typically only interact with the persons with disabilities communities to gain feedback on legislation related to them. This presents an opportunity to change existing relationships and interactions with this community by giving them an opportunity to increase their capacities and improve their livelihoods.

Responsibilities

The PMU is primarily responsible for carrying out the specified stakeholder engagement activities. The stakeholders will be engaged while carrying out various assessments and studies, training, and workshop events.

Monitoring and reporting

The project stakeholders would be engaged at various levels to carry out the monitoring activities. Then the PMU will liaise with relevant Government agencies and other partners and collect data and monitor the activities regularly. The PMU will report back the results to the stakeholders at the earliest through letters or conduct meetings both individually as well as through the engagement of all relevant agencies.

Resources, responsibilities and timelines

The size of the project does not allow for extensive stakeholder engagement measures or dedicated staff for this purpose. Stakeholder engagement will therefore form part of the broader interactions with project stakeholders. The frequency of communication will be guided by the specific level of stakeholder interest. Specific opportunities for engagement will coincide with anticipated outputs and

the development phases for deliverables and milestones towards outputs. More deliberate consultation and engagement activities will be implemented for the two pilot projects and as part of the project monitoring and reporting activities.

At the national level, project-affected, marginalized and disadvantaged stakeholders have been identified, including persons with disabilities and other disadvantaged groups as per the list of stakeholder groups provided above in this document. This list will also be completed at the local level for the pilot sites.

While the project financially supports the Social safeguard and gender officer (in the PMU), there is no budget specified for SEP activities but has been included in the budgets of related outputs, notably the design and implementation of the training and knowledge plan, national dialogue (bioenergy task force), stakeholder consultation for pilot projects and extensive data collection for the monitoring, review and evaluation of impacts.

A.1 Grievance mechanism

Grievance redress

Any project activity could potentially create or cause concerns on the part of various stakeholders. Bioenergy projects, though relatively new to Barbados, can generate a number of challenges and potentially negative impacts including but not limited to, as described in the SESP. Generating energy from biomass comes with some risks both directly from the production or indirectly from related activities. These risks include:

? Fire (improper storage of biomass)

? Respiratory health impacts (mould from improperly stored biomass, fumes emitted from burning biomass, etc)

? Disruption of food production

? Disruption of water availability

? Noxious odours

? Noise and vibration

A grievance redress mechanism enables stakeholders directly and indirectly affected or potentially affected to raise those grievances in three main categories:

? **Environmental grievances:** suggestions, concerns or complaints regarding the impact of project activities on the environment e.g contamination of water bodies, noise impacts, presence of construction waste or debris, etc.

? **Social grievances**: suggestions, concerns or complaints regarding the impact of project activities on community/work life e.g. restrictions on access to natural resources, discriminatory treatment, protection of vulnerable groups, use of local labour, child labour, gender including gender-based violence.

? **Grievances related to project performance:** suggestions, concerns or complaints regarding the performance of the project and people working for the project directly and indirectly including third-party contractors e.g. violation of obligations, absence of project team members, poor supervision of activities, delays in payment and delivery of materials, working conditions and occupational health, etc.

The GRM is a key aspect of stakeholder engagement and will combine with other mechanisms and approaches to ensure robust, regular and gender-sensitive involvement, engagement and consultation with and of stakeholders at multiple levels. A project-specific and energy-specific GRM will be developed during the implementation phase with guidance on the GRM and related forms available on the project webpage.

Project-level Grievance Redress Mechanism

During the design and implementation of any project, a person or group of people may perceive or experience potential harm, directly or indirectly due to the project activities. The grievances that may arise can be related to social issues such as eligibility criteria and entitlements, disruption of services, temporary or permanent loss of livelihoods (economic displacement) and other social and cultural issues. Grievances may also be related to environmental issues such as excessive dust generation, damages to infrastructure due to construction-related vibrations or transportation of raw material, noise, traffic congestion, decrease in quality or quantity of private/ public surface/groundwater resources during irrigation rehabilitation, damage to home gardens and agricultural lands, etc. Vibrations related to machinery operation may also be excessive and affect some persons negatively including persons with autism. Some environmental issues may have social impacts including on community health and may also trigger other social consequences such as ill health (e.g., excessive dust generation could trigger respiratory illnesses including asthma). There could also be incidences of suspected exploitation, abuse, sexual harassment or other forms of Gender Based Violence and or outright conflict and physical violence that might occur between someone working directly for the project and on behalf of the project (e.g., a sub-contractor) and a member of a community or the public or with a government official or NGO or other combination of persons. Grievances may also include or relate to

the project not meeting its commitment to provide timely information about planned works and the risk they may pose to persons.

Should any of these situations arise, there must be a mechanism through which affected parties can fairly resolve such issues with the project personnel in an efficient, unbiased, transparent, timely and cost-effective manner. To achieve this objective, a Grievance Redress Mechanism will be agreed upon during the Inception Phase. The design of the Grievance Redress Mechanisms (GRM) will be discussed at the project inception workshop and operationalized before the initiation of activities. Information on the role and the application of the GRM should be presented to all stakeholders and should be clearly advertised and accessible during project implementation including access to the mechanism either via the project/UNDP website and/or via WhatsApp.

The Grievance Redress Mechanism will be designed to:

1. be a legitimate process that allows for trust to be built between stakeholder groups and assures stakeholders that their concerns will be assessed in a fair and transparent manner;
2. allow simple and streamlined access to the Grievance Redress Mechanism for all stakeholders and provide adequate assistance for those that may have faced barriers in the past to be able to raise their concerns;
3. provide clear and known procedures for each stage of the Grievance Redress Mechanism process and clarity on the types of outcomes available to individuals and groups as well as clear timelines for responses;
4. ensure equitable treatment to all concerned and aggrieved individuals and groups through a consistent, formal approach that is fair, informed and respectful to a concern, complaints and/or grievances as well as free from discrimination and bias;
5. to provide a transparent approach, by keeping any aggrieved individual/group informed of the progress of their complaint, the information that was used when assessing their complaint and information about the mechanisms that will be used to address it as well as the amount of time in which they should expect updates and or a full response; and
6. enable continuous learning and improvements to the Grievance Redress Mechanism. Through continued assessment, the learnings may reduce potential complaints and grievances.

The GRM will be gender- and age-inclusive as well as responsive addressing potential access barriers to women, the elderly, the disabled, youth and other potentially marginalized groups as appropriate to the Project, its operation and sustainability. This should include ensuring as many means of accessibility and media for submission are facilitated as possible. The GRM will not impede access to judicial or administrative remedies as may be relevant or applicable and will be readily accessible to all stakeholders at no cost and without retribution. For areas, where legal redress is more appropriate and

where crimes may be suspected of taking place, the GRM process will give way to and or potentially inform those legal processes.

Information about the Grievance Redress Mechanism and how to make a complaint and/or grievance will be communicated and validated during the stakeholder engagement process and placed at prominent places for the information of the key stakeholders. Information on the GRM will be regularly communicated during other related project communication activities.

All complaints and/or grievances regarding social and environmental issues can be received either orally (to the field staff), by phone, in a complaints box, via WhatsApp or in writing to the UNDP. This may be done anonymously or declaratively. A key part of the grievance redress mechanism is the requirement for the PMU to maintain a register of complaints and/or grievances received, the timeliness of responses provided and the final conclusion/adjudication of the grievance. It will also be important that the record speaks to any repetitiveness of any specific grievances which should trigger more serious steps and consideration. The following information will be recorded:

a) time, date and nature of the enquiry, concern, complaints and/or grievances;

b) type of communication (e.g., telephone, WhatsApp, written communication or letter, personal /oral contact);

c) name, contact address and contact number (where relevant);

d) response and review undertaken as a result of the enquiry, concern, complaints and/or grievances;

e) actions taken with the name/role/accountability of the person taking action as well as the formal response given to the complaint/complainant; and

f) Any repetition and escalation of the same or related complaint and any additional measures taken (where relevant).

Communications related to the GRM are expected to be clear, easily understood and free of stereotypical language/images and biases. Guidance within the GAP will outline steps and considerations to ensure gender sensitivity and inclusive approaches.

UNDP SRM and SECU

In addition to the project-level and national grievance redress mechanisms, complainants have the option to access UNDP?s Accountability Mechanism, with both compliance and grievance functions.

The Social and Environmental Compliance Unit investigates allegations that UNDP's Standards, screening procedures or other UNDP social and environmental commitments are not being implemented adequately, and that harm may result to people or the environment as a result of a project/programme or other intervention with which UNDP is associated]. The Social and Environmental Compliance Unit is housed in the Office of Audit and Investigations and managed by a Lead Compliance Officer. A compliance review is available to any community or individual with concerns about the impacts of a UNDP programme or project. The Social and Environmental Compliance Unit is mandated to independently and impartially investigate valid requests from locally impacted people, and to report its findings and recommendations publicly.

The Stakeholder Response Mechanism offers locally affected people an opportunity to work with other stakeholders to resolve concerns, complaints and/or grievances about the social and environmental impacts of a UNDP project. The Stakeholder Response Mechanism is intended to supplement the proactive stakeholder engagement that is required of UNDP and its Implementing Partners throughout the project cycle. Communities and individuals may request a Stakeholder Response Mechanism process when they have used standard channels for project management and quality assurance and are not satisfied with the response (in this case the project-level grievance redress mechanism). When a valid Stakeholder Response Mechanism request is submitted, UNDP focal points at country, regional and headquarters levels will work with concerned stakeholders and Implementing Partners to address and resolve the concerns. Visit www.undp.org/secu-srm for more details.

All stakeholder and project-related engagement and communications are expected to be gender sensitive and inclusive, free of bias and discrimination as much as possible. They should also be accessible to persons without regular access to data, internet and online telephony or other technology. Low bandwidth solutions and low-resolution content should be an option where possible.

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement

Exhibit 8 Stakeholder table

Stakeholder	Mandate and/or business	Role in project outcome
Government and public sector		

Stakeholder	Mandate and/or business	Role in project outcome
Ministry of Energy and Business (MEB)	MEB?s Energy Division is responsible for all matters related to energy in Barbados. These include a) energy policy and planning, b) energy licencing (renewable and non-renewable), c) renewable energy and energy efficiency, as well as matters related to oil gas, geology and mining.	MEB will be the Project?s Implementing Partner and, through the Energy Division (Permanent Secretary), oversees various units, such as Project Monitoring and Coordination Team (PMCT), supported by the Division?s Project Execution Unit (PUE), Energy Conservation and Renewable Energy Unit (ECREU) and Planning and Resources Unit (PPRU). This includes activities such as overall planning and strategy, coordination with stakeholders, procurement of goods and services, execution of activities, M&E. The Natural Resources Department (NRD)will also provide support to ESS monitoring and act as a source for lessons learned from the non-renewable sector.
Ministry of Environment and National Beautification (MENB)	MENB is to promote and facilitate the sustainable use of our resources by encouraging the involvement of all citizens and the integration of environmental considerations into all aspects of national development. ? Environmental Protection Department is responsible for protecting the natural and built environment, through the promotion of sustainable practices, education, partnerships and the enforcement of legislation. ? Sanitation Services Authority has responsibility for sanitation and sewerage wastewater management system), solid waste management systems, and drainage systems for rainwater (storm water drainage).	MENB?s Permanent Secretary is the GEF Operational Focal Point. Environmental protection is a key issue in terms of the impacts of feedstock used, bioenergy conversion systems and residues. The Ministry will be important in the case of sargassum harvesting and its possible use as feedstock for anaerobic digestion. SSA will be involved in SMARTER through its involvement in solid waste management (the landfill and recycling centre at Vaucluse) and the segregation of organic waste streams at the source as well as the Vaucluse collection point. Equally, SSA will contribute to ESS monitoring on waste and pollution management as a reviewer of TORS and draft assessment reports as well as the sharing of relevant SOPs that could be adapted in SMARTER?s ESS management approach. The EPD plays a critical role in EIAs and in E(SS) monitoring in the country generally and will provide support to aspects of ESS monitoring relating to community health safety and security as well as resource efficiency and pollution management issues.

Stakeholder	Mandate and/or business	Role in project outcome
Ministry of Transport, Works and Water Resources (MTWW)	MTWW is responsible for efficient road network services, proper maintenance of Government buildings and vehicles, effective drainage solutions, special electrical services and public transportation. ? Government Electrical Engineering Department (GEED) is responsible for design approvals and inspections of all RE installations in Barbados to ensure safety and compliance with relevant codes and standards. GEED also maintains electrical systems in government-owned buildings, where PV systems have been installed. ? Barbados Water Authority (BWA) is the entity in Barbados charged with supplying the island with potable water as well as the provision of wastewater treatment and disposal services to the sewered areas of Bridgetown and the South Coast.	GEED will play a role with respect to the installation of decentralised RE systems in government-owned buildings. Regarding the cooperation with BWA, SMARTER will look for synergies with the GCF-funded project (3R-CReWS; see Box 13, currently under preparation) in particular in its Component 1 on this project proposes to employ environmentally friendly bioreactors (BRs), micro-organisms generating bio-hydrogen and biogas and subsequent harnessing of energy using fuel cell technology to effectively treat the wastewater
Ministry of Agriculture and Food Security (MAFS)	MAFS is responsible for the agricultural sector and agricultural lands and is therefore an important stakeholder in the development of the bioenergy sector.	MAFS? input is relevant and necessary in the development of policy and regulations as well as the locations for bioenergy production. In its turn, the Project is relevant for MAFS, being currently without a specific policy on agriculture and energy
Fair Trading Commission	Under the purview of the MEB, FTC is the economic regulator of the incumbent utility, responsible for setting tariffs and rates of RE electricity including bioenergy technology. FTC is further responsible for consumer protection and ensuring fair competition in the market	As the regulator FTC will be involved, in discussions with BLPC as an off-taker and IPPs for defining feed-in tariffs for bioenergy. Its role is also in ensuring fair competition (tendering processes) and just distribution of rights and benefits as

Stakeholder	Mandate and/or business	Role in project outcome
National Petroleum Company (NPC)	NPC is the statutory body set up with responsibility for the management of the distribution of natural gas supply in Barbados for domestic, commercial and industrial use. ? Barbados National Oil Company Ltd. (BNOC) is responsible for the production of crude oil, and natural gas and imports of liquefied petroleum gas (LPG) and LNG. Natural gas is sold to the parent company NPC which delivers the natural gas through its pipeline network, and 24.5% is owned by NPC while the GOB holds the remainder of the shares ? Barbados National Terminal Company Ltd.(BNTC) supplies diesel and fuel oil to local major oil and gas retailers who sell these products to the Barbadian public (Sol and Rubis)	It is envisaged that bio-methane and liquid biofuels (biodiesel and ethanol) will play eventually a large role in replacing fossil fuels as Barbados strives to become 100% fossil fuel free. BNTC is currently carrying out a pilot on biodiesel which may evolve into a SMARTER-supported demonstration project. BNOC is looking into options to inject bio-methane from anaerobic digestion into its pipeline system, which is another potential demonstration project
Barbados Agricultural Management Corporation (BAMC)	Under the purview of MAFS, BAMC is responsible for the management and commercialization of the products produced by the proponents of the agricultural sector. BAMC manages and operates around 30% of the sugar industry in Barbados and owns the Port vale sugar cane factory. BAMC?s research department acts as an official advisor for Barbados	BAMC, BSIL and private farmers have been in discussion to establish Grow Energy, a company aimed at producing sugar cane by-products and biomass energy.
Export Barbados (f.k.a. BIDC, Barbados Investment Development Corp.)	BIDC (since 2021 trading as Export Barbados) supports small and medium enterprises (SMEs) and larger companies aimed at developing Barbados? industrial, export, and other related activities.	BIDC is involved in a proposal to set up an anaerobic digestion plant, using food waste, roadside grasses, and industrial wastewater from BIDC?s industrial estates
Barbados National Standards Institute (BNSI)	Under the purview of MEB, BNSI sets and regulates the standards in Barbados.	BNSI will be an important stakeholder in setting the standards for biomass and biofuels.
Multilateral and bilateral development partners		
Development finance	Inter-American Development Bank (IDB), European Union (EU) and Caribbean Development Bank (CDB) support small- and medium-sized sustainable energy projects through a mix of loans and grants)	Synergies will be sought with the IDB-funded Smart Energy Fund II project which makes funding available for RE (and EE) projects in the public sector as well as private sector and there is scope for SMARTER add-value in smarter capacity regarding RE and EE

Stakeholder	Mandate and/or business	Role in project outcome
CARICOM-Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE)	CCREEE functions as CARICOM?s CARICOM Energy Knowledge Hub, aiming to complement and strengthens ongoing national/regional activities in the areas of policy and capacity development, knowledge management and awareness raising, as well as investment and business promotion	The Project will closely coordinate with the CARICOM Energy Unit and the CARICOM Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE)
Caribbean Community Climate Change Center (CCCC)	CCCC s a regional entity whose work is focused on small island developing States in the Caribbean (incl. capacity building, awareness raising, implementing mitigation and adaptation projects, policy advice and support)	CCCC is a GCF-accredited entity responsible for the 3R-CReWS project, currently in its formulation phase
GIZ (German international cooperation)	GIZ supports Barbados from its office in the Dominican Republic through technical studies and advice for the GOB and its support to CARICOM/CCREEE as its regional partner. Worth mentioning is GIZ?s support in developing the regional C-SERMS regional strategy	GIZ is also a strong partner for technology transfer to Barbados, notably biodigester technology in which Germany is a world leader. GIZ has supported a regional roadmap assessing climate risks in the region, including Barbados.
UN agencies	? UNDP implemented the GEF-funded DREAM (Disaster Risk and Energy Access Management) project from 2015-19. The Project implemented 22 grid-tied PV systems with battery back-up at CRCs (70-kWp in total) and 9 grid-tied PV systems combined with existing diesel generation at polyclinics (171-kWp) and support the delivery of a draft utility license for IPPs (as a basis for negotiations with the utility BLPC). ? UNIDO implements the GEF-funded Strategic Platform to Promote Sustainable Energy Technology Innovation, Industrial Development and Entrepreneurship in Barbados with MEB, BIDC and CCREEE	UNDP is the GEF agency responsible for project oversight (see Section 7). Synergies will be sought with the regional project, *Improving National Sargassum Management Capacities in the Caribbean* (expected to run during 2022-2025). This Japan-funded initiative will boost marine and near-shore coastal conservation efforts and support integrated coastal management actions. As sargassum is regarded as an imported feedstock in anaerobic digestion the near-shore and off-shore equipment provided under the programme is regarded as co-financing (USD 1.9 million)
LEDS LAC Low-Emissions Resilient Development Strategies	LEDS LAC is a networks of organizations and individuals working in the promotion, design and implementation of LEDS in Latin America and the Caribbean.	The Bioenergy Community of Practice (BioE CoP) was launched in 2015 (with LEDS Global Platform) and is a peer-to-peer learning network of practitioners from governments, the private sector and non-governmental organizations, who work together for advancing the development of bioenergy in Latin America and the Caribbean.

