GEF-7 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Medium-sized Project
TYPE OF TRUST FUND:GEF Trust Fund

PART I: PROJECT INFORMATION

Project Title:	Strengthening the national greenhouse gas inventory of the Republic of Mauritius to improve climate reporting and transparency		
Country(ies):	Mauritius	GEF Project ID:	6433
GEF Agency(ies):	UNDP	GEF Agency Project ID:	
Project Executing Entity(s):	Ministry of Social Security, National Solidarity, and Environment and Sustainable Development (MoSSNSESD)	Submission Date:	June 18th, 2019
GEF Focal Area(s):	Climate Change	Project Duration (Months)	48 months

A. INDICATIVE FOCAL/NON-FOCAL AREA ELEMENTS

Programming Directions	Trust Fund	(in $)	
		GEF Project Financing	Co-financing
CCM-3-8	GEFTF	1,269,850	770,000
Total Project Cost		**1,269,850**	**770,000**

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To assist the Republic of Mauritius in strengthening its national greenhouse gas inventory and associated data collection process, and to mainstream greater use of the inventory in policy formulation and NDC tracking

Project Components	Component Type	Project Outcomes	Project Outputs	Trust Fund	(in $)	
					GEF Project Financing	Co-financing
1. Improving the accuracy and localisation of the national greenhouse gas inventory	Technical Assistance	1.1 Key Category sectors benefit from locally-calibrated emission factors and/or activity data, enabling the inventory to advance to Tier 2 or Tier 3 GHG estimation approaches	1.1 Development of Tier 2 emission factors for key fuels: coal, heavy fuel oil, gasoline, diesel, kerosene and liquified petroleum gas – for application in Energy Industries, Transport, Manufacturing Industry and Construction, and Energy Other Sectors 1.2 Development of Tier 3 emission	GEFTF	1,010,000	550,000

			factors for Mauritius's 9 thermal power plants and a real-time grid emission factor – for application in Energy Industries and (increasingly) Transport			
			1.2 Development of Tier 2 activity data for Mauritius's land transport sector (road, Metro), augmented by gender and socio-economic usage data			
			1.4 Development of Tier 2 enteric fermentation emission factors and model for livestock			
			1.5 Development of Tier 2 allometric equations, root-to-shoot ratios and carbon densities for 4 key tree species in the Mauritian context			
			1.6 Ground-truthed forest inventory of privately-held forestland and non-forest tree cover (e.g. along river			

			banks and roadsides)			
2. Strengthening the national greenhouse gas inventory process	Technical Assistance	2.1 Reduced burden (time, cost) on institutions supplying data to the national greenhouse gas inventory	2.1 Implemented government roadmap for a permanent MRV structure, including firm government financing and institutional commitments

2.2 Development of an IT-based system to simplify and streamline the inventory data collection process | GEFTF | 100,000 | 70,000 |
| 3. Mainstreaming the national greenhouse gas inventory to enhance transparency and support policy-making | Technical Assistance | 3.1 Enhanced policy-relevance of the national greenhouse gas inventory, transitioning from a periodic UNFCCC obligation to a useful policy tool | 3.1 Targeted training on the use of the new IT-based system and on the use of the inventory for policy formulation, target-setting, scenario analysis and MRV of NDC commitments

3.2 Enhancing the role of the Climate Change Information Centre (CCIC) as a transparency portal | GEFTF | 55,000 | 80,000 |
			Subtotal	GEFTF	1,165,000	700,000
			Project Management Cost (PMC)	GEFTF	104,850	70,000
			Total Project Cost		1,269,850	770,000

For multi-trust fund projects, provide the total amount of PMC in Table B, and indicate the split of PMC among the different trust funds here: (   )

C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount ($)
Donor Agency	Agence Francaise de Developement	In-kind	Recurrent expenditures	30,000
Recipient Country Government	Ministry of Social Security, National Solidarity, and Environment and Sustainable Development (MoSSNSESD)	In-kind	Recurrent expenditures	180,000
Recipient Country Government	Ministries, departments and parastatals (National Transport Authority (NTA), Central Electricity Board (CEB), Mauritius Renewable Energy Agency (MARENA), Mauritius Cane Industry Authority (MCIA), Forestry Service, etc.)	In-kind	Recurrent expenditures	460,000
GEF Agency	UNDP	Grant	Recurrent expenditures	20,000
Private Sector	Independent Power Producer (Omnicane)	In-kind	Recurrent expenditures	60,000
Others (Academia)	University of Mauritius	In-kind	Recurrent expenditures	20,000
Total Co-financing				770,000

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES), FOCAL AREA AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	(in $)		
					GEF Project Financing (a)	Agency Fee (b)	Total (c)=a+b
UNDP	GEFTF	Mauritius	Climate Change	(select as applicable)	1,269,850	120,636	1,390,486
Total GEF Resources							

E. PROJECT PREPARATION GRANT (PPG)

Is Project Preparation Grant requested? Yes ☒ No ☐ If no, skip item E.

PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country/ Regional/Global	Focal Area	Programming of Funds	(in $)		
					PPG (a)	Agency Fee (b)	Total c = a + b
UNDP	GEF TF	Mauritius	Climate Change	(select as applicab	50,000	4,750	54,750
Total PPG Amount					**50,000**	**4,750**	**54,750**

F. PROJECT'S TARGET CONTRIBUTIONS TO GEF 7 CORE INDICATORS

Provide the relevant sub-indicator values for this project using the methodologies indicated in the Core Indicator Worksheet provided in Annex B and aggregating them in the table below. Progress in programming against these targets is updated at the time of CEO endorsement, at midterm evaluation, and at terminal evaluation. Achieved

targets will be aggregated and reported at anytime during the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and SCCF.

	Project Core Indicators	Expected at PIF
1	**Terrestrial protected areas** created or under improved management for conservation and sustainable use (Million Hectares)	
2	**Marine protected areas** created or under improved management for conservation and sustainable use (Million Hectares)	
3	Area of **land restored** (Million Hectares)	
4	Area of **landscapes under improved practices** (excluding protected areas)(Million Hectares)	
5	Area of **marine habitat under improved practices** (excluding protected areas) (Million Hectares)	
	Total area under improved management (Million Hectares)	
6	**Greenhouse Gas Emissions Mitigated** (million metric tons of CO2e)	
7	**Number of shared water ecosystems** (fresh or marine) under new or improved cooperative management	
8	Globally over-exploited **marine fisheries** moved to more sustainable levels (thousand metric tons)(Percent of fisheries, by volume)	
9	**Reduction**, disposal/destruction, phase out, **elimination** and avoidance of **chemicals of global concern** and their waste in the environment and in processes, materials and products (thousand metric tons of toxic chemicals reduced)	
10	Reduction, avoidance of emissions of **POPs to air** from point and non-point sources (grams of toxic equivalent gTEQ)	
11	Number of **direct beneficiaries disaggregated by gender** as co-benefit of GEF investment	72 men; 48 women

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

The project provides support to a range of government ministries, departments and paratatals, as well as the private sector and civil society, to improve the data collection process, accuracy and accessibility of the national GHG inventory of the Republic of Mauritius, in line with the objectives of the GEF Capacity Building Initiative for Transparency. Ultimate beneficiaries are the population of Mauritius (1.3 million people, who will benefit from improved evidence-led policy-making) and the international community (which will benefit from improved GHG transparency). Direct beneficiaries – defined as those who "are aware that they are receiving GEF support and/or who use the specific resource" – can conservatively be defined as the individuals in the participating institutions who participate in, or benefit from, project activities. The number of participating individuals is, due to the technical and specialised nature of the project, likely to number approximately 120. Mirroring the approximate gender breakdown in the project's co-financing institutions (approximately 60% men / 40% women), the 120 direct beneficiaries are estimated to include ~72 men and ~48 women.

G. PROJECT TAXONOMY
Please fill in the table below for the taxonomic information required of this project. Use the GEF Taxonomy Worksheet provided in Annex C to help you select the most relevant keywords/ topics/themes that best describe this project.

Level 1	Level 2	Level 3	Level 4
Influencing Models	Strengthen institutional capacity/decision-making	(multiple selection)	(multiple selection)
Stakeholders	Type of engagement Private Sector	Participation	(multiple selection)
Capacity, Knowledge and Research	Enabling Activities	(multiple selection)	(multiple selection)

Gender Equality	Gender mainstreaming	Sex-disaggregated indicators Gender-sensitive indicators	(multiple selection)
Focal Area/Theme	Climate change	Climate Change Mitigation

United Nations Framework on Climate Change

Climate Finance (Rio Markers) | Enabling Activities[1]

Paris Agreement

Climate Change Mitigation 2
Climate Change Adaptation 1 |

PART II: PROJECT JUSTIFICATION

1a. *Project Description.* Briefly describe:
1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description); 2) the baseline scenario and any associated baseline projects, 3) the proposed alternative scenario with a brief description of expected outcomes and components of the project; 4) alignment with GEF focal area and/or Impact Program strategies; 5) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing; 6) global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and 7) innovation, sustainability and potential for scaling up.