Stakeholder	Mandate and/or business	Role in project outcome
International Renewable Energy Agency (IRENA)	IRENA is a lead global intergovernmental agency for energy transformation that serves as the principal platform for international cooperation, supports countries in their energy transitions, and provides state-of-the-art data and analyses on technology, innovation, policy, finance and investment. IRENA works with countries in, e.g., renewable energy assessments and roadmaps, grid flexibility planning, entrepreneur support as well collaborative frameworks (such as on energy transition and high shares of renewables).	Barbados is a partner in IRENA?s SIDS Lighthouses Initiative is a framework for action which brings together 38 SIDS and 31 partners to support the island's energy transformation and climate action.
NGOs, universities, other		
NGOs	NGOs include Future Center Trust and Barbados Environment Conservation Trust. The NGOs I Am A Girl; Business and Professional Women?s Club of Barbados (BPW Barbados); and Code Red for Gender Justice	The engagement of these NGOs can help deepen the gender assessment as well as for broader stakeholder engagement regarding the job market and capacity building. Conducting consultations with Barbadian women?s groups as well as relevant regional gender organisations can provide the necessary perspectives for SMARTER given its GEN 2 rating. NGOs can also support capacity-building efforts under Components 1 and 2 related to social inclusion and gender equality (with a specific view to ensuring that Persons with Disabilities are not left behind in SMARTER). At least one NGO is recommended as a member of the Bioenergy Task Force especially in identifying complementarities between bioenergy production/development and other sustainable development initiatives.

Stakeholder	Mandate and/or business	Role in project outcome
Universities and training	? University of the West Indies ? Cave Hill has a MPhil/PhD in Environmental Science and BSC in Physics that include sustainable energy courses or topics. Under CERMES, there are also some integrated perspectives in natural resources and environmental management courses. Research is carried out on bioenergy, such as the use of agro-residues and sargassum in anaerobic digestion. ? Samuel Jackman Prescod Institute of Technology offers vocational/professional certificates in photovoltaic, electric installation as well as electric vehicle fundamentals ? Barbados Community College has an Associate Degree in Mechanical Engineering that includes power generation and energy efficiency ? Barbados Vocational Training Board is involved in solar water heater technician training	Execution of capacity building and research activities, knowledge accumulation and dissemination management; providing research inputs on key documents such as the capacity needs assessment, bioenergy assessment and policy. UWI carries out research and pilot activity on biomethane. The MSc in Renewable Energy Management previously offered by the Department of Pure and Applied Sciences at UWI is planned to be restarted. Bioenergy modules could be further developed and integrated into MSC/BSc environmental, physics, biology and chemistry courses
	? UWI has the Institute for Gender and Development Studies (IGDS) based at the University of the West Indies on all three campuses. In Barbados, it is also referred to as the Nita Barrow Unit or NBU. Its mission is to produce and disseminate knowledge to transform gender relations in the Caribbean, in support of the University's mission to enhance regional and international development.	The NBU will be an important stakeholder in capacity development and knowledge management components of the project with specific emphasis on Outcomes 1 and 2. Recommended as members of the Task Force.
Private sector and private sector organisations		
Barbados Light and Power Company Ltd. (BLPC)	BLPC is a private firm owned by Light & Power Holdings Limited (L&PH) that owns and operates all electricity production, transmission and distribution facilities in Barbados. BL&P?s current license for the exclusive right to supply electricity for any public or private purpose under the Electric Light and Power Act (ELPA) is valid until 2028. As of 2010, 70% of the shares of BL&P were owned by Emera Holdings of Canada with the remaining shares owned by Barbadian investors.	BLPC is a key stakeholder in new bioenergy technologies, policies and procedures being introduced for on-grid power generation

Stakeholder	Mandate and/or business	Role in project outcome
Fuel suppliers	Sol Group is a Barbados-owned petroleum product distribution and retail company active in 23 Caribbean markets. Rubis Caribbean, part of the French-owned Rubis Group, is its main competitor in Barbados.	Fuel suppliers would be involved in B10 biodiesel and E10 ethanol in their filling stations
Associations	? Barbados Sugar Industry Ltd presents the private sugarcane farmers ? Barbados Renewable Energy Association (BREA) is an NGO that represents the interests of (private) companies involved in renewable energy. Members include Blue Circle Energy, HDF Energy, BLPC, Blackstone Megawatt, Caribbean LED Lighting, NGE, Emera, EnSmart, Massy, Solar Genesis, Solargrow and Williams Solar ? Barbados Biogas Association (BBA)?s members come from the sugar industry, attempting to influence policy towards the government repurposing the sugar industry for bioenergy. They have not met since the COVID situation	Stakeholders in various Outcomes including Outcomes 2, 3 and 4. Beneficiaries potentially of capacity assessments under Component 1 and capacity development under Outcome 2.

Exhibit 9 Stakeholders engaged during SMARTER project preparation (PPG)

Meeting date	Organisatuion
24 Oct 2022	UNDP Country Office Ministry of Energy and Business (MEB)
25 Oct 2022	Barbados National Standards Institute (BNSI) Government Electrical Engineers Department National Petroleum Corporation (NPC) / Barbados National Oil Company Ltd (BNOC)
26 Oct 2022	Ministry of Environment and National Beautification Barbados Agricultural Management Corporation Ministry of Transport, Works and Water Resources / Barbados Water Authority Fair Trading Commission Inter-American Development Bank (online)
27 Oct 2022	University of West Indies (UWI) Barbados Renewable Energy Association (BREA) Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE)
28 Oct 2022	Online stakeholder workshop (hosted by MEB)
16 Jan 2023	MEB ? NRB (National Resources Department)
17 Jan 2023	MEB ? ECREU (Energy Conservation and Renewable Energy Unit) MEB ? PEU (Project Execution Unit)
18 Jan 2023	MEB ? PPRU (Programme Planning and Resources Unit)
19 Jan 2023	MENB ? SSA (Sanitation Services Authority) Future Centre Trust

20 Jan 2023	MEND ? EPD (Environmental Protection Department
24 Jan 2023	Barbados Environmental Conservation Trust

Select what role civil society will play in the project:

Consulted only; Yes

Member of Advisory Body; Contractor; Yes

Co-financier; Yes

Member of project steering committee or equivalent decision-making body; Yes

Executor or co-executor;

Other (Please explain)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

1. The Ministry of Energy and Business has only recently undertaken efforts directed at mainstreaming gender in its work although limited to the electricity sector. Generally, as identified by Ministry staff from units consulted as well as other government Ministries and departments (MENB, SSA, EPD) gender and social considerations are not normally a significant part of their work or review processes and gender specifically is a relatively unknown area to them in terms of its operational relevance to their work.

2. Using a gender needs framework of strategic and practical needs, the following elements of Gender Equality and Women?s Empowerment are given due consideration (as aligned with the GEF taxonomy and gender results), a) leadership and decision-making, b) access and control over resources, b) livelihood, c) ecosystems, d) gender-based rights and participation, e) governance; and f) gender-based education and assets. The SMARTER project is positioned to be a ground-breaking example and trendsetter in the region by leading the way as a gender-responsive energy project. It can do this by incorporating the recommendations made in the Gender Assessment Report, enhancing the level at which gender is meaningfully integrated into this project. Through these actions, the project will not only help Barbados? transition to be a 100% renewable energy country but also support gender equality and women?s empowerment. It has the potential to not only get more women involved in the energy

sector as well as transportation and agriculture but also support women to become active agents in the renewable energy field and the climate change fight.

3. The Gender Action Plan (attached) outlines specific actions to be taken during the life of the project and is detailed in Annex J of the UNDP Project Document. The main group of activities identified in the GAP are as follows:

? Capacity assessment to inform that capacity building for gender mainstreaming throughout the project:

? Capacity building for key implementing actors:

? Development of gender-responsive tendering and procurement:

? Development of a Code of Conduct

? Development of an energy and bioenergy-focused Grievance Redress Mechanism (GRM)

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes
Closing gender gaps in access to and control over natural resources;

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women Yes

Does the project?s results framework or logical framework include gender-sensitive indicators?

Yes
4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

1. With the Electric Light and Power Act (ELPA) of 2013, the market opened to independent power producers (IPPs) while respecting the rights granted under BLPC?s licence until 2028. In September 2019, the FTC approved a feed-in tariff (FIT) framework for RE technologies for installations up to 1 MW. The rules and regulations will also apply to power generated by independent power producers, while the SMARTER project will assist in (re-)defining FiTs for types of biomass and conversion methods, as appropriate and finetune regulation to bioenergy specifics. Thus, power

generation from bioenergy is likely to be private-sector driven or in partnership with public entities such as BAMC and BIDC.

Barbados? oil and gas sector is concentrated around a few key players, the state-owned National Petroleum Company (NPC) and its daughter company Barbados National Oil Company Limited (BNOC) together with the private fuel distributors Sol and Rubis. In principle, market pricing is adopted, the main exception being natural gas (which is imported/produced along with crude by BNOC and has traditionally been sold at sub-market prices, (i.e., prices below competing fuels). Thus, NPC/BNOC are likely to play a prime mover role in producing bio-methane (from anaerobic digestion of suitable feedstock) to feed into the existing gas pipeline distribution system. Investment in bio-methane is likely to be in public-private ownership & construction.

2. In the longer term, the production of biodiesel or ethanol (from locally produced or imported bio-feedstock) is an option considered in the indirect emission reduction calculations of SMARTER (see Exhibit 3 and in the UNDP ProDoc, Annex H). Assessments and pilots will be driven by public entities such as NPC/BNOC and BAMC but the island-wide distribution will inevitably engage the private fuel distributors.

3. Medium-sized or small enterprises (SMEs) may set up anaerobic digestion facilities (to generate power for their own use or to sell to the grid, such as farms or large hotels). Currently, one local company is collecting and processing used cooking oil for its use as feedstock in a biodiesel pilot undertaken by NPC/BNTC. Building off this, during project implementation, private sector engagement will be central to the project, whether with industry bioenergy project developers or private sector organisations (such as BREA), in order to solicit ongoing feedback and inputs, and ultimately to catalyze private sector investment.

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation (table format acceptable):

Exhibit 7 Risks and risk mitigation

Description and [type]	Level	Mitigation Measures
Social and environmental risks (see also Annex L on SESP in the UNDP Project Document)		

Description and [type]	Level	Mitigation Measures
1: Stakeholders (in particularly marginalized groups) might face restricted access to basic services (electricity) as energy tariffs may become no longer affordable for low-income groups under a 100% RE scenario [social].	moderate	The stakeholder engagement plan (Annex K) will guarantee that the perspective of potentially excluded groups and right-holders is heard and integrated to project design and implementation. Enhanced stakeholder engagement measures including expansion of groups to be consulted regularly as part of project implementation. GRM for the project that can be used by the MEB going forward for gender and stakeholder issues.
2: Energy projects may affect livelihoods and access to services by women and men in different ways. Women may not be equally included in decision-making processes regarding decentralised energy projects and may not benefit equally as men in all areas/opportunities such as employment or business development [social].	moderate	The Assessment identifies a need to focus on women?s participation in the sector as well as the gender sensitivity of institutions and their energy development practice, very much in line with the draft Gender Strategy for the Electricity Sector developed for the Ministry with support from the Inter-American Development Bank (IABD). The Barbados labour market remains segregated by gender particularly the category of jobs that are most closely aligned to energy and electricity generation. Careful attention to these factors is required to mitigate the risks through a livelihood assessment and action plan during project implementation
3: Within demonstration sites, economic displacement (temporary and mid-term) could occur. Loss and gains may occur from transitions from crop agriculture to feedstock production and the competition that may arise between feedstock production and crop and livestock agriculture for resources such as land and water [environmental/social]	moderate	To address this, the project will develop a targeted gender-sensitive socio-economic assessment and livelihood assessment. The livelihoods assessment will focus on risks related to project activities, within the pilot sites under the agriculture and tourism sectors. The assessments will enable determining whether a Livelihood Action Plan that could ensure proper compensation of livelihoods by the affected stakeholders.
4: Land use issues may arise, resulting in habitats being negatively affected or even endangered as a result of inappropriate planning and design of RE projects [environmental].	low	For the upstream activities, the project will be designed to establish criteria for zoning bioenergy potential (in line with the Ministries of Environment?s and of Agriculture?s policies) and shaping the licensing process for bioenergy projects. The pilots/demos supported by the GEF intervention will assess constraints. The Project in its Outputs 1.1 and 2.1 (energy/bioenergy policy) will coordinate with existing natural resources, marine environment and biodiversity plans. ESIAs to be conducted before any demo project is initiated should identify potential sources of risks and specific actions that can mitigate these risks.

Description and [type]	Level	Mitigation Measures
5: The Caribbean region is susceptible to hurricanes and natural disasters on an annual basis (occurrence and impact intensified by climate change) that can impact the functionality of bioenergy supply and systems (including delays to project implementation). Though Barbados has not had a serious hurricane event, it is regularly impacted by flooding, land degradation and household damage, most recently Hurricane/TS Elsa [climate/environmental]	moderate	The construction of any bioenergy facility or structure should assess these risks and possible mitigation actions. This may require careful attention to the location as well as the infrastructure in place and or to be built to support project demonstration and pilot activities ensuring, where possible, hurricane as well as flood resistance. Continuous monitoring of climate data particularly for hurricanes and tropical storms should allow the project to respond to this risk. Contingency measures as well as a Business Continuity Strategy are also encouraged.
6: Inadequate construction practices and operation of energy infrastructure/ technology may lead to occupational health and safety hazards for personnel and persons living nearby or those who conduct livelihood activities nearby [social/regulatory]	moderate	The pilot/demos? ESIA will delineate specific measures (to be developed and implemented during project implementation) to guarantee adequate construction practices and the scope of presentation of any concerns related to such by stakeholders, beneficiaries or other affected parties. This is expected to include a Grievance Redress Mechanism. A related Constructors Environmental and Social Management Plan (C-ESMP) could be developed to ensure adequate practices. In any case, TORs and bidding documents (in the call for Proposals, Output 3.2) will also include these requirements and contractors will be expected to develop their own ESMPs. The GRM will allow individuals to raise any concerns they may have or any negative experiences for a prompt response and remedial action.
7: The proposed Project activities may involve the handling and transportation of waste (both hazardous and non-hazardous). Waste generated by the project is expected to be minimal, inert and of potential fertilizer value [environmental/health].	moderate	There may be some risks to water quality as well as human health from accidents or spills. Waste management will be addressed at a policy level (bioenergy policy) and, depending on the type of the pilot/demo, on a project level, to .guarantee the correct disposal of digestates during the demonstration activities. Waste and pollution assessment to be carried out for demo projects.
Financial, policy and economic		

Description and [type]	Level	Mitigation Measures
8: Carrying out the implementation plan of the BNEP meets substantial delays and annual targets of RE penetration cannot be met [policy]	moderate	Changes in political context or priorities cannot be excluded and are generally beyond the control of a GEF project. However, Barbados? policy framework towards a low-emission, sustainable energy sector is well-established with the new BNEP (2019-2030). a move away from the established policy seems highly unlikely. However, government budgets are limited, while private investments in RE systems may not come in the scale or timeframe expected. Multi- and bilateral technical assistance and investment programmes will accompany the GOB over the next years.
9: Bioenergy systems would not attain technical and operational maturity within the Project?s timeframe [technology/economic].	high	The sustainability of bioenergy in Barbados depends on feedstock and land availability, import prices of feedstock and materials a supportive value chain (ecosystem) including skilled operators, and the levelized cost per energy unit of the electricity or fuel produced with biomass sources. Especially biodigester technology requires strict operating conditions to maintain biochemical processes within the established parameters. While bio-digestion is successfully deployed in several industrialised countries, there is little experience in Barbados so far. The presence of local counterparts including UWI, BBA, and CCREEE are enabling factors for building a local (or regional) ecosystem, which will be strengthened by the Project. Local partners will be supported in carrying out detailed assessments of various feedstock-conversion-application pathways of bioenergy and of feasibility analysis of specific bioenergy investment proposals in particular.
10: Co-financing of investment in public RE systems will not or only partly materialise [financing/operational].	moderate	Commitment letters have been provided by co-financing partners. These commitments will be tracked and reported on during implementation. The realisation is not only partly dependent on committed co-financing but also equity-financing organised by the private developers to have an active interest

Description and [type]	Level	Mitigation Measures
11: Poor appetite from private investors limits the uptake in Barbados of bioenergy in particular and/or of RE systems in general [financing].	moderate	To reduce risk in the area of biomass-generated power, the Project will help in finetuning the current biomass feed-in tariff to values that realistically affect the LCOE (based on bioenergy assessment and feasibility studies supported by the Project. BNOC has an active interest in the injection of bio-methane into its gas pipeline system and currently receives support from IDB (cleaner fuels project). The introduction of biodiesel or ethanol has an extra layer of risk in the sense that the introduction is not a project-by-project but is an ?all of nothing? in which all the 40+ filling stations have to provide E10 or B20. The Project?s bioenergy assessments and feasibility studies will help NPC/GoB decision-makers in formulating a ?go/no-go decision
Operational and COVID		
12: The Implementing Partner would face limitations to prepare and implement project activities in accordance with annual work plans [operational].	low	Work plans are inevitably exposed to external factors including Government decision-making and the need to align agendas and timeframes across multiple stakeholders. While implementation delays cannot be discarded, it should be noted that the Ministry (MEB) has extensive experience working with international cooperation agencies and projects. Multi- and bilateral technical assistance and investment programmes (IDB, GEF and GCF-funded) will accompany the GOB over the next years. This provides a solid basis for the SMARTER proposal.
13: Resurgence of COVID or new pandemics may cause supply chain delays and disrupt project activities [health/social]	low	New Covid-19 variants may come up leading to new waves of COVID-19 infections. The COVID-19 pandemic can impact project implementation. The COVID-19 pandemic limits social interaction and restricts community activities. This situation may hinder proposed project activities, such as beneficiary needs and impact surveys, the design and installation of the project-supported minigrid pilots as well as the organization of stakeholder and capacity-building promotional events. The economic impact of COVID-19 may shift investment priorities of the individual, government, and companies towards preventing uncertainties. In such cases as mentioned above, a contingency plan will be made by bringing some activities forward as possible, and with online meetings.

1. More details on risks are given in Annex F (Risk log register) and Annex L (Social and environmental safeguards planning) of the UNDP Project Document.

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

1. General roles and responsibilities in the projects? governance mechanism

2. **Implementing Partner:** The Project will be implemented under the Full National Implementation Modality (Full NIM). The Implementing Partner for this project is the Ministry of Energy and Business Development (MEB) through its Energy Division. The Implementing Partner is the entity to which the UNDP Administrator has entrusted the implementation of UNDP assistance specified in this signed project document along with the assumption of full responsibility and accountability for the effective use of UNDP resources and the delivery of outputs, as set forth in this document

3. The Implementing Partner is responsible for executing this project. Specific tasks of the Implementing Partner include:

- ? Project planning, coordination, management, monitoring, evaluation, and reporting. This includes providing all required information and data necessary for timely, comprehensive, and evidence-based project reporting, including results and financial data, as necessary. The Implementing Partner will strive to ensure project-level M&E is undertaken by national institutes and is aligned with national systems so that the data used and generated by the project supports national systems.
- ? Risk management as outlined in this Project Document;
- ? Procurement of goods and services, including human resources;
- ? Financial management, including overseeing financial expenditures against project budgets;
- ? Approving and signing the multiyear work plan;
- ? Approving and signing the combined delivery report at the end of the year; and,
- ? Signing the financial report or the funding authorization and certificate of expenditures.

Responsible Parties:

4. No Responsible Parties have been identified during project design.

Project stakeholders and target groups:

5. An overview of the main stakeholders and target groups is given in section 4.4, while Annex J provides details on their involvement in the Project.

UNDP:

6. UNDP is accountable to the GEF for the implementation of this project. This includes overseeing project execution undertaken by the Implementing Partner to ensure that the project is being carried out in accordance with UNDP and GEF policies and procedures and the standards and provisions outlined in the Delegation of Authority (DOA) letter for this project. The UNDP GEF Executive Coordinator, in consultation with UNDP Bureaus and the Implementing Partner, retains the right to revoke the project DOA, suspend or cancel this GEF project. UNDP is responsible for the Project Assurance function in the project governance structure and presents to the Project Board and attends Project Board meetings as a non-voting member.

Project governance structure

7. The UNDP Resident Representative assumes full responsibility and accountability for oversight and quality assurance of this Project and ensures its timely implementation in compliance with the GEF-specific requirements and UNDP?s Programme and Operations Policies and Procedures (POPP), its Financial Regulations and Rules and Internal Control Framework. A representative of the UNDP Country Office will assume the assurance role and will present assurance findings to the Project Board, and therefore attends Project Board meetings as a non-voting member.

8. The Implementing Partner will designate a high-ranking official as the National Project Director. He/She will assume responsibility for the Project on behalf of the National Government.

Segregation of duties and firewalls vis-?-vis UNDP representation on the project board

9. As noted in the Minimum Fiduciary Standards for GEF Partner Agencies, in cases where a GEF Partner Agency (i.e. UNDP) carries out both implementation oversight and execution of a project, the GEF Partner Agency (i.e. UNDP) must separate its project implementation oversight and execution duties, and describe in the relevant project document a: 1) Satisfactory institutional arrangement for the separation of implementation oversight and executing functions in different departments of the GEF Partner Agency; and 2) Clear lines of responsibility, reporting and accountability within the GEF Partner Agency between the project implementation oversight and execution functions.

10. In this case, UNDP is only performing an implementation oversight role in the project vis-?-vis our role in the project board and in the project assurance function and therefore a full separation of project implementation oversight and execution duties has been assured.

Roles and Responsibilities of the Project Organization Structure:

a) Project Board: All UNDP projects must be governed by a multi-stakeholder board or committee established to review performance based on monitoring and evaluation, and implementation issues to ensure quality delivery of results. The Project Board (also called the Project Steering Committee) is the most senior, dedicated oversight body for a project.

11. The two main (mandatory) roles of the project board are as follows:

1) **High-level oversight of the execution of the project by the Implementing Partner** (as explained in the ?Provide Oversight? section of the POPP). This is the primary function of the project board and includes annual (and as-needed) assessments of any major risks to the project, and decisions/agreements on any management actions or remedial measures to address them effectively. The Project Board reviews evidence of project performance based on monitoring, evaluation and reporting, including progress reports, evaluations, risk logs and the combined delivery report. The Project Board is responsible for taking corrective action as needed to ensure the project achieves the desired results.
2) **Approval of strategic project execution decisions of the Implementing Partner** with a view to assess and manage risks, monitor and ensure the overall achievement of projected results and impacts and ensure long term sustainability of project execution decisions of the Implementing Partner (as explained in the ?Manage Change? section of the POPP).

Requirements to serve on the Project Board:
? Agree to the Terms of Reference of the Board and the rules on protocols, quorum and minuting.
? Meet annually; at least once.
? Disclose any conflict of interest in performing the functions of a Project Board member and take all measures to avoid any real or perceived conflicts of interest. This disclosure must be documented and kept on record by UNDP.
? Discharge the functions of the Project Board in accordance with UNDP policies and procedures.
? Ensure highest levels of transparency and ensure Project Board meeting minutes are recorded and shared with project stakeholders.

Responsibilities of the Project Board:
? Consensus decision making:

o The project board provides overall guidance and direction to the project, ensuring it remains within any specified constraints, and providing overall oversight of the project implementation.
o Review project performance based on monitoring, evaluation and reporting, including progress reports, risk logs and the combined delivery report;
o The project board is responsible for making management decisions by consensus.
o In order to ensure UNDP?s ultimate accountability, Project Board decisions should be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition.
o In case consensus cannot be reached within the Board, the UNDP representative on the board will mediate to find consensus and, if this cannot be found, will take the final decision to ensure project implementation is not unduly delayed.
? Oversee project execution:
o Agree on project manager?s tolerances as required, within the parameters outlined in the project document, and provide direction and advice for exceptional situations when the project manager?s tolerances are exceeded.
o Appraise annual work plans prepared by the Implementing Partner for the Project; review combined delivery reports prior to certification by the implementing partner.
o Address any high-level project issues as raised by the project manager and project assurance;
o Advise on major and minor amendments to the project within the parameters set by UNDP and the donor and refer such proposed major and minor amendments to the UNDP BPPS Nature, Climate and Energy Executive Coordinator (and the GEF, as required by GEF policies);
o Provide high-level direction and recommendations to the project management unit to ensure that the agreed deliverables are produced satisfactorily and according to plans.
o Track and monitor co-financed activities and realisation of co-financing amounts of this project.
o Approve the Inception Report, GEF annual project implementation reports, mid-term review and terminal evaluation reports.
o Ensure commitment of human resources to support project implementation, arbitrating any issues within the project.
? Risk Management:
o Provide guidance on evolving or materialized project risks and agree on possible mitigation and management actions to address specific risks.
o Review and update the project risk register and associated management plans based on the information prepared by the Implementing Partner. This includes risks related that can be directly managed by this project, as well as contextual risks that may affect project delivery or continued UNDP compliance and reputation but are outside of the control of the project. For example, social and environmental risks associated with co-financed activities or activities taking place in the project?s area of influence that have implications for the project.
o Address project-level grievances.
? Coordination:
o Ensure coordination between various donor and government-funded projects and programmes.
o Ensure coordination with various government agencies and their participation in project activities.

Composition of the Project Board: The composition of the Project Board must include individuals assigned to the following three roles:

1. **Project Executive:** This is an individual who represents ownership of the project and chairs (or co-chairs) the Project Board. The Executive usually is the senior national counterpart for nationally implemented projects (typically from the same entity as the Implementing Partner), and it must be UNDP for projects that are direct implementation (DIM). In exceptional cases, two individuals from different entities can co-share this role and/or co-chair the Project Board. If the project executive co-chairs the project board with representatives of another category, it typically does so with a development partner representative. The Project Executive is: *Permanent Secretary (Energy), MEB*
2. **Beneficiary Representative(s):** Individuals or groups representing the interests of those groups of stakeholders who will ultimately benefit from the project. Their primary function within the board is to ensure the realization of project results from the perspective of project beneficiaries. Often representatives

from civil society, industry associations, or other government entities benefiting from the project can fulfil this role. There can be multiple beneficiary representatives in a Project Board.

3. **Development Partner(s):** Individuals or groups representing the interests of the parties concerned that provide funding, strategic guidance and/or technical expertise to the project. The Development Partner(s) are: *UNDP Resident Representative or Deputy Resident Representative.*

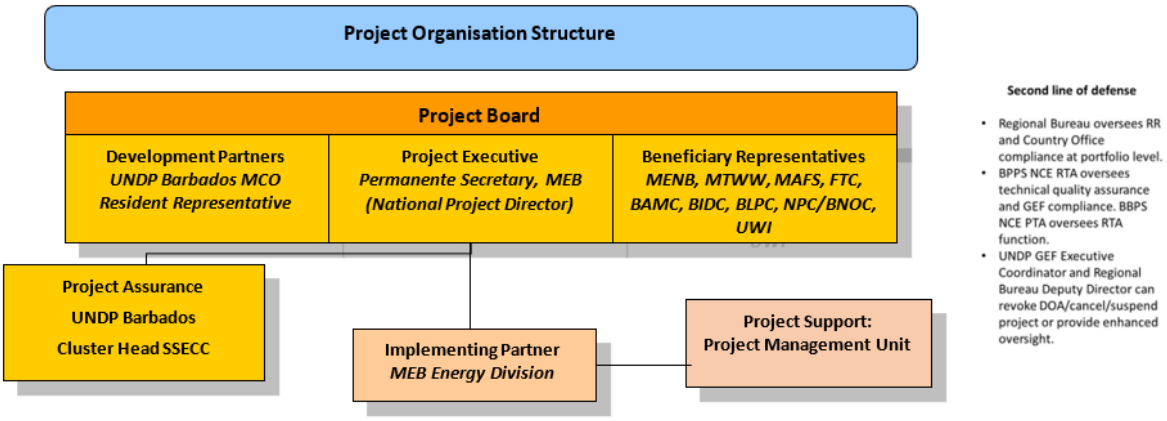
b) **Project Assurance:** Project assurance is the responsibility of each project board member; however, UNDP has a distinct assurance role for all UNDP projects in carrying out objective and independent project oversight and monitoring functions. UNDP performs quality assurance and supports the Project Board (and Project Management Unit) by carrying out objective and independent project oversight and monitoring functions, including compliance with the risk management and social and environmental standards of UNDP. The Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. Project assurance is totally independent of project execution.

12. A designated representative of UNDP playing the project assurance role is expected to attend all board meetings and support board processes as a non-voting representative. It should be noted that while in certain cases UNDP?s project assurance role across the project may encompass activities happening at several levels (e.g. global, regional), at least one UNDP representative playing that function must, as part of their duties, specifically attend Board meeting and provide board members with the required documentation required to perform their duties. The UNDP representative playing the main project assurance function is an official of the UNDP Country Office, Zambia

c) **Project Management ? Execution of the Project:** The Project Manager (PM) is the senior most representative of the Project Management Unit (PMU) and is responsible for the overall day-to-day management of the project on behalf of the Implementing Partner, including the mobilization of all project inputs, supervision over project staff, responsible parties, consultants and sub-contractors. The project manager typically presents key deliverables and documents to the board for their review and approval, including progress reports, annual work plans, adjustments to tolerance levels and risk registers[1].

13. A designated representative of the PMU is expected to attend all board meetings and support board processes as a non-voting representative. The primary PMU representative attending board meetings is the Project Manager (PM). Efforts shall be made to mobilise the project team for the full project tenure to ensure the availability of experts and consultants until the end of the Project. Apart from the PM, the structure of PMU will include a Deputy Project Manager with specific responsibilities for the Pilot Project and Monitoring. A Financial-Administrative Officer will be part of the PMU but financed by MESBE co-financing budget (unlike the PM and Deputy PM that are financed from the GEF budget). Detailed job descriptions are provided in Annex G. On an as-needed basis, short-term experts and contracted companies will be hired to work on assignments in research, policy development, communications and outreach, and technical assistance of activities in the various project components. A Lead Advisor (LA) will be hired at the start of the project at the same time as the Project Manager (with a specialization in rural and renewable energy) on an intermittent basis to support the PMU to recommend actions that focus work plans on achieving key milestones in a timely manner; recommend special expertise to be deployed on the Project to assist in its achievement of key milestones; and provide the interface between Project team and key specialist consultants, both domestic and international when appropriate.

Exhibit 8 Project organization: Full NIM with Government as Implementing Partner



d) **Technical Advisory Committee:** This Committee will advise the project team on technical issues, thematic aspects or more operational issues. As part of the activities of Output 2.4, a ?Bioenergy Task Force? will be set up that will not only function as the Project?s Technical Advisory Committee but will continue as a body for discussing bioenergy matters after the Project ends. The Committee will have working-level representatives from organisations as indicated in Box 12, such as government entities (Prime Minister?s office and line ministries with relevant Departments), public sector companies (such as BNOC, BIDC and BAMC), cooperating partners and regional organisations (e.g. UNDP, IBD, CCREEE), private sector associations (BREA) and R&D institutions (e.g. UWI), to which other representatives from specially nominated representatives from the private sector could be added. Gender-balanced and socially inclusive participation is desirable.

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[1] Apart from managerial tasks, the Project manager will also conduct activities of a technical nature in the four components, including technical review of studies (design, advice and comments) in the various components and provide technical backstopping to all activities in the four Components of the Project for technical matters related to renewable and bioenergy

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assesments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

1. The Project is aligned with Barbados? priorities and reports under the UNFCCC including its Second National Communication (SNC, 2018) and the Nationally Determined Contribution (NDC, 2015; update 2021). The SNC explicitly mentions that ?Barbados is dedicated to the implementation of sustainable energy technologies, including wind, solar, cogeneration and waste-to-energy strategies?. Barbados has not submitted a Biennial Update Report (BUR). The SMARTER initiative is closely aligned with Barbados National Energy Policy (BNEP 2019-2030) and its Implementation Plan (2018). It is also supportive of the Barbados Physical Development Plan (PDP, amended 2016), specifically Chapter 3 ? Land Use and Built form Policies; the National Agricultural Policy (NAP, 2013) and the 2020 Water Protection and Land Use Zoning Policy. The Project is also aligned with the National Climate Change Policy Framework which is monitored by the National Climate Change Committee of the Ministry of Environment and National Beautification (MENB).

2. On a regional level, as a CARICOM member, Barbados has been actively involved in the formulation and implementation of the CARICOM Energy Policy and the underlying Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS) that were approved in 2013. CARICOM?s Caribbean Centre for Renewable Energy and Energy Efficiency is hosted by Barbados.