(a) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed

The Republic of Mauritius is a small island developing state (SIDS) off the south-east coast of the African continent in the south-west Indian Ocean, approximately 900 km east of Madagascar. In 2013, the latest year for which official data are available, net greenhouse gas (GHG) emissions for Mauritius, including the Agriculture, Forestry and Other Land Use (AFOLU) sector, were estimated to be 4.8 $MtCO_2e$ – a near-doubling since 2000.

Mauritius has recently completed its Third National Communication to the UNFCCC (TNC, 2016), is currently undertaking its first Biennial Update Report (BUR-1) and plans to commence work on its Fourth National Communication (FNC) in 2020. An updated Nationally Determined Contribution (NDC-2) will be submitted in 2020. The UNEP-GEF project, 'NAMAs for low-carbon island development strategy', which is currently under implementation, intends to (i) strengthen national capability to identify, prioritise and develop mitigation actions to meet NDC targets; (ii) initiate implementation actions on renewable Eenergy targets; and (iii) set up an enhanced transparency framework (ETF) to track and transparently report on NDC implementation for renewable energy actions. The country also has a large portfolio of GEF and GCF projects under implementation, addressing areas such as renewable energy, energy efficiency, sustainable transport and land use, land use change and forestry (LULUCF).

Under its NDC, Mauritius is targeting a 30% reduction in GHG emissions by 2030. Thirteen project options have been identified for adaptation and 10 for mitigation. The financial resource requirements are estimated at USD 5.5 billion, with USD 4 billion allocated for adaptation and the remaining USD 1.5 billion for mitigation activities during the period 2015-2030.

The electricity sector and the transport sector together account for two-thirds of Mauritius's greenhouse gas emissions (46% and 19%, respectively). Both sectors are undergoing rapid, transformational and inter-related change that will significantly alter their emissions profiles.

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[1] Capacity Building Initiative for Transparency (CBIT)

Electricity demand is increasing rapidly, from a peak of 468 MW in 2018 to 492 MW in January 2019 and likely more than 500 MW in 2020. Average annual growth in GHG emissions from the electricity sector since 2000 has been 4.3%. The Mauritian grid is emissions-intense, reliant upon coal (39%) and heavy fuel oil (38%) for the majority of power generation: the grid emission factor is officially 1.01 tCO_2/MWh[2], but this is subject to uncertainty (see below). The grid is also 'greening' rapidly, with 18% renewable energy penetration today (mainly bagasse) and a target of at least 35% by 2025. Over 100 MW of new renewable energy – mainly wind and solar – is under development in 2019 alone. Large-scale energy efficiency efforts are being directed at the manufacturing sector. These trends will interact in complex ways, changing not just the amount of fossil fuel that is used but also the diurnal and seasonal use of different sources of energy.

Meanwhile, the transport sector is also growing rapidly (there are now 532,000 registered vehicles on the road, up from 508,000 in 2016 and 465,000 in 2014) and is benefitting from a programme of large infrastructure investment (fly-overs, road expansions, etc.). The government is considering blending bio-ethanol, sourced from the country's large sugar industry, with gasoline to reduce emissions. The light-rail Metro Express, due to begin service in September 2019, will transform commuting patterns into the capital, Port Louis. As Mauritius's only railway, it will displace road transport, both buses and private vehicles, in yet-to-be-seen ways. As an electric system drawing power from the grid (initially 11 MW for Phase 1 of the rail system), it is one manifestation of a nascent electrification revolution in the transport sector, accompanied by a tripling – to 10,000 – of the number of hybrid (electric-petrol) cars in the past three years in Mauritius and ambitious government plans to electrify the bus fleet.