Exhibit 9 Barbados policies and plans relevant to sustainable and bioenergy

Policy / planning document	Relevance
Vision 2030 and National Development Plans	The National Long-term Vision 2030 (Vision 2030) expresses Zambia?s aspirations for the year 2030. The vision will be operationalised through the five-year development plans, starting with the 5th National Development Plan. The 7th National Development Plan 2017 to 2021 (NDP) sets out the strategy to improve energy production and distribution for sustainable development by enhancing the generation, transmission and distribution of electricity, promoting renewable and alternative energy, and improving electricity access to rural and peri-urban areas

Policy / planning document	Relevance
Barbados Sustainable Development Policy (2004)	The over-arching goal of this policy is to ensure the optimisation of the quality of life for every person by ensuring that economic growth and development do not occur to the detriment of our ecological capital. Although formulated well before, the Policy links with actions plans for 24 sectors with the UN Sustainable Development Goals (see Box 8) adopted in 2050,
Barbados National Energy Policy (and Implementation Plan), 2019	The BNEP aims to achieve a 49% fossil fuel reduction by 2023 and a 100% fossil fuel reduction by 2030. The above fossil fuel reduction targets can be stated as increased production of energy from renewable energy targets for electricity generation of 52% in 2023 and 100% by 2030. It is the Government?s policy to phase out local consumption of natural gas by 2030, replacing natural gas with an appropriate renewable fuel(s). Significant additional investments are now needed for the BNEP goal of 100% renewable energy to be attained by 2030. To this end, a draft Integrated Resource and Resilience Plan (IRRP) has been formulated that will guide the implementation of the BNEP
Electric Light and Power Act (ELPA), 2013 and subsequent Amendment Bills (2015, 2019)	The Electric Light and Power Act, 2013 (ELPA) sets the government?s priorities in the electricity sector which are to reduce electricity prices, increase energy security, promote the use of cleaner fuels, and reduce negative environmental impacts. The Electric Light and Power Act 2013 (ELPA) is ?an Act to revise the law relating to the supply and use of electricity, to promote the generation of electricity from sources of renewable energy, to enhance the security and reliability of the supply of electricity and to provide for related matters?. It replaced the original 116-year-old Electric Light and Power Act which was passed in 1899 and was further amended in 2015.
Fair Trading Commission Act, 2002 and subsequent Amendment Bill (2020)	The Fair Trading Commission assumed regulatory responsibilities on January 2, 2001, under the Fair Trading Commission Act, CAP. 326B. The Commission is responsible for the enforcement of the provisions of the Utilities Regulation Act, CAP. 282, the Telecommunications Act, CAP. 282B, the Fair Competition Act CAP. 326C and the Consumer Protection Act

Policy / planning document	Relevance
National Climate Change Policy (2012) Second National Communication (SNC; 2018) Barbados Nationally Determined Contribution (2016; update 2021)	The SNC explicitly mentions that ?Barbados is dedicated to the implementation of sustainable energy technologies, including wind, solar, cogeneration and waste-to-energy strategies?. Barbados has not submitted a Biennial Update Report (BUR) as yet. Barbados Nationally Determined Contribution (NDC) of 2015 mentions that Barbados intends to achieve an economy-wide reduction in GHG emissions of 44% compared to its business-as-usual (BAU) scenario by 2030; i.e. in absolute terms, translating to a reduction of 23% compared with the baseline year, 2008. A fossil fuel-free electricity sector represents a significant enhancement of the 2015 NDC target of 65% renewable energy, alongside a 22% improvement in energy efficiency in the electricity sector. In the 2021 NDC Update, Barbados? conditional mitigation contribution for 2030 consists of: 1. a 95% share of renewable energy in the electricity mix, 2. 100% electric or alternatively-fueled vehicles in the passenger fleet; 3. a 20% increase in energy efficiency across all sectors as compared to BAU; 4. a 29% decrease in industrial, commercial and residential fuel consumption as compared to BAU; and 5. a 20% decrease in waste emissions. Barbados adopts the following ambitious contributions for 2030: ? 35% reduction relative to business-as-usual emissions in 2030 without international support (unconditional). ? 70% reduction relative to business-as-usual emissions in 2030 conditional upon international support.
Barbados Sargassum Adaptive Management Strategy (SAMS)	After the Prime Minister declared Sargassum to be a national emergency, the country is postured via the SAMS to find uses of Sargassum that meet the crisis at its current scale. The question of bioenergy for Barbados is the only at-scale question when it comes to Sargassum management.
Barbados Physical Development Plan (PDP) (Draft) Amendment, 2017	Requirements for the Environmental and Social Impact Assessments (ESIA) vary and have been identified in relevant sections of the PDP policies but may also be subject to the discretion of the Environmental Impact Assessment Committee. However generally the several types of industrial plants require an ESIA, a) chemical or petroleum manufacturing, c) desalination plant; d) power generation plant; e) cement plant (or other plants for the burning of lime or bricks). This also applies to any other industry where the process is potentially obnoxious or dangerous to health and amenity because of excessive smell, fumes, smoke, dust, grit, ash, noise or vibration.
Planning and Development (Environmental Impact Assessment) Regulations, 2021	According to these regulations, an Environmental Impact Assessment Committee, appointed by the Board, functions to screen applications for planning permission to determine whether an environmental impact assessment is required in any case.

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

Exhibit 10 Communication strategy

Key element	Relevant group	Means	Timeframe
1. Project governance meetings; PSC meetings and its Working Group meetings	All stakeholders that are members of the PSC or its Working Groups or are invited to attend	Meetings	Periodically, depending on PSC and Advisory Committee frequency of meetings
2. Seminars/workshops and training events, including the Inception workshop, and final project workshop	National and sub-national government officials Private sector; NGOs and CSOs	Workshop, meeting, seminar, training (gender-sensitive, socially inclusive) On-the-job training Budget:	Typically, workshops will be held to start up an activity and/or at the end to present results. The timeline of each activity is given in Annex D of the UNDP ProDoc
3. Project documents, thematic reports and publications; Technical and other reports	Government departments and decision-makers at the national and sub-national level; Development partners Research institutes and academia; individual experts; NGOs	Direct dissemination (e.g., email or hard copy/ USB-drive). Regular access via website to reports and documents and database and info systems	Technical reports will typically be published at the end of an assignment (see Annex D of the ProDoc).
4. Project knowledge capturing and info dissemination (gender-sensitive, socially inclusive)	Government officials Financial and private sector Development partners; NGOs and CSOs	Online access; Printed materials; Media	Thematic reports and knowledge products are published at the end of one or more outputs to provide a summary of findings, results, and lessons learnt
5. Communications on significant project- related works that could be disruptive to individuals, communities, recreation and or livelihoods.	All stakeholders but particularly government departments and decision-makers at the national and sub-national level; subcontractors working on behalf of the project and or project partners	Online access Printed materials distributed and or pinned up in public and high-traffic areas that meet gender-sensitive standards Radio (which is still a reliable source, particularly for the elderly) Media and Social Media including Facebook/Instagram using gender-sensitive communications principles or guidance	Periodically and at least 30 days before any significant physical works are to be undertaken. During works if any significant changes are to occur (e.g., stoppages, intensification and or extension of the activity.

1. The Project emphasizes strong communication with a broader range of stakeholders. Key elements of the project?s communication strategy are outlined in Exhibit 10. The budget for workshops, training and information dissemination (printed materials, etc.) is about USD 126,500 (not including consultancy or contracted services which are in separate budget lines).

2. The project will effectively engage the stakeholders involved in the project to get their support and guide the project implementation to achieve higher results.

? Project outreach proposed includes a project website, media (print/audiovisual), workshops, training, etc.

? The PMU and the Project Board will ensure that the Gender Action Plan (see Annex J of the UNDP ProDoc) and Stakeholder Engagement Plan (see Annex K of the UNDP ProDoc) recommended by the project are pursued and implemented. The various groups especially women will be engaged during the consultation meetings and be included in the different capacity-building programs. The project will also ensure that it is closely coordinated with other initiatives supported by development partners on electric mobility

? Meetings, monitoring visits, surveys, and written communications will be used to receive feedback to continue the ongoing dialogue as well as during implementation.

? The project will follow a participatory approach in decision-making by engaging all the relevant stakeholders. Government agencies, NGOs, CSOs, and private sector actors will be actively involved during the project implementation.

9. Monitoring and Evaluation

Describe the budgeted M and E plan

1. Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the UNDP POPP and UNDP Evaluation Policy. The UNDP Country Office is responsible for ensuring full compliance with all UNDP project monitoring, quality assurance, risk management, and evaluation requirements.

2. Additional mandatory GEF-specific M&E requirements will be undertaken in accordance with the GEF Monitoring Policy and the GEF Evaluation Policy and other relevant GEF policies. The costed M&E plan included below, and the Monitoring plan in Annex 5, will guide the GEF-specific M&E activities to be undertaken by this project.

3. In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be agreed upon during the Project Inception Workshop and will be detailed in the Inception Report.

Key Project-specific M&E and Responsibilities

4. The Project Manager will play a key role in regularly monitoring the outcomes and activities of this project. In particular, REA will support the day-to-day monitoring of the project?s activities. The Project Manager is responsible for day-to-day project management and regular monitoring of project results and

risks, including social and environmental risks (outlined in SESP) as well as gender action plan outcomes (outlined in Gender Assessment and Action Plan). The Project Manager will ensure that all project staff maintain a high level of transparency, responsibility and accountability in M&E and reporting of project results. The Project Manager will inform the Project Board, the UNDP Country Office and the UNDP-GEF RTA of any delays or difficulties as they arise during implementation so that appropriate support and corrective measures can be adopted.

Further, the Project Manager is responsible to initiate and manage primary data collection for indicators in the Project Results Framework. The following key M&E activities and reports are proposed to be produced during the implementation of this project, and are required to be collected, monitored and evaluated under the oversight of the Project Manager:

? M&E for Project Objective, Outcomes and GEF Core Indicators:

? M&E for Project Component-level Outcome Indicators

5. The Project Manager will develop annual work plans based on the multi-year work plan included in the Annex of UNDP Project Document, including annual output targets to support the efficient implementation of the project. The Project Manager will ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality. This includes, but is not limited to, ensuring the results framework indicators are monitored annually in time for evidence-based reporting in the GEF PIR, and that the monitoring of risks and the various plans/strategies developed to support project implementation occur on a regular basis.

6. Project Board (PB): The Project Board will take corrective action as needed to ensure the project achieves the desired outcomes and results. The PB will hold project reviews to assess the performance of the project and appraise the Annual Work Plan for the following year. In the project?s final year, the PB will hold an end-of-project review to capture lessons learned and discuss opportunities for scaling up and to disseminate results and lessons learned with relevant project stakeholders. This final review meeting will also discuss the findings outlined in the project terminal evaluation report and the management response.

7. Project Implementing Partner: With support from the project, MEB will develop and deploy a monitoring, evaluation, reporting, and verification system to track the implementation of master planning, policy and regulatory frameworks, feasibility studies, training, and associated investments. REA will use this system to supply all required information and data necessary for timely, comprehensive and evidence-based project reporting, including results and financial data. MEB will strive to ensure that project-level M&E is undertaken by project stakeholders in both the public and private sectors, and that the results of M&E are aligned with national systems so that the data used by and generated by the project supports national systems.

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8. UNDP Country Office: The UNDP Country Office will support the Project Manager as needed, and be available to support MEB as needed. Project progress meetings will take place according to the schedule outlined in the annual work plan. Notes of the Project Progress meetings will be taken by the project team and circulated to the Project Board. The UNDP Country Office will support key GEF M&E activities including the annual GEF PIR, the independent mid-term review and the independent terminal evaluation. The UNDP Country Office will also ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality.

9. The UNDP Country Office is responsible for complying with all UNDP project-level M&E requirements as outlined in the UNDP POPP. This includes ensuring the UNDP Quality Assurance Assessment during implementation is undertaken annually; that annual targets at the output level are developed and monitored and reported using UNDP corporate systems; the regular updating of the ATLAS risk log; and updating of UNDP gender marker on an annual basis based on gender mainstreaming progress reported in the GEF PIR and UNDP ROAR. Any quality concerns flagged during these M&E activities (such as annual GEF PIR quality assessment ratings) must be addressed by the UNDP Country Office and the Project Manager. The UNDP Country Office will retain all M&E records for this project for up to seven years after project financial closure in order to support ex-post evaluations undertaken by the UNDP Independent Evaluation Office (IEO) and/or the GEF Independent Evaluation Office (IEO).

10. UNDP-NCE Unit: Additional M&E and implementation quality assurance and troubleshooting support will be provided by the UNDP-NCE Regional Technical Advisor and the UNDP-NCE Unit as needed.

Additional GEF monitoring and reporting requirements:

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11. Inception Workshop and Report: A project inception workshop will be held within 60 days of project CEO endorsement, with the aim to:

? Familiarize key stakeholders with the detailed project strategy and discuss any changes that may have taken place in the overall context since the project idea was initially conceptualized that may influence its strategy and implementation.

? Discuss the roles and responsibilities of the project team, including reporting lines, stakeholder engagement strategies and conflict resolution mechanisms.

? Review the results framework and monitoring plan.

? Discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E budget; identify national/regional institutes to be involved in project-level M&E; discuss the role of the GEF OFP and other stakeholders in project-level M&E.

? Update and review responsibilities for monitoring project strategies, including the risk log; SESP report, Social and Environmental Management Framework and other safeguard requirements; project

grievance mechanisms; gender strategy; knowledge management strategy, and other relevant management strategies.

? Review financial reporting procedures and budget monitoring and other mandatory requirements and agree on the arrangements for the annual audit.

? Plan and schedule Project Board meetings and finalize the first-year annual work plan.

? Formally launch the Project.

12. GEF Project Implementation Report (PIR): The annual GEF PIR covering the reporting period July (previous year) to June (current year) will be completed for each year of project implementation. Any environmental and social risks and related management plans will be monitored regularly, and progress will be reported in the PIR. The PIR submitted to the GEF will be shared with the Project Board. The quality rating of the previous year?s PIR will be used to inform the preparation of the subsequent PIR.

13. Lessons learned and knowledge sharing: Results from the project will be disseminated to all key project stakeholders via M&E and Knowledge Dissemination workshops. The project will also closely coordinate and participate in UN Environment?s Global E-Mobility Program (GEF-funded) activities and workshops, to share lessons learned and potentially use tools and systems developed by the Global Program.

14. GEF Core Indicators: The GEF Core indicators will be used to monitor global environmental benefits and will be updated for reporting to the GEF prior to MTR and TE. Note that the project team is responsible for updating the indicator status. The updated monitoring data should be shared with MTR/TE consultants prior to required evaluation missions, so these can be used for subsequent ground-truthing. The methodologies to be used in data collection have been defined by the GEF and are available on the GEF website.

15. Independent Mid-term Review (MTR): The terms of reference, the review process and the final MTR report will follow the standard templates and guidance for GEF-financed projects available on the UNDP Evaluation Resource Center (ERC). The evaluation will be ?independent, impartial and rigorous?. The evaluators that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project under review. The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the evaluation process. Additional quality assurance support is available from the BPPS/GEF Directorate. The final MTR report and MTR TOR will be publicly available in English. The MTR process will begin after the second PIR has been submitted to the GEF, and the MTR report will be submitted to the GEF in the same year as the 3rd PIR. A management response to MTR recommendations will be posted in the ERC within six weeks of the MTR report?s completion. The MTR findings and

responses outlined in the management response will be incorporated as recommendations for enhanced implementation during the final half of the project?s duration.

16. Terminal Evaluation (TE): An independent terminal evaluation (TE) will take place upon completion of all major project outputs and activities. The terms of reference, the evaluation process and the final TE report will follow the standard templates and guidance for GEF-financed projects available on the UNDP Evaluation Resource Center. The evaluation will be ?independent, impartial and rigorous?. The evaluators that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project being evaluated. The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the BPPS/GEF Directorate. The final TE report and TE TOR will be publicly available in English. The terminal evaluation process will begin three months before the operational closure of the project allowing the evaluation mission to proceed while the project team is still in place, yet ensuring the project is close enough to completion for the evaluation team to reach conclusions on key aspects such as project sustainability. The Project Manager will remain on contract until the TE report and management response has been finalized. A management response to the TE recommendations will be posted to the ERC within six weeks of the TE report?s completion. The final TE report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Advisor and will be approved by the Project Board. The UNDP Country Office will include the planned project terminal evaluation in the UNDP Country Office evaluation plan and will upload the final terminal evaluation report in English and the corresponding management response to the UNDP Evaluation Resource Centre (ERC). Once uploaded to the ERC, the UNDP IEO will undertake a quality assessment and validate the findings and ratings in the TE report and rate the quality of the TE report. The UNDP IEO assessment report will be sent to the GEF IEO along with the project terminal evaluation report.

17. Final Report: The project?s terminal GEF PIR along with the terminal evaluation (TE) report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lessons learned and opportunities for scaling up.

Exhibit 11 Monitoring and evaluation plan and budget

GEF M&E requirements	Responsible Parties	Indicative costs (USD)	Time frame
Inception Workshop	MEB Project Manager (PM)	3,500	Within 60 days of CEO endorsement of this project.
Inception Report	PM	None	Within 90 days of CEO endorsement of this project.

GEF M&E requirements	Responsible Parties	Indicative costs (USD)	Time frame
Monitoring of indicators in the project results framework	PM Subcontract	8,000	Annually before GEF PIR and/or by contracted party before TE
GEF Project Implementation Report (PIR)	UNDP RTA ?CO PM	None	Annually typically between June-August
Monitoring all risks (UNDP risk register)	UNDP CO PM	None	On-going.
Supervision and oversight missions	UNDP CO, RTA and BPPS/GEF	None	Annually, troubleshooting and oversight as needed
Final project workshop	MEB, UNDP CO	3,500	Before project closure
Independent Mid-Term Review (MTR)	Independent evaluators	24,450	See cover page
Independent Terminal Evaluation (TE)	Independent evaluators	24,450	See cover page
TOTAL indicative COST (4% of total cost)		**USD 63,900**	

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

1. The Project will provide direct employment, to estimated 196 persons (FTE, thus not including temporary workers). Indirect employment (e.g. supply chains of goods and equipment) has not been taken into account in this figure.

2. In the primary energy supply of Barbados, currently, 88% of energy needs are imported, thus negatively affecting the country?s trade balance. In the alternative energy scenario, in line with the country?s ?100% RE? policy goal (presented in Annex G of the UNDP Project Document, the share of imports would be down to about one-third of the primary energy supply. Biomass can play a significant role in this up from providing 2211 terajoules (TJ) in the ?RE scenario? as compared to 391 TJ currently (of the 211 TJ, 1808 TJ is locally produced and 403 TJ imported biofuel/feedstock). Note that the Project?s indirect emission reduction estimate is based on the potential share of bioenergy.

3. Indirectly, as bio-methane will be injected into the nation?s pipeline system, biomass-generated electricity sold to the grid, or made available as transport fuel (CNG, biodiesel, ethanol), the client base of these energy systems will indirectly benefit from the introduction of bioenergy (BNOC clients: 21,200; BLPC: 130,000, and vehicle-owners: 19,200)[1].

4. Socioeconomic development and climate change are intricately linked, with social and economic activities climate forcing and climate change determining climate impacts which in turn affect socioeconomic developments. For example, the realization of bioenergy will have both environmental and socio-economic impacts. Seeing both the direct environmental (cleaner development) and socioeconomic benefits (new skilled jobs and better services; avoided fuel imports) will attract private and public developers and eventually transform the market into self-sustained growth.

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[1] Based on estimates and calculations presented in the Annexes G and H of the UNDP Project Document

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approval	MTR	TE
High or Substantial	Medium/Moderate		

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

1. The SESP screening review of the SMARTER project (see Annex L1) determined a project overall risk categorization of **moderate risk**, mainly focused on three standards: labour and working conditions, community health, safety and security and pollution prevention and resource efficiency. Other risks that were identified relate to UNDP programming principles of human rights, gender and accountability, related to the inclusion of vulnerable groups in decision-making processes and access to basic services, gender equality and women?s empowerment as well as stakeholder engagement, access to information and the ability to exercise socio-economic rights in the context of opportunities and benefits generated from bioenergy production. SES assessment and management will include key activities that may not proceed until they are screened and assessed during the project implementation

phase, and confirmation that appropriate management measures are verified and operational. These relate specifically to activities under Output 3.3.

2. Several risks were identified in the SESP screening for SMARTER, some general risks related to SES Principles and some risks specific to standards that may result from Component 3(the demo pilot activities) which are expected to take place in communities (sites are not yet identified during design).

3. In relation to the risks identified in the SESP related to pilot sites, the recommended assessments within the SESP and in this section, serve to describe the related procedures that the PMU and IP must conduct after the identified pilot sites have been identified and confirmed, and the activity that will take place is defined. Initially, the PMU and the project team will conduct re-screening and risk identification in each project pilot site to confirm the risks identified in the current SESP. Revision and updating of the current Stakeholder Engagement Plan will also take place to ensure that the relevant stakeholders are identified in each pilot site. Stakeholders will be involved in the process of screening and categorization, in addition to project staff/PMU.

?

4. Risks identified at the level of SES principles, are moderate, and include:

- Concern that communities are not yet aware of planned activities that might take place in their area (this is because site selection is still pending);

- Concern that rights holders may not be able to express clearly and in the most effective ways in which they have or could be affected by proposed activities and that they may not be aware of the channels they can utilise to express their grievances. Stakeholders lack specialized knowledge of bioenergy processes and of bio-energy which may limit their ability to identify concerns, express those concerns and how these are framed these in SES terms.

- Limited engagement with women?s groups/leaders on gender equality concerns regarding the process including the stakeholder engagement process, grievance processes and possible public statements. There are no obvious organizations in the NGO sector working on gender and energy except for the Ashley Lashley Foundation and the Barbados Professional Women?s Club more indirectly due to their focus and prioritization of climate change. It has been hard to engage the Department of Bureau Affairs despite multiple attempts and there is currently no clear focal point for gender and environment/gender and climate change that can be identified.

5. Risks related to project level standards identified, are moderate category and include:

Labour and working conditions:

- Women?s participation in the RE/EE labour market remains relatively low and there is potential for women?s involvement to be overlooked, in the labour market related to bio-energy production, due to gender-blind approaches. The limited uptake of women to date of opportunities in the energy sector and their low involvement in the sector more generally reflects a somewhat historical bias and gender segregation of roles in the labour market wherein men work in certain industries and women work in others. Changing this dynamic will likely require education and promotion. More women are also getting involved in technical roles within the field and SMARTER could lend support to such efforts in how its approaches skills building, capacity building, job creation and livelihood enhancement.

- The waste management field is also male-dominated and is largely influenced by traditional and social drivers. Most women in the field are involved in clerical and administrative roles. This means that the exposure to environmental and health risks may be skewed and also that the expansion of opportunities for women would also need to consider adequate working conditions including OHS concerns.

- Similarly, working conditions and working arrangements in demo sites may not consider women?s needs and risks that may be gendered such as health and reproductive risks from exposure to hazardous materials without a specifically mandated focus on such issues Additionally, handling of any waste material used for bioenergy production and waste derived from the production process would need to be explicitly included in occupational health and safety guidelines as well as Code of Conduct on sites. These should follow explicit guidelines in existing legislation and or from agencies with the requisite mandates i.e. the Sanitation Service Authority or the Environmental Protection Department.

- Construction activities are expected to be small in scale and to imply the need for attention to occupational health and safety related to the materials used and to safety during the construction process. Also to be considered would be any impacts of inappropriate practices on community health, safety and security.

6. Community health, safety and security: there is potential for a number of disturbances, disruptions and annoyances from biofuel production including transportation that could affect communities and people within them. This includes noise and air pollution, sanitation, erosion as well as possible effects on structural integrity given the topographical features of Barbados. The possible creation of temporary breeding habitats for some vectors due to storage, transportation and disposal of biomass residue and other materials.

7. Pollution prevention and resource efficiency: is the area of potential highest risk though of limited scale. The challenge is that SMARTER?s possible generation of waste comes on top of two challenges facing the waste management sector of Barbados. One is significant management challenges with municipal waste and solid and other forms of waste. The second is that there is limited capacity and land space for disposing of specialised waste. The country has a serious challenge with waste management particularly hazardous waste (e.g., batteries, leachate and other waste derivatives). Attention needs to be paid to the long-term handling of various batteries and other technologies brought to support renewable energy in the country.

8. The Sanitation Service Authority (SSA) noted that there is too much waste generated in the country with some types of waste not being handled by the SSA. Other waste risks derive from the transport and storage of waste. These issues in combination justify waste management as a moderate risk. However, it should be noted that while the project will produce its own waste, it could contribute a solution to the existing waste issues by utilizing some of that waste for its activities. There are also positive benefits that SMARTER will engender in addition to a small number of new jobs as well as livelihood enhancement opportunities for those who may be interested in feedstock production as part of climate-smart agricultural practice and given the presence of guaranteed market per se. Yet at this stage of bioenergy production and given the heavy emphasis needed on creating the enabling environment for its expansion, direct benefits will be relatively small and limited.

9. There may not be enough organics available for the project due to competition as other projects/organizations are seeking organics for their own use. There exists an opportunity to collect organic matter from homes (such as grass cuttings) that could be sorted and collected for bioenergy purposes. An additional opportunity, therefore, exists with the waste generated from livestock production (such as entrails and manure) that could be used. This would serve to alleviate some burdens facing the waste management sector that require unique handling of hazardous waste off-shore by reducing the waste load and reducing the need for costly shipment. Waste management processes consider regulations and regulator responsibilities for EPD and SSA. Additionally, since 2009, the Sustainable Barbados Recycling Centre, a privately owned waste transfer station, has been in operation with its primary objective being to maximise the landfill?s lifespan by diverting recyclable materials. At present, 65?70% of recyclable materials including glass, plastics, vegetation, rock and soil, electronic, construction and demolition waste, wood and metals are diverted from landfill. SMARTER builds on this tradition by also diverting organic waste matter, wastewater, sargassum and feedstock derivatives and residues also from the landfill.

The SMARTER project also will be positive for the environment by expanding the update and use of wastewater as well as organic waste that the sanitation and waste management regime has been

challenged to address and manage. The wastewater co-benefit is in keeping with the National Water Reuse Policy agreed in principle by Cabinet three-four years ago. Additionally, any biofuels generated would be in keeping with the Sustainable Energy Framework of Barbados (SEFB and its objectives for health and safety by removing fossil fuels from use in transportation as well as for waste management

ANNEX H of the word version of CEO ER: Summary of Social and environmental standards Risk Management Approach

Screening and categorization of the project's social and environmental risks is a key requirement of UNDP?s Social and Environment Standards UNDP Social and Environmental Standards and the GEF?s Environmental and Social Safeguard Standards.

The SESP serves to:

? Integrate SESP programming principles into projects to strengthen social and environmental sustainability by maximising social and environmental opportunities and benefits,
? Identify potential social and environmental risks of project-funded activities
? Determine the project?s risk category (Low, Moderate, Substantial or High)
? Determine the social and environmental assessment and management measures needed to manage and mitigate potential risks and impacts

The Environmental and Social Management Approach outlined in this section, is mainstreamed within the project implementation strategy. It is meant to provide indications to the Project Team on how to apply UNDP social SES Policy and serves as a simplified Environmental and Social Management Framework. This section summarizes and is complementary to the SESP. The SESP states the required actions and should be used by the Project Team as the main document to guide SES implementation, until the required targeted assessments and management plans, and site-based ESMP?s are developed. For site-based risk management, the latter assessments and management plans will be developed once further screening is conducted by the Project Team after project sites and activities are fully determined during the implementation phase of the project. No activities that have been identified as leading to potential SES risks will take place until such assessment and management plans are in place.

This section covers a summary of key project-related risks and benefits and proposed actions, relevant national legislation and institutional frameworks that guide SES risk management and monitoring in Barbados, required procedures for screening, assessment and management, stakeholder engagement and information disclosure, grievance redress mechanism, institutional arrangements and capacity building, monitoring and evaluation arrangements and specific planned actions and timelines.

The SESP screening review of the SMARTER project (see Annex L1) determined a project overall risk categorization of **moderate risk**, mainly focused on three standards: labour and working conditions, community health, safety and security and pollution prevention and resource efficiency. Other risks that were identified relate to UNDP programming principles of human rights, gender and accountability, related to the inclusion of vulnerable groups in decision-making processes and access to basic services, gender equality and women?s empowerment as well as stakeholder engagement, access to information and the ability to exercise socio-economic rights in the context of opportunities and benefits generated from bioenergy production. SES assessment and management will include key activities that may not proceed until they are screened and assessed during the project implementation phase, and confirmation that appropriate management measures are verified and operational. These relate specifically to activities under Output 3.3.

Summary of key risks and benefits:

Several risks were identified in the SESP screening for SMARTER, some general risks related to SES Principles and some risks specific to standards that may result from Component 3(the demo pilot activities) which are expected to take place in communities (sites are not yet identified during design).

In relation to the risks identified in the SESP related to pilot sites, the recommended assessments within the SESP and in this section, serve to describe the related procedures that the PMU and IP must conduct after the identified pilot sites have been identified and confirmed, and the activity that will take place is defined. Initially, the PMU and the project team will conduct re-screening and risk identification in each project pilot site to confirm the risks identified in the current SESP. Revision and updating of the current Stakeholder Engagement Plan will also take place to ensure that the relevant stakeholders are identified in each pilot site. Stakeholders will be involved in the process of screening and categorization, in addition to project staff/PMU.

Risks identified at the level of SES principles, are moderate, and include:

- Concern that communities are not yet aware of planned activities that might take place in their area (this is because site selection is still pending);
- Concern that rights holders may not be able to express clearly and in the most effective ways in which they have or could be affected by proposed activities and that they may not be aware of the channels they can utilise to express their grievances. Stakeholders lack specialized knowledge of bioenergy processes and of bio-energy which may limit their ability to identify concerns, express those concerns and how these are framed these in SES terms.
- Limited engagement with women?s groups/leaders on gender equality concerns regarding the process including the stakeholder engagement process, grievance processes and possible public statements. There are no obvious organizations in the NGO sector working on gender and energy except for the Ashley Lashley Foundation and the Barbados Professional Women?s Club more indirectly due to their focus and prioritization of climate change. It has been hard to engage the Department of Bureau Affairs despite multiple attempts and there is currently no clear focal point for gender and environment/gender and climate change that can be identified.

Risks related to project level standards identified, are moderate category and include:

- Labour and working conditions:

o Women?s participation in the RE/EE labour market remains relatively low and there is potential for women?s involvement to be overlooked, in the labour market related to bio-energy production, due to gender-blind approaches. The limited uptake of women to date of opportunities in the energy sector and their low involvement in the sector more generally reflects a somewhat historical bias and gender segregation of roles in the labour market wherein men work in certain industries and women work in others. Changing this dynamic will likely require education and promotion. More women are also getting involved in technical roles within the field and SMARTER could lend support to such efforts in how its approaches skills building, capacity building, job creation and livelihood enhancement.

o The waste management field is also male-dominated and is largely influenced by traditional and social drivers. Most women in the field are involved in clerical and administrative roles. This means that the exposure to environmental and health risks may be skewed and also that the expansion of opportunities for women would also need to consider adequate working conditions including OHS concerns.

o Similarly, working conditions and working arrangements in demo sites may not consider women?s needs and risks that may be gendered such as health and reproductive risks from exposure to hazardous materials without a specifically mandated focus on such issues Additionally, handling of any waste material used for bioenergy production and waste derived from the production process would need to be explicitly included in occupational health and safety guidelines as well as Code of Conduct on sites. These should follow explicit guidelines in existing legislation and or from agencies with the requisite mandates i.e. the Sanitation Service Authority or the Environmental Protection Department.

o Construction activities are expected to be small in scale and to imply the need for attention to occupational health and safety related to the materials used and to safety during the construction process. Also to be considered would be any impacts of inappropriate practices on community health, safety and security.

- Community health, safety and security: there is potential for a number of disturbances, disruptions and annoyances from biofuel production including transportation that could affect communities and people within them. This includes noise and air pollution, sanitation, erosion as well as possible effects on structural integrity given the topographical features of Barbados. The possible creation of temporary breeding habitats for some vectors due to storage, transportation and disposal of biomass residue and other materials.
- Pollution prevention and resource efficiency: is the area of potential highest risk though of limited scale. The challenge is that SMARTER?s possible generation of waste comes on top of two challenges facing the waste management sector of Barbados. One is significant management challenges with municipal waste and solid and other forms of waste. The second is that there is limited capacity and land space for disposing of specialised waste. The country has a serious challenge with waste management particularly hazardous waste (e.g., batteries, leachate and other waste derivatives). Attention needs to be paid to the long-term handling of various batteries and other technologies brought to support renewable energy in the country.

The SSA noted that there is too much waste generated in the country with some types of waste not being handled by the SSA. Other waste risks derive from the transport and storage of waste. These issues in combination justify waste management as a moderate risk. However, it should be noted that while the project will produce its own waste, it could contribute a solution to the existing waste issues by utilizing some of that waste for its activities. There are also positive benefits that SMARTER will engender in addition to a small number of new jobs as well as livelihood enhancement opportunities for those who may be interested in feedstock production as part of climate-smart agricultural practice and given the presence of guaranteed market per se. Yet at this stage of bioenergy production and given the heavy emphasis needed on creating the enabling environment for its expansion, direct benefits will be relatively small and limited.

There may not be enough organics available for the project due to competition as other projects/organizations are seeking organics for their own use. There exists an opportunity to collect organic matter from homes (such as grass cuttings) that could be sorted and collected for bioenergy purposes. An additional opportunity, therefore, exists with the waste generated from livestock production (such as entrails and manure) that could be used. This would serve to alleviate some burdens facing the waste management sector that require unique handling of hazardous waste off-shore by reducing the waste load and reducing the need for costly shipment. Waste management processes consider regulations and regulator responsibilities for EPD and SSA. Additionally, since 2009, the Sustainable Barbados Recycling Centre, a privately owned waste transfer station, has been in operation with its primary objective being to maximise the landfill?s lifespan by diverting recyclable materials. At present, 65?70% of recyclable materials including glass, plastics, vegetation, rock and soil, electronic, construction and demolition waste, wood and metals are diverted from landfill. SMARTER builds on this tradition by also diverting organic waste matter, wastewater, sargassum and feedstock derivatives and residues also from the landfill.

The SMARTER project also will be positive for the environment by expanding the update and use of wastewater as well as organic waste that the sanitation and waste management regime has been challenged to address and manage. The wastewater co-benefit is in keeping with the National Water Reuse Policy agreed in principle by Cabinet three-four years ago. Additionally, any biofuels generated would be in keeping with the Sustainable Energy Framework of Barbados (SEFB and its objectives for health and safety by removing fossil fuels from use in transportation as well as for waste management.

Supporting Documents

Upload available ESS supporting documents.

Title	Module	Submitted
PIMS 6451 SMARTER SESP 31March23 - cleared	**CEO Endorsement ESS**	
6451_SMARTER_ Pre-SESP new template final for PISC_031621	**Project PIF ESS**	

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

This project will contribute to the following Sustainable Development Goal (s):

Directly to SDG 7 (sustainable energy) and indirectly to other SDGs (see Box 7 for explanatory details)

This project will contribute to the **Multi-country programme document for Barbados and the Eastern Caribbean (2022?2026)** outcomes, outputs and indicators:

UNMSDCF 6 Caribbean countries manage natural resources and ecosystems strengthening their resilience and enhancing the resilience and prosperity of the people and communities that depend on them. UNMSSDCF Indicator 13.2.1Number of countries that have communicated the establishment or operationalization of an integrated policy, strategy or plan that increases their ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)

Output 3.1: Populations, including the most vulnerable, have enhanced access to affordable, reliable and sustainable energy. Relevant Indicators 3.1.1: Number of megawatts generated from new solar photovoltaic, bioenergy or other renewable energy system installations. 3.1.2: Number of new financing mechanisms in place to support the implementation of efficient energy and renewable energy transitions.

	Objective Indicators	**Baseline**	**Mid-term project**	**End of Project (EoP)**
Project objective To strengthen Barbados? institutional and technological capacities to transit towards a resilient, affordable and low-carbon energy infrastructure	1) Greenhouse gas (GHG) emissions mitigated [GEF core indicator 6 and sub-indicators] *(units of measure: GJ, MW, tCO_2)*	Installed 10 MW utility-scale PV and 59.8 MW distributed solar PV (2021). No installed bioenergy yet (see Box 1)	Core indicators: Lifetime GHG emission reduction: [6.2] Direct: 45,868 tCO_2 [6.3] Lifetime energy production: 733,180 GJ [6.4] Installed power capacity: 0.8 MW	Notes: calculations and methodology are explained in Annex H: [6.2]: Lifetime *direct* GHG emission reduction (ER): 215,593 tCO_2. *Indirect* GHG ER: 329,311 tCO_2 Sub-indicators (related to direct ER): [6.3] Lifetime energy production: 4,120,114 GJ [6.4]: Installed RE power capacity: 1.61 MW. See the table in the footnote at the end of the section for an overview **

	2) Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment * [GEF core indicator 11] *(unit of measure: number of people)*	Zero, since the project has not yet started	An estimated 190 beneficiaries (one-fourth of EoP value)	Total of 766 *direct* beneficiaries (266 women), (see Annex H) due to direct job creation (196, of which 67 women) and recipients of SMARTER training (570, of which 200 women, 35%)
	3) Well-indicated status of bioenergy in 100% RE fuel and electricity planning *(unit of measure: binary 1/0)*	Bioenergy share is zero. IRRP aims at 92 GJ (6%) of biomass in 100% RE power. Rene wable fuels (non-electricity) not defined in detail	Proposal for BNEP energy action plan expansion developed, including targets (and share) for Biomass and waste/landfill fuel and electricity	MEB-approved BNEP action plan with updated energy indicators (incl. share of RE in total energy supply and electricity; share of types of biomass in total energy and in electricity)

	Outcome Indicators	**Baseline**	**Mid-term project**	**End of Project (EoP)**
Component 1	**Policy and regulations**			
Outcome 1 Government capacity for resilient, low-emission energy planning and energy system purview has been strengthened	4) Revised RE regulatory framework with respect to distributed RE and feed-in tariffs *(unit of measure: binary 1/0)*	Regulatory framework for distributed RE and feed-in tariff systems existent but in need of regular assessment and updating	At least one revision of the regulatory framework for RE finalized (grid connection rules, feed -n tariff assessment, etc?.	Revised set of distributed RE (and bioenergy) grid connection regulations and updated feed-in tariffs are endorsed/adopted by GoB
	5) Management and monitoring of RE in public buildings *(unit of measure: binary 1/0)*	No systematic monitoring	Management and monitoring plan for RE (and EE) in public buildings drafted	Management and monitoring plan for RE in public buildings implemented
	6) Assessment of the role of bioenergy in 100% RE scenario *(unit of measure: number of assessments)*	Role of biomass (and waste/landfill) indicated for power generation	One assessment with electricity-fuels demand and supply scenario, indicating the role of bioenergy options	Assessment of the role of bioenergy in the 100% RE scenario is MEB approved

Outputs, Outcome 1	1.1 Support provided for reviewing relevant sector policies to identify opportunities for incorporation of various bioenergy in Barbados? just energy transition 1.2 Enhanced management of distributed renewable energy systems			
	Outcome Indicators	**Baseline**	**Mid-term project**	**End of Project (EoP)**
Component 2	**Bioenergy policy and technology**			
Outcome 2 Enabling conditions for successful bioenergy deployment in Barbados have been created.	7) Bioenergy policy formulated validated with stakeholders and submitted for endorsement *(unit of measure: binary 1/0)*	No bioenergy policy or regulations	Main elements of bioenergy policy drafted. Validation with stakeholders	Full draft bioenergy proposal submitted for government endorsement (as part of overall BNEP action plan, see Indicator 3)
	8) Assessment of bioenergy supply-conversion options *(unit: number of assessments)*	Some studies carried out but no integrated assessment	One integrated bioenergy supply-conversion-demand assessment developed (results are linked with Indicator 6)	Assessment is approved by MEB and disseminated among stakeholders
	9) Academic courses offering substantial bioenergy elements *(unit of measure: number of courses)*	Renewable energy subjects included in three training institutes	Curricula on bioenergy developed for inclusion in energy or other relevant courses (chemistry, physics, engineering)	At least two courses included in associate and undergraduate level academic curricula: 1) Bioenergy incorporated in re-activated RE course at UWI Cave Hill Campus re-activated; 2) one other institute (such as Prescott Institute and BCC
	10) Stakeholder coordination and institutionalization of dialogue mechanism * *(unit of measure: binary 1/0)*	n/a	Bioenergy task force formally set up (not-for-profit entity) with a defined role in national and sectoral bioenergy management in Barbados.	Bioenergy tasks force formally setup and operational (with 30% women participation)

Outputs, Outcome 2	2.1 Mapping and assessment of possible biomass resources ? conversion ? bioenergy carriers (gas, liquid) and applications (electricity, bio-methane, liquid biofuels) in various sectors 2.2 National dialogue advanced and appropriate national bioenergy policy formulated 2.3 Capacity strengthened for bioenergy technology development and implementation 2.4 National dialogue and information exchange facilitated by a ?bioenergy task force?			
	Objective and Outcome Indicators	**Baseline**	**Mid-term project**	**End of Project (EoP)**
Outcome 3 A pipeline of bioenergy (and decentralised RE) has been developed and put into operation	11) Status of pilot/demos linked with SMARTER and prospective energy production *(unit of measure: number)*	n.a.	Four business case concepts, of which three with a feasibility study, out of which one with business/investment plan	A) Six business case concepts, of which four with a feasibility study. B) Of the four feasibility cases, three have reached the business/investment plan stage out of these at least one is in operation or in construction
	12) Status of the prospectus with investment opportunities (formulated with SMARTER support) *(unit of measure: number()*	Some concepts proposed (biofuels, bio-CNG, bio-methane, anaerobic digestion) but not fully formulated yet	See baseline	Investment prospectus formulated (including investment opportunities of indicator 11)
Outputs, Outcome 3	3.1 Investment prospectus of bioenergy (and renewable) projects. 3.2 Detailed studies of pilot-scale bioenergy facilities for appropriately chosen biomass feedstock and formulation of ?bioenergy pilot plan? 3.3 Implementation of bioenergy demo/pilot facilities and increased investment in renewable energy			

	Outcome Indicators	**Baseline**	**Mid-term project**	**End of Project (EoP)**
Component 4	**Knowledge management and information dissemination**			

Outcome 4 The Project?s knowledge management and M&E plans, outreach and promotion have been implemented	13) Awareness of bioenergy and capacity of government staff and practitioners on bioenergy is enhanced * *(unit of measure: binary 1/0)*	n/a	Gender-sensitive and socially inclusive knowledge plan is updated at project inception. The capacity of targeted recipients is assessed by a survey towards the end of year 2, and an average score of at least 2 is achieved.	The capacity of targeted recipients significantly improved (as assessed by the survey, including gender and social inclusion aspects) towards the end of the project with an average score of at least 4 (out of five)
	14) Status of the website for the repository of info and external communication established [*binary 1/0]* and functioning [*binary 1/0]*	n/a	Website established	Online information repository of bio-energy initiatives established and regularly updated. Advocacy messages on bioenergy generation including economic, environmental and social benefits produced and available online.
Outputs, Outcome 4	4.1 Scientific, technological, engineering, operational and social experiences with bioenergy development in Barbados, collected, promoted and shared, nationally and within the Caribbean region			

[1] The indicator 13) on measurement of capacity and awareness will be used to measure capacity increase of government staff

[2] The indicator 13) on measurement of capacity and awareness will be used to measure capacity increase of government staff and practitioners (incl. course participants)

[3] The expected energy production is based on a) installed solar-PV (in public buildings, 12. MW) and b) three bioenergy investment opportunities that have reached signed business/investment plan stage, assumed to be one (01) biogas-for-power project, one (01) bio-methane production planned and one (01) biodiesel pilot (as explained in Annex G). The expected energy production by EoP by the public building PV and three bioenergy pilot/demos is 4,122 terajoules (TJ, as mentioned in Indicator 1), of which 753 TJ is electric energy and 3,367 TJ of gaseous or liquid biomass fuels. The installed power capacity by EoP is 1.61 MW (of which 1.2 installed PV in public buildings and 0.41 MW of biomass-fueled power

[4] A summary of possible concepts (business cases) is given in Annex G.

[5] Knowledge and communication plan (see Annex K.3). On a scale of 1 to 5, an average score of at least 2 is achieved: in which ?1? represents a low level of capacity and ?5? represents a strong capacity to understand relevant issues and apply knowledge and skills to find effective solutions. (1)

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

PIF
Part I ? Project Information
Focal area elements

1. Is the project/program aligned with the relevant GEF focal area elements in Table A, as defined by the GEF 7 Programming Directions?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes.

4/28/2022 MY:

Please address the following comments from the GEF PPO unit:

1. On the Letter of Endorsement: The records indicate that this PIF was received on 8/12/2021. The letter was signed by Ms. Kellman in December 2020 and the current OFP is Mr. Charley Browne. Please provide any any evidence to show the LoE is still valid.

2. As this is a UNDP project, a checklist should be provided at PIF stage. We were not able to find out this checklist in the documents section of the Portal. Please submit it to the GEF Portal.

3. Co-financing: National Petroleum Corporation/Barbados National Oil Company ? this entity appears to be affiliated with the ministry of energy. If so, please change the source to ?Recipient Country Government?.

4. For gender, please provide more detailed information. Firstly, in the objective and relevant components, please provide more details on gender dimension. Secondly, the project document indicates that the project is expected to close gender gaps in accessing to and controlling over natural resources. However, it does not provide any indicative information on how this project intends to do so. In the relevant sections of the project document, please provide such indicative information.

Agency Response

Roboto
1. An updated LoE has with signature of current OFP has been uploaded to portal.

2. The checklist has been re-uploaded to portal.

3. Co-financing table changed for National Petroleum Corporation/Barbados National Oil Company for Recipient Country government.

4. Further info on gender has been added to paragraphs 97 and 98: Potential gender gaps and corresponding actions will be further assessed during the PPG with a detailed gender assessment and the definition of a Gender Action Plan. The gender analysis will undertake an initial screening of the state of art of gender considerations in the sector and point out specific outputs and activities needed to 1. gather and identify the basic data on gender in the bioenergy sector and 2. Define key strategic activities that will place woman as strategic agents of change and not only beneficiaries of project activities.

Given the lack of reliable and updated data on gender and bioenergy sector (and the energy sector in general) in Barbados, the project has defined under component 1 - Institutional strengthening for resilient, low-emission energy planning ? a specific output focused on reviewing relevant sector policies to identify opportunities for incorporation of gender aspects in the integration and strengthening the energy-water-agriculture-health nexus in the Bioenergy sector. This upstream activity will implement a focused assessment to define policy actions to tackle gender gaps in access to and control over natural resources aiming to increase women?s participation and decision-making and amplify socio-economic benefits in the different sectors interrelated to Bioenergy. A consultive approach will be thoroughly applied as social, cultural and gender issues could adversely affect the adoption of centralised and decentralised RE systems by the project (identified as a moderate risk), a well-known problem in many countries often referred to as the ?not in my backyard? (NIMBY) syndrome.

Indicative project/program description summary

2. Are the components in Table B and as described in the PIF sound, appropriate, and sufficiently clear to achieve the project/program objectives and the core indicators?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

1. The PM appreciates the UNDP for indicating the GEF grant budget as detailed as at project outputs. Please continue such a way of good presentation. However, please double check the numbers in Table B to make sure they are correct. For example, at output 2.1.5, the GEF grant amount is missing. Other errors can also be detected in Table B. Please revise it.

2. What are the outreach activities under output 2.1.3?

3. Please revise the budget for PMC so that the PMC will be financed from the GEF grant and the Co-financing with the same share. .

2/10/2022 MY:

Not completed yet.

Please continue addressing the following comment that was indicated on 8/13/2021.

3. Please revise the budget for PMC so that the PMC will be financed from the GEF grant and the Co-financing with the same share.

Subtotal 1,448,942 8,640,000

PMC 144,894 400,000

10% 5%

4/22/2022 MY:

Yes, comments were addressed and the project doc was revised.

Agency Response

Roboto

1. April 13th
Cofinance for PMC has been revised and has now the same share of GEF grant (10%: 1,116,000)

Table **B** figures adjusted accordingly. Please note that the Project scope and outcomes/outputs have been adjusted and updated.
2. This previous output 2.1.3 is no longer included. As a consequence of further engagement with the government, the new PIF scope is reduced and a more realistic budget proposed. Grid-battery storage licensing, smart grids and end-user monitoring is no longer included. Several of these activities are covered by the baseline. Also, the DREAM TE allowed for a better understanding of the governance concerning the utility license and its implications for independent power production. As a whole, Barbados is making substantial steps forward, allowing the revised PIF to focus more strongly on

bioenergy and RE pipeline development. We believe the current set-up is more consistent and clarifies the GEF action viz-a-viz the baseline situation. For your guidance, please note the following:
? The baseline has been updated as per Q4 2021 given the time lapsed since the PIF as submitted (compiled Q1 2020), Work on sector policy has proceeded since.
? The previous PIF was pre-COVID-19.
? Due to STAR allocation lower than foreseen, the original budget was very tight given the scope.
? The DREAM TE became available after the first PIF concept.

3. The PMC cofinance has been increased to US$400k (MESBE cofinance).

Co-financing

3. Are the indicative expected amounts, sources and types of co-financing adequately documented and consistent with the requirements of the Co-Financing Policy and Guidelines, with a description on how the breakdown of co-financing was identified and meets the definition of investment mobilized?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

No.

The ratio of co-financing is less than 5. For a country with per capita GDP about $20,000, the PM suggests to raise the co-financing ratio to 7, and the ratio of investment mobilized to 5.

2/10/2022 MY:

No.

The ratio of co-financing is increased to 5.6 but it is still not enough. Recently, some key donor countries were concerned about the low co-financing ratios in SIDS. Please raise the co-financing ratio to 7, and the ratio of investment mobilized to 5. Thank you.

4/22/2022 MY:

Yes, comments were addressed and the project doc was revised.

Please get the co-financing letters from the engaged stakeholders sooner than later for the purpose of CEO endorsement.

Agency Response

Roboto

April 13th

The government has re-engaged with stakeholders and managed to commit more cofinance resources. The cofinance is 7:1 (11,160,000) with 5:1 of investment mobilized (table C of PIF reviewed).

Please note that Barbados GDP is estimated at US$16,100 per capita (See footnote 3, Source: https://www.statista.com/statistics/533707/gross-domestic-product-gdp-per-capita-in-barbados/). Barbados economy has contracted by 10% due to COVID-19 - note that the Caribbean is the region hardest hit by the pandemic globally. Yet, we increased cofinance to US$ 9.04M and hope this fulfills GEF expectations.

GEF Resource Availability

4. Is the proposed GEF financing in Table D (including the Agency fee) in line with GEF policies and guidelines? Are they within the resources available from (mark all that apply):
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes. The numbers are consistent with those indicated in the LoE of the OFP.

Agency Response

Roboto

The STAR allocation?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes. The project-requested budget is reserved from the country's CCM STAR allocation.

Agency Response

Roboto

The focal area allocation?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes. The project-requested budget is reserved from the country's CCM STAR allocation.

Agency Response

Roboto

The LDCF under the principle of equitable access?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

N/A

Agency Response

Roboto

The SCCF (Adaptation or Technology Transfer)?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

N/A

Agency Response

Roboto

Focal area set-aside?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

N/A

Agency Response

Roboto

Impact Program Incentive?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

N/A

Agency Response

Roboto

Project Preparation Grant

5. Is PPG requested in Table E within the allowable cap? Has an exception (e.g. for regional projects) been sufficiently substantiated? (not applicable to PFD)
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes.

Agency Response

Roboto

Core indicators

6. Are the identified core indicators in Table F calculated using the methodology included in the corresponding Guidelines? (GEF/C.54/11/Rev.01)
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

No.

The methodology used to estimate GHG emission reductions is not compatible with the GEF recommended methodological framework, which is available at the web.

Please clearly state baseline scenario and its related GHG emissions in both direct and consequential ways.

Then, please elaborate GEF project investment scenario and its GHG emissions in the relevant sectors in the country.

Afterwards, the GEBs of the GEF project can be easily identified. Please present and justify assumptions in the estimation.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

We appreciate your guidance. Please note that the baseline, incremental action and expected investments and impacts have changed. (1) Efficiency gains due to improved public sector PV systems

is no longer considered. (2) Energy savings as a result of residential electricity demand management (via smart grids) is no longer part of the project.
Direct GHG emission reductions are now obtained from: a) RE capacity (7.5 MW expected) installed with cofinance; and b) installed 250-kW bioenergy plant (biogas for heat and electricity). See paragraphs 83-87. Indirect emissions are expected through bioenergy market development, for which a 20% GEF causality factor is applied. We only consider bioenergy as the GEF project will focus on this technology (policy, licensing, skills and investment). GEF support will contribute to other RE project development as well, but we exclude this indirect impact to avoid any double counting. Overall GEF cost-effectiveness would be about 7.4 US$/tCO2e (3.5 if indirect GHG savings are considered). We believe that this is a strong case for GEF funding.

Project/Program taxonomy

7. Is the project/program properly tagged with the appropriate keywords as requested in Table G?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

It seems that Table G (**Project Taxonomy)** is not completed. Please double check it and complete it if applicable.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

Table updated in Annex C and table G of the word document and in the GEF portal.

Part II ? Project Justification
1. Has the project/program described the global environmental/adaptation problems, including the root causes and barriers that need to be addressed?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes. The project justification is presented on pages 5-8.

Agency Response

Roboto

2. Is the baseline scenario or any associated baseline projects appropriately described?
Secretariat Comment at PIF/Work Program Inclusion

8/13/2021 MY:

No.

Please project carbon emissions in the relevant sectors at the baseline scenario, on which the additionality of the GEF project can be justified. For example, to justify Outcome 1.1.." to provide MEWR with policy instruments and tools to facilitate the uptake of RE power systems and smart grids in the country ", it is necessary to elaborate the current situation in the country in terms of policy instrument and tools and carbon emissions that are related to these policy and instrument tools.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

The baseline scenario has been fully reworked, see par 39-50.
While acknowledging the progress made by Barbados, relevant barriers have been identified (par. 21-37) and summarized in the table, page 12. The barrier descriptions identify voids challenges and provides lines of action to address them. Par. 38 gives a brief description of the baseline, barriers, and the ambition level of the proposed SMARTER Project, as follow: ?38. In summary, all types of barriers are present to a larger or lesser extent, affecting Barbados? capacity to achieve its goal to become a 100% RE country by 2030 and foster the utilization of domestic bioenergy. The barriers that can reasonably be addressed within the framework of a GEF MSP are: sector governance and energy asset management; access to (bioenergy) technology; and RE pipeline development. Transversal challenges include inter-sectorial dialogue, information, and development of the energy nexus, in particular linked to circularity, resilience and gender?.

The 2021 NDC states and updates the original 2015 baseline emissions data {page 18} in summary as follows: Total absolute emissions in the base year (2008) have been restated at 2,123Gg CO2e. The 2015 NDC inventory stated emissions at 1,816Gg CO2e. The absolute emissions reductions resulting from this 2021 NDC update conditional contribution below the 2008 base year are 705Gg CO2e (2025) and 1,459Gg CO2e (2030) respectively. Total economy-wide BAU emissions projections are 1,881Gg CO2e (2025) and 1,958Gg CO2e (2030) respectively.

3. Does the proposed alternative scenario describe the expected outcomes and components of the project/program?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Not completed, since the baseline scenario is not clear. Please update the alternative scenario after the baseline scenario is revised.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

The proposed alternative scenario has been fully rewritten to reflect the changes in scope and identified outputs and outcomes. The revised proposal takes benefit from the GEF-5 DREAM Terminal Evaluation (which became available June 2020 - after the first PIF concept was compiled) and advanced by MESBE (which made some originally proposed outputs less relevant). See paragraphs 51-75, as follows:

- Component 1, par 52-57
- Component 2, par 58-64
- Component 3, par 65-71
- Component 4, par 72-75.

Bioenergy is a strategic option for Barbados as reflected in the Barbados National Energy Plan 2019-2030, which offers a framework for all RE technologies and grid-connected storage. Barbados also has an effective land use zoning policy and procedures for its revision. Recently, land use for wind and solar energy has been incorporated. However, a specific policy for bioenergy and forthcoming regulation is not in place in Barbados, and the GOB lacks the expertise. Which is the main rationale behind GOB request for UNDP and GEF support. (Neither is adequate expertise present among national stakeholders, hence the inflow of knowledge, technology and expertise to Barbados is highly needed).
Barbados is committed to become 100% fossil-free and environmentally sustainable. We therefore increasingly look at bioenergy from the perspective of economic circularity to maximize economic value and minimize environmental externalities and waste. We have tried to reflect this in the new PIF design.

4. Is the project/program aligned with focal area and/or Impact Program strategies?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes. it is aligned with "CCM-1-1 Promote innovation and technology transfer for energy breakthroughs - De-centralized RE power with energy storage."

Agency Response

Roboto

5. Is the incremental/additional cost reasoning properly described as per the Guidelines provided in GEF/C.31/12?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Not completed.

Please allocate some of the GEF grant to output 2.1.5, without which it would be very difficult to justify why the GEF should finance this kind of project if country stakeholders can use their own funds to cost-effectively invest in low carbon technologies on ground without the test and verification of new policy and new instrument tools to be developed by the GEF project.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

Your comment refers to GEF support for investment. Please note the revised project framework and output numbering. Some GEF funding is now allocated in 3.1.4 to enable investment. For 3.1.5 funding is enhanced in support of bioenergy project.
We fully agree that installed RE (specifically bioenergy) plants on the ground are key to verify policies and procedures, for building a supportive ecosystem, and verify the actual delivery of all types of benefits (incl. GHG emission reductions).

6. Are the project?s/program?s indicative targeted contributions to global environmental benefits (measured through core indicators) reasonable and achievable? Or for adaptation benefits?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Not at this time.

Please justify any assumptions in GHG accounting. For example, the following statement, which is copied from paragraph 78 of the PIF, contains a lot of assumptions without justification.

". Smart energy management including behavioural change can typically yield 10% energy savings; it is assumed assumed that half of the target group is reached. The annual energy savings then attained are 15,700 MWh/yr (equivalent to about 2.0 MW of baseload capacity). At an approximate GHG intensity of the grid of 0.8 tCO2eq/MWh, the annual GHG emission reductions are 12.6 kton CO2eq. Over a 10-year period, accumulated reductions are 126 kton CO2eq."

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

We acknowledge your comments on the initial GHG reduction estimates.
Note that the GHG calculations for this modified PIF is fully re-worked. See par 83-87 and under Q6 for further details.

7. Is there potential for innovation, sustainability and scaling up in this project?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes. They are shown in paragraphs 80-87 of the PIF.

Agency Response

Roboto

Project/Program Map and Coordinates

Is there a preliminary geo-reference to the project?s/program?s intended location?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Not completed. On the map shown in paragraph 88, please mark the targeted project demonstration sites.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

The following project site coordinates are considered:
(1) Portvale Sugar Factory: 13.195029370718755, -59.61616080709527
(2) Pom marine: 13.076189421673508, -59.59656892666094

Stakeholders

Does the PIF/PFD include indicative information on Stakeholders engagement to date? If not, is the justification provided appropriate? Does the PIF/PFD include information about the proposed means of future engagement?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Not completed yet.

If possible, please put the names of project stakeholders to match the outputs of the project in Table B. In the description of project components, please indicate which organizations or project stakeholders will execute the sub-components of capital investments for technology demonstrations. Please be aware that approval of the PIF does not imply that the GEF Implementing Agency will execute the Project.

The implementing agency cannot be an executing agency in the project. There must be specific project stakeholders to execute the project.

Please elaborate whether this project will benefit or impact any Indigenous or minority Peoples and Local Communities. If so, please show evidence that they have been consulted with the project impacts. Please indicate which stakeholders will be affected by the project on ground and how they have been consulted.

Please ensure that the PIF includes information about the future roles of stakeholders and proposed means of future engagement. Please check if the future roles of stakeholders have been identified. Please demonstrate how the project keeps engaging stakeholders through adequate means.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

1. An initial stakeholder list with their potential role in or with the Project has been included (Table par. 95). A comprehensive stakeholder engagement plan will be developed during PPG. As per SESP pre-screening a comprehensive stakeholder engagement plan will be developed during PPG defining roles, means of engagement (participation methods) and responsibilities of the diverse project partners. UNDP will apply the 2017-2021 ICPE (Independent Country Programme Evaluation) lessons learned by using an inclusive approach that draws on stakeholder consultation and the principles of leaving no one behind. Together with MESBE UNDP will work with state and non-state actors in each phase of the project cycle. This approach will enhance buy-in and ownership of the projects.

2. Note that the Project will likely be Nationally Implemented (NIM), i.e. executed by the Government (MESBE). This will be confirmed during PPG phase by the HACT results. Government has not requested support services from UNDP.

3. There are no indigenous peoples in Barbados. In any case, policy planning and projects involving land use are subject to public consultation processes established by Law. Recently, zoning for wind and solar energy was done under such a process. As a further warrant, UNDP project are all subject to Social and Environmental Screening, based on which Social/Environmental Management Plans are put in place with the objective to meet all possible safeguards and standards. A Stakeholder Engagement Plan, Gender Plan, and consultation with all types of rightholders is part of the process.

Gender Equality and Women?s Empowerment

Is the articulation of gender context and indicative information on the importance and need to promote gender equality and the empowerment of women, adequate?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

No.

Please check and elaborate preliminary issues or findings on gender-specific context of the project, describe plans to address gender issues during the project development phase. For example, please show any planned gender responsive measures/activities to address gender gaps and promote gender equality and women's empowerment that is related to the project.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

Some preliminary information throughout the PIF :
- Economically, women and youth face structural inequalities related to access to capital and other resources, and the persistent gender pay gaps and highly unequal distribution of unpaid care work . This inequality, and the region?s heterogeneity, are reflected in Barbados ranking 56 of 162 countries in the Gender Inequality Index.
- Source: www.ccreee.org Barbados? 2019 Energy Report Card. Data indicates employment in the sector is as follows: 112 females, 208 males and an additional 351 people not aggregated by gender.
- Additional Information - Source: https://www3.weforum.org/docs/WEF_GGGR_2021.pdf
- Page 10 - Barbados is listed as 27th out of 156 countries as measured in the WEF Global Gender Gap Index 2021 which is 1st in the Caribbean and 3rd in the entire LAC region.
- Similarly, Page 18 indicates that Barbados scored 7th out of 156 countries for Gender based Economic Participation and Opportunity second only behind the Bahamas in the entire LAC region.

More strategically, the revised SMARTER concept aims to respond to one of the findings of the DREAM Terminal Evaluation, i.e., that the gender-energy nexus in Barbados is not well understood nor documented. Energy always has a gender component, but how this works out in Barbados is not so clear. The SMARTER project shall provide more insight, which will be used to update the initial Gender Analysis and Action Plan (mandatory UNDP annexes for the PPG).
Even more importantly, we believe that systemic changes will occur in the near term as Barbados is phasing out fossil fuels and energy end-uses will either switch to grid electricity, self-generation, or new (clean) fuels. This will bring along changes in how energy is used, how and by what means people will use transport, what appliances will be used in the house, etc. GOB and UNDP want to be able to understand how the energy transition will affect all energy-nexus, including transport, agriculture, tourism, fishery, and gender.

Private Sector Engagement

Is the case made for private sector engagement consistent with the proposed approach?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes. It is stated on para 92 of the PIF.

Agency Response

Roboto

Risks to Achieving Project Objectives

Does the project/program consider potential major risks, including the consequences of climate change, that might prevent the project objectives from being achieved or may be resulting from project/program implementation, and propose measures that address these risks to be further developed during the project design?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

No.

In Section 5. Risks, please address risks due to climate change. While doing so, please include:

1. Outlining the key aspects of the climate change projections/scenarios at the project locations, which are relevant for the type of intervention being financed (e.g. changes in temperatures, rainfalls, increased flooding, sea level rise, saltwater acquirer contamination, increased soil erosion, etc.).

1.1 please include time horizon if feasible/data available (e.g. up to 2050).

1.2 please look at list of examples from STAP guidance.

2. Listing key potential hazards for the project that are related to the aspects of the climate scenarios listed above. This means elaborating a narrative that describes how the climate scenarios indicated above are likely to affect the project, during 2020-2050.

3. Describing plans for climate change risk assessment and climate risk mitigation measures during PPG. Please see the STAP guidance.

If the project developer does not know well the requirement of GEF STAP, please ask UNDP New York office for help.

Also, please brief the measures to cope with COVID-19 by responding the following three questions:

1. General: Describe briefly how the pandemic overall is addressed in the project, including associated impacts, risks and opportunities. Projects are required to identify and establish likely impacts and risks from COVID-19, and how they will be dealt with in the context of delivering global environment benefits and climate adaptation and resilience benefits;

2. Risk analysis: Please consider any risks and measures to deal with the risks that are caused by COVID-19 and post-COVID-19. These risks include (1) availability of Technical Expertise and Capacity and Changes in Timelines in the selected provinces; and (2) any expected financing from the government and co-financing from all stakeholders. Please describe further how risks from COVID-19 have been analyzed and mitigation strategies incorporated into the design of this project. The PIF is expected to include consideration to the risks that COVID-19 poses for all aspects of project design and eventual implementation.

3. Opportunity analysis: Describe further how the project has identified potential opportunities to mitigate impacts (if any) caused by COVID-19 to deliver GEBs and/or climate adaptation and resilience benefits, and contribute toward green recovery and building back better.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

Climate Risks:

1. UNDP?s common Multi-Country Assessment (CMCA) has identified that the climate emergency and data availability are two of the top three issues cited across the Sub-Region. These issues are directly correlated, as data gaps make it difficult to undertake robust analysis to inform mitigation and adaptation planning. Therefore, at this point is difficult to outline detailed climate change scenarios for project locations with large time horizons. However, an initial screening of potential risks, vulnerabilities and possible mitigation measures, focused generally in the RE sector has been added to the PIF in paragraph 100, based on a recent RE climate risk assessment developed by the German GIZ specifically for Barbados(2019).
2. Climate Risk assessment for the Renewable Energy Sector :

1) Hazards: Barbados has not experienced a major climate shock since Hurricane Janet in 1965, and nothing on the scale of the catastrophic events that its neighbours have experienced in recent years. It has, however, been affected in recent decades by various climatic shocks including Hurricane Tomas in 2011 which damaged approximately 1,500 houses, caused interruptions to 80% of the island?s electricity supply and resulted in approximately USD1.85m (BBD37 million) worth of damages (Grainge 2017). Hurricane Matthew in 2014, and a tropical depression in 2016 have led to flooding throughout the island (Robinson and Rogers, 2018).

2) Assessing vulnerability and exposure and rating the risks: According to Grainger (2018), ?between 1972 and 2010, approximately 70% of damages to infrastructure caused by storms and hurricanes in the Caribbean were to the transport sub sector, while 25% was to the energy subsector and the remainder to the water and sanitation sub sector?. With the integration of more renewable energy sources, it is important to ensure that the existing and future energy generation and transmission/ distribution infrastructure is climate resilient. In the case of a climatic shock, the power sector is highly exposed, but it is generally the transmission and distribution infrastructure that presents systemic risks. As Bioenergy is not a relevant part of RE transition in Barbados yet, a further analysis of vulnerability and exposure of project locations and GEF financed interventions will be undertaken during PPG phase.

3. Possible measures to manage the risk: The potentially catastrophic nature of climate risks in the Caribbean, particularly in the context of climate change, means that risk transfer is likely to play an important role in building resilience. This is enabled by the design of appropriate financial instruments, including insurance. Currently there are significant barriers to risk transfer in the renewable energy sector.As the client of IPPs, and sole distributor of electricity on the island, BL&P bears the risk of supply interruptions. Going forward, as it signs more power purchase agreements with IPPs, it may be important to include contractual clauses that require IPPs to implement similar risk management procedures to their projects. Barbados? bioenergy policy shall address the impact of climate change on the availability of land and marine biomass resources in Barbados.

COVID:

1. The COVID-19 impact has been incorporated in the baseline of the PIF (par 40) and in Risks section: 1, 4, and 5 (on Risk Table in par 98).

2. In January 2022, 51% of the population is fully vaccinated. COVID has fast tracked the roll out of online services in the public sector and Barbados as a whole. Most government services are available online, including payments. A flexible work arrangement policy has been rolled out and public officers, where possible, now carry out their duties remotely. Online meetings have now been normalized and there is acceptance and a growing familiarity with the online video conferencing for meetings, workshops and consultancies. These changes can well contribute to a higher pace of digitalization of public services, which is an important element of this project (licensing processes).

3. This project will directly support the national green development strategy to become energy independent and 100% Fossil-Fuel Free by 2030, thus significantly reducing the impact on the environment and GHG emissions. Project will support community-driven, decentralised RE projects and identify and strengthen value chains sustaining bioenergy projects in the agricultural sector, hotel and tourism industry and sugar sector. These sectors were all hard hit by the pandemic. It will also strengthen Barbados? energy security and support the process of becoming energy independent

Coordination

Is the institutional arrangement for project/program coordination including management, monitoring and evaluation outlined? Is there a description of possible coordination with relevant GEF-financed projects/programs and other bilateral/multilateral initiatives in the project/program area?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

No.

In Section 6. Coordination, please draw a chart to show the coordination relationship among all stakeholders of the project. Please specify how the private sector, CSO, and indigenous people will be coordinated in the project.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

Coordination of stakeholders will be detailed in the Stakeholder Engagement Plan, which is a mandatory UNDP project annex. Briefly, GOB consults with CSO (Civil Society Organizations) and IP Coordination with other agencies will also be assured by UNDP through inter-agency meetings, notably

with IDB, EU, CDB, IRENA, bilateral agencies as well as national agencies, such as the Barbados Sugar Industries Limited (BSIL), and the Barbados Biogas Association (BBA).
To ensure effective coordination and build-up of know-how, a technical working group comprising experts from the IP and other sector Government stakeholders will be established. Its interrelation to Project board will be defined during PPG. A technical advisory group shall be established with institutions involved in other renewable energy programs in Barbados, such as Public Sector Smart Energy Programme (PSSEP) and the Energy Smart Fund II (ESF-II), to guarantee complementarity and integration of initiatives. At this point, details are not finalized but after due consideration during the design phase, details will be outlined in the CEO endorsement package.

Consistency with National Priorities

Has the project/program cited alignment with any of the recipient country?s national strategies and plans or reports and assessments under relevant conventions?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

No.

Please elaborate how this project implementation is consistent with the country's roadmap towards 2030 zero-carbon energy scenario.

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

The final draft of the IRRP speaks to 20MW biomass plants of which 10MW should be built by 2025. Component 1 of the SMARTER project seeks to develop a bioenergy policy as well as update the licensing regime to include bioenergy which is a necessary first step in support of implementation of the technology. Bioenergy projects are already being proposed that would benefit from the policy and licensing regime.

Knowledge Management

Is the proposed ?knowledge management (KM) approach? in line with GEF requirements to foster learning and sharing from relevant projects/programs, initiatives and evaluations; and contribute to the project?s/program?s overall impact and sustainability?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

No.

Please provide information on Knowledge Management with the following requirements:

1. an overview of existing lessons and best practice that inform the project document

2. plans to learn from relevant projects, programs, initiatives & evaluations

3. proposed processes to capture, assess and document information, lessons, best practice & expertise generated during implementation

4. proposed tools and methods for knowledge exchange, learning & collaboration

5. proposed knowledge outputs to be produced and shared with stakeholders

6. a discussion on how knowledge and learning will contribute to overall project impact and sustainability

7. plans for strategic communications

2/10/2022 MY:

Yes, comments were addressed.

Agency Response

Roboto

1. Please note that the revised SMARTER concept incorporates lessons learned from the UNDP GEF-5 DREAM project in Barbados.
2. Knowledge Management is addressed specifically under Component 4 - a KM framework shall become in place in the inception phase of the project, which is also a mandatory UNDP requirement. In general terms the approach will consider four steps in the knowledge management of project?s activities:
- Identification and collection of project?s reports, results, lessons learnt and other experience. The focal point at the PMU for this task will be either project manager or a communication specialist
- Analysis and formatting of the collected material, to be integrated in the knowledge management system.
- Accessibility and dissemination of knowledge materials. This is mainly provided through the project website and other reginal platforms
- Publication and sharing of experiences and knowledge with international peers. The C-SERMS Platform Thematic Working Groups are envisioned as a conduit to increase exposure and impact, as Caribbean SIDS share similar circumstances and challenges.

MESBE has 2 websites that can be used for knowledge management. The latter ? smart energy website being specifically targeted towards the BNEP and the national objectives:
- https://energy.gov.bb/
- http://www.smartenergybarbados.com/

Environmental and Social Safeguard (ESS)

Are environmental and social risks, impacts and management measures adequately documented at this stage and consistent with requirements set out in SD/PL/03?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

No.

1. Please ensure that the project document has provided the overall risk categorization (High/Substantial, Moderate/Medium, Low). Please check for appropriate justification.

2. Please confirm that the project document includes information on any measures to address ESS related risks and impacts during project implementation.

3. Please upload any available screening/assessment reports such as preliminary Environmental and Social Risk and Impact Assessment report(s).

4. Please consider social measures to deal with the impact of COVID-19 at local communities where the mining activities are conducted.

2/10/2022 MY:

Not completed yet.

In the section of 9. Environmental and Social Safeguard (ESS) Risks of the PIF, please check item by item to see if the section has fully addressed all the issues that were listed in the comments above dated 8/13/2021. COVID 19 risk for example was not addressed.

4/22/2022 MY:

Yes, comments were addressed and the project doc was revised.

Agency Response

Roboto

April 13th

1. The Safeguards risk categorization has been added to PIF (paragraph 99): The project has a range of potential moderate risks that require further assessment during PPG, and collectively make the project Substantial Risk at this early stage. Please check the pre-SESP report (uploaded to portal) which has a full screening of all potential ESS related risks and specific target assessments planned for PPG.

2 & 3. The targeted assessments planned for PPG are:

? Gender analysis (to generate gender action plan)

? Comprehensive stakeholder analysis (to define Stakeholder Engagement plan)

? Waste audit/analysis (to Waste Management Plan);

? ESIA (Environmental and Social Impact Assessment) : To be confirmed during the PPG according to the scope of demonstrative activities. Potentially needed for demonstrative activities that demand infrastructure planning and construction.

? SESA (Strategic Environmental and Social Assessment): To be confirmed during PPG; Potentially needed for upstream policy activities.

4. The comment above related to ? COVID at local communities where mining activities are conducted? is not clear as there are no mining activities in SMARTER project.

All info regarding safeguards is in the detailed Social and Environmental Screening Template (pre-SESP screening document) attached to the PIF and uploaded in the portal.

Part III ? Country Endorsements
Has the project/program been endorsed by the country?s GEF Operational Focal Point and has the name and position been checked against the GEF data base?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Yes. The LoE is uploaded onto the GEF Portal.

Agency Response

Roboto

Termsheet, reflow table and agency capacity in NGI Projects

Does the project provide sufficient detail in Annex A (indicative termsheet) to take a decision on the following selection criteria: co-financing ratios, financial terms and conditions, and financial additionality? If not, please provide comments. Does the project provide a detailed reflow table in Annex B to assess the project capacity of generating reflows? If not, please provide comments. After reading the questionnaire in Annex C, is the Partner Agency eligible to administer concessional finance? If not, please provide comments.
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

N/A

Agency Response

Roboto

GEFSEC DECISION
RECOMMENDATION

Is the PIF/PFD recommended for technical clearance? Is the PPG (if requested) being recommended for clearance?
Secretariat Comment at PIF/Work Program Inclusion
8/13/2021 MY:

Not at this time.

Please address the comments above.

2/10/2022 MY:

Not at this time.

Please address the comments above.

4/28/2022 MY:

Please address the comments of the PPO that are presented in Box 1 of this review sheet.

ADDITIONAL COMMENTS

Additional recommendations to be considered by Agency at the time of CEO endorsement/approval.
Secretariat Comment at PIF/Work Program Inclusion

ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: **50,000**			
Project Preparation Activities Implemented	***GETF/LDCF/SCCF Amount ($)***		
	Budgeted Amount	***Amount Spent Todate***	***Amount Committed***
PPG Team Leader - RE Specialist	30,000	27,540	2,460
PPG - Gender and SES	20,000	18,345	1,655
Total	**50,000**	**45,885**	**4,115**

ANNEX D: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

ATLANTIC OCEAN
North Point
Salmond
Fairfield
The Spout
Greenidge
Hope
Content
SAINT LUCY PARISH
Wall Road
Cuckold Point
Paul's Point
Durham
Cave Hill
Alexandra
Bromefield
Nesfield
Benthams
Collins
Bascobel
Checker Hall
Road Fustic
Diamond Corner
Moore Hill
Rose Hill
Mont Brevitor
French
Shorey
Indian Ground
Litchfield
Speightstown
SAINT PETER PARISH
Belleplaine
Windy Hill
Bawdens
Walkers
SAINT ANDREW PARISH
Mullins
Gibbes
Sion Hill
Bruce Vale
Weston
SAINT JAMES PARISH
SAINT JOSEPH PARISH
Mount All
Hillaby
Boarded Hall
Bathsheba
Hill Crest
Allaynes Bay
Lancaster
Melvin Hill
Horse Hill
St. Elizabeths
St. Margarets
Martins Bay
Porters
Chapman
Carrington
Chimborazo
Sunnam
Congor Rocks
Greenwich
Welchman Hall
Branchbury
Bonwell
Holetown
Seaview
Rock Hall
Clifton Hill
Pothouse
Consal Point
College Savannah
Small Town
Glebe Land
Coach Hill
Bath Point
Sunset Crest
SAINT THOMAS PARISH
Wakefield Tenantry
Palmers
Whitehaven
Bayfield
Ragged Point
SAINT JOHN PARISH
Holders Hill
Ashbury
Thorpes
Bagatelle
Bridge Field
Proutes
Market Hill
Ellesmere
Steward Hill
Thicket
Bel Air
SAINT PHILIP PARISH
Husbands
Clermont
Cane Wood
Newbury
Kendal
Parish Land
Walkers Terrace
SAINT GEORGE PARISH
Jackson
Lazaretto
Eden Lodge
Cave Hill
The Glebe
Foster Hall
College Vale
Church Village
Black Rock
Bush Hill
Valley
Ebenezer
Work Hall
Robinsons
Belfield
SAINT MICHAEL PARISH
Melverton
Bushy Park
Six Cross Roads
Deacons
Brighton
Marchfield
Stroude Land
Long Bay
Rouen
Boarded Hall
Brereton
Diamond Valley
Dash Valley
Mapp Hill
Four Roads
The Crane
New Orleans
South District
Highland
Rices
Carrington
Mount Friendship
Woodbourne
Belleville
Wildey
Eday
Sion Hill
Cobbler's Rock
Henrys
Highgate
St. Patrick
Heddings
BRIDGETOWN
St. Davids
CHRIST CHURCH PARISH
St. Martins
Upton
Bayville
Sheraton Park
Newton Terrace
Gemswick
Needham's Point
Rendezvous
Coverley
St. Mathias
Rockley
Providence
Charnocks
Hastings
Grantley Adams International Airport
Worthing
Top Rock
Dover
Thornbury Hill
Fairy Valley Rock
Oistins
Scarborough
Wilcox
Chancery Lane
Sayes Court
Enterprise
Inch Marlowe Point
Kendal Point
Inch Marlowe
ATLANTIC
Anguilla (UK)
Saint Martin (Fra. + Neth.)
Saint Barthelemy (Fra.)
Saba (Neth.)
Barbuda
St Eustatius (Neth.)
Basseterre
ANTIGUA AND BARBUDA
SAINT KITTS AND NEVIS
Antigua
Saint John's
Montserrat (UK)
Guadeloupe
Lesser Antilles
Basse-Terre
Pointe-à-Pitre
DOMINICA
Roseau
CARIBBEAN SEA
Martinique
Fort-de-France
Castries
SAINT VINCENT AND THE GRENADINES
Kingstown
GRENADA
Saint George's
CARIBBEAN SEA
VENEZUELA
COLOMBIA
National Capital
main city

GEO LOCATION INFORMATION

The Location Name, Latitude and Longitude are required fields insofar as an Agency chooses to enter a project location under the set format. The Geo Name ID is required in instances where the location is not exact, such as in the case of a city, as opposed to the exact site of a physical infrastructure. The Location & Activity Description fields are optional. Project longitude and latitude must follow the Decimal Degrees WGS84 format and Agencies are encouraged to use at least four decimal points for greater accuracy. Users may add as many locations as appropriate. Web mapping applications such as OpenStreetMap or GeoNames use this format. Consider using a conversion tool as needed, such as:https://coordinates-converter.com Please see the Geocoding User Guide by clicking here

Location Name	Latitude	Longitude	Geo Name ID	Location & Activity Description

ANNEX E: Project Budget Table

Please attach a project budget table.

Expenditure Category	Detailed Description	*Component (USDeq.)*							*Total (USD eq.)*	*Responsible Entity (Executing Entity receiving funds from the GEF Agency)[1]*
		Component 1	*Component 2*	*Component 3*	*Component 4*	*Sub-total*	*M&E*	*PMC*		
Equipment	Project management cost: office equipment and furniture					-		*10,000*	*10,000*	*Ministry of Energy and Business (MEB)*
Equipment	Rental/maintenance of info-tech equipment (incl. licensing/maintenance platform software)				*3,020*	*3,020*			*3,020*	*Ministry of Energy and Business (MEB)*

Equipment	Support to MEB and Bioenergy Off-Grid Task Force with the needed information technology equipment and software (Comp.1: USD 7500)	7,500				*7,500*			*7,500*	*Ministry of Energy and Business (MEB)*
Equipment	Support to MEB and Bioenergy Off-Grid Task Force with the needed information technology equipment and software (Comp.2: USD 6615)		6,615			*6,615*			*6,615*	*Ministry of Energy and Business (MEB)*
Equipment	Equipment for measurements of feedstock characteristics (USD 17,000)		17,000			*17,000*			*17,000*	*Ministry of Energy and Business (MEB)*
Contractual services - Individual	Cost of management & administration tasks (project manager), USD 113,399.					-		*113,399*	*113,399*	*Ministry of Energy and Business (MEB)*
Contractual services - Individual	Tasks of project staff: Technical+Pilot Coord, , Social Safeguards and Gender (total USD 82250) as well as Lead Advisor, USD 7875) related to outputs of Component 3			*90,125*		*90,125*			*90,125*	*Ministry of Energy and Business (MEB)*

Contractual services - Individual	Tasks of project staff: Technical+Pilot Coord, Social Safeguards and Gender (total USD 82250) as well as Lead Advisor, USD 7875) related to outputs of Component 1	90,125				*90,125*			*90,125*	*Ministry of Energy and Business (MEB)*
Contractual services - Individual	Tasks of project staff: Technical+Pilot Coord, Social Safeguards and Gender (total USD 82250) as well as Lead Advisor, USD 7875) related to outputs of Component 2		90,125			*90,125*			*90,125*	*Ministry of Energy and Business (MEB)*
Contractual services - Individual	Tasks of project staff: Technical+Pilot Coord, Social Safeguards and Gender (total USD 82250) as well as Lead Advisor, USD 7875) related to outputs of Component 4				*90,125*	*90,125*			*90,125*	*Ministry of Energy and Business (MEB)*

Contractual services - Company	Company contract awarded to successful bidders (one or two) in pilot/demo Call for Proposals (USD 450,000) and carrying out feasibility studies (USD 80,000) and compilation of investment opportunities in the prospectus (USD 10,000). Contracts for GRM and code of conduct (USD 8000), waste and pollution risks assessment (USD 10000) and livelihoods assessment (USD 18000)			*576,000*		*576,000*			*576,000*	*Ministry of Energy and Business (MEB)*
Contractual services - Company	Company contract for design of bioenergy awareness and promotion plan and campaign (USD 30,000)				*30,000*	*30,000*			*30,000*	*Ministry of Energy and Business (MEB)*

Contractual services - Company	Company contracts for support of planning and licensing related ICT systems services at MEB (USD 5,000) as well as Bioenergy Task Force website maintenance and support (USD 5,000)	10,000				*10,000*			*10,000*	*Ministry of Energy and Business (MEB)*
Contractual services - Company	Contract for measurement of progress indicators (incl. capacity strengthening survey)					-	*8,000*		*8,000*	*Ministry of Energy and Business (MEB)*
Contractual services - Company	Contracts for bioenergy supply and demand assessment with recommendations (USD 40,000) and for capacity needs assessment (USD 20,000) and capacity strengthened support with selected institutions (USD 30,000) as well as bioenergy website setup and maintenance (USD 7500)		97,500			*97,500*			*97,500*	*Ministry of Energy and Business (MEB)*

International Consultants	Budget for consultancy and travel for M&E (final, MTR) is USD 48,900, which is divided as indicated over budgent lines 30A to C. Note 30A: international consultancy (USD 37,500)					-	*37,500*		*37,500*	*Ministry of Energy and Business (MEB)*
International Consultants	International consultancy (6 weeks @ 3750/week) for policy and planning support and workshop participation	22,500				*22,500*			*22,500*	*Ministry of Energy and Business (MEB)*
International Consultants	International consultancy (6 weeks @ USD 3750/week) for bioenergy feedstock and conversion assessments; policy formulation and advice on bioenergy-related capacity strengthening		22,500			*22,500*			*22,500*	*Ministry of Energy and Business (MEB)*
International Consultants	International consultancy (8 weeks @ 3750/week) for selected bioenergy pilot/demo design studies) and participation in related workshops/events			*30,000*		*30,000*			*30,000*	*Ministry of Energy and Business (MEB)*

International Consultants	International consultancy on bioenergy (or related planning, financing, etc.) in KM activities (4 weeks @ 3750/week)				*15,000*	*15,000*			*15,000*	*Ministry of Energy and Business (MEB)*
Local Consultants	Local consultancy (16 weeks @ USD 1300/week) for stakeholder engagement, bioenergy feedstock and conversion and demand assessment; policy formulation and advice		20,800			*20,800*			*20,800*	*Ministry of Energy and Business (MEB)*
Local Consultants	Local consultancy (8 weeks @ USD 1300/week) for stakeholder engagement, support DREI analysis and for gender/SES consultancy	10,400				*10,400*			*10,400*	*Ministry of Energy and Business (MEB)*
Local Consultants	Local consultancy to support KM, outreach and stakeholder mobilization activities (14 weeks @ 1300/week)				*18,200*	*18,200*			*18,200*	*Ministry of Energy and Business (MEB)*
Local Consultants	National consultancy for MTR and TE (USD 10,400)					-	*10,400*		*10,400*	*Ministry of Energy and Business (MEB)*

Local Consultants	National consultancy to support international consultant (12 weeks @ 1300/week) for cost-benefit analysis; socio-econ assessment related to feasibility and design studies of selected bioenergy investments			*15,600*		*15,600*			*15,600*	*Ministry of Energy and Business (MEB)*
Training, Workshops, Meetings	Inception (and/or final project) workshops (USD 3500 each or USDD 7000)					-	*7,000*		*7,000*	*Ministry of Energy and Business (MEB)*
Training, Workshops, Meetings	One workshop on call for Proposals and one on investment prospectus (USD 3500 per event). These may be linked or combined organizationally with workshops and events of Component 4			*7,000*		*7,000*			*7,000*	*Ministry of Energy and Business (MEB)*
Training, Workshops, Meetings	Workshops (USD 14,000 for workshops, regional conferences, including project closure event; note that travel is in a separate budget line)				*14,000*	*14,000*			*14,000*	*Ministry of Energy and Business (MEB)*

Training, Workshops, Meetings	Workshops (USD 7000) and training (USD 15000) for Component 1	22,000				*22,000*			*22,000*	*Ministry of Energy and Business (MEB)*
Training, Workshops, Meetings	Workshops and seminars (05 event.days @ USD 3500/day) related to Component 2 activities as well one or two training courses at selected institutions (USD 30000)		47,500			*47,500*			*47,500*	*Ministry of Energy and Business (MEB)*
Travel	Regional travel project staff					-		*5,000*	*5,000*	*Ministry of Energy and Business (MEB)*
Travel	Travel for short-term consultants (and staff but excl. international. ticket of international. experts, in BuLi 71200)	2,187	4,725	*2,468*		*9,380*			*9,380*	*Ministry of Energy and Business (MEB)*
Travel	Travel for short-term consultants (and staff but excl. international. ticket of international. experts, in BuLi 71200). Travel for participation in regional events				*9,534*	*9,534*			*9,534*	*Ministry of Energy and Business (MEB)*

Travel	Travel MTR and TE (USD 1,000)					-	*1,000*		*1,000*	*Ministry of Energy and Business (MEB)*
Office Supplies	Project management cost: office supplies					-		*6,495*	*6,495*	*Ministry of Energy and Business (MEB)*
Other Operating Costs	AV and printing cost (newsletters, workshops, reports, etc.) in Comp. 1 (USD 2493)	2,493				*2,493*			*2,493*	*Ministry of Energy and Business (MEB)*
Other Operating Costs	AV and printing cost (newsletters, workshops, reports, etc.) in Component 2 (USD 2500)		2,500	*2,500*		*5,000*			*5,000*	*Ministry of Energy and Business (MEB)*
Other Operating Costs	Cost of AV, printing production (for workshops and a regional event)				*5,000*	*5,000*			*5,000*	*Ministry of Energy and Business (MEB)*
Other Operating Costs	Professional hired services for project auditing (USD 10,000)					-		*10,000*	*10,000*	*Ministry of Energy and Business (MEB)*
Grand Total		**167,205**	**309,265**	***723,693***	***184,879***	***1,385,042***	***63,900***	***144,894***	***1,593,836***	

ANNEX F: (For NGI only) Termsheet

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

ANNEX G: (For NGI only) Reflows

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agencys is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

ANNEX H: (For NGI only) Agency Capacity to generate reflows

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies? capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).