It is vital that these fundamental changes to the two largest greenhouse gas-emitting sub-sectors are accurately captured in the national greenhouse gas inventory. Unfortunately, the current inventory suffers from some deficiencies in this respect. Table 1 summarises the inventory improvements needed for specific sectors and sub-sectors, as identified by the National Greenhouse Gas Inventory Report (2017) and the Third National Communication (2016). These include:

- Despite accounting for almost half of national GHG emissions, despite the fact that all fossil fuels are imported (and hence amenable to testing), and despite the fact that the electricity sector is very concentrated – there are just 9 power plants that use fossil fuels in Mauritius – and hence easily surveyed, emissions from the Energy Industries sub-sector are estimated using an IPCC Tier 1 approach. As the Inventory Report notes (page 54), "It would be useful for the carbon content of fuels to be tested, so that country-specific carbon emission factors could be used rather than default ones from the 2006 IPCC guidelines." Such nationally-calibrated emission factors would also have application in other sub-sectors that consume fossil fuels – notably, the Manufacturing Industry and Construction sub-sector, where fuel oil is widely used in boilers, and in the Transport sub-sector, where gasoline and diesel are used in vehicles.

- With regard to the Transport sub-sector, the National Transport Authority (NTA) maintains a digital vehicle database that contains information on types of vehicles (including light-duty and heavy-duty split into fuel-types), the age of vehicles, and the use of catalyst and fuel-injection technology. However, activity data – kilometres travelled – is scant and largely derived from the country's bus fleet rather than private vehicles. Furthermore, the lack of nationally-calibrated fuel emission factors (EFs) means that the current GHG inventorisation of Transport is necessarily restricted to a Tier 1 approach.

As Table 1 indicates, other sectors and sub-sectors would also benefit from improvements to the national greenhouse gas inventory. However, many such improvements would improve the accuracy of the inventory only marginally. Iron and Steel Production, for example, forms a prominent component of the Industrial Processes and Product Use (IPPU) sector and is currently analysed using a Tier 1 approach. But Iron and Steel Production accounts for less than 1% of national GHG emissions. Other sectors and sub-sectors represent more important GHG sources or sinks: for example, Solid Waste accounts for almost one-fifth of national emissions. Improved estimation of the GHG characteristics of these sectors/sub-sectors would have a tangible impact on the national inventory. But, as

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[2] https://cdm.unfccc.int/methodologies/standard_base/Grid_emission_Mauritius.pdf

outlined below, many of these sectors/sub-sectors are already being served by other initiatives and projects and there is no need for GEF support. The two exceptions are:

- The Forestry sub-sector. Forests cover approximately 25% of the land area of Mauritius and, as the sugarcane sector contracts, forestry and agro-forestry are being promoted by the government as alternative livelihood options for land-owners. Carbon sequestration is currently equivalent to a substantial 8% of national GHG emissions. However, this sink estimate is subject to considerable uncertainty due to gaps in activity data (notably, relating to forest on privately-held land, to which the Forestry Service has had limited access, relating to trees alongside roads and rivers, and relating to the approximately 180 ha of mangrove forest) and gaps in carbon estimation factors (such as a complete lack of locally-calibrated allometric equations and root-to-shoot ratios). While a number of baseline projects are partially addressing the former (activity-related) barrier, none is addressing the latter (estimation factors) barrier.

- The Livestock component of the Agriculture sub-sector. Agriculture accounts for nearly 3% of national GHG emissions, one-quarter of which are attributable to livestock (enteric fermentation and manure). The livestock population is growing rapidly (4% per year) in Mauritius, driven by rising incomes (and hence demand for meat) and farmers transitioning away from the declining sugarcane sector. Data paucity is specifically identified by the National Greenhouse Gas Inventory Report (p. 94) as a key barrier to estimating Livestock GHG emissions: "Some activity data and EFs had to be estimated by using expert knowledge…It is anticipated to empower FAREI [the Food and Agricultural Research and Extension Institute] to improve collection of livestock population data and develop local emission factors to reduce the uncertainty level." Furthermore, FAREI has developed a detailed proposal to improve enteric fermentation GHG estimates that represents an immediate entry-point for GEF support.

Table 1: Improvements Required to the National Greenhouse Gas Inventory

Sector	Adopted GHG Estimation Approach	Improvements Required
% of national GHG emissions (excluding FOLU sink)	*(As noted in the National GHG Inventory and Third National Communication)*	
Energy (77%)	Tier 1 approaches were adopted for all energy sub-sectors, using IPCC default emission factors. Fugitive emissions from fuels were not estimated.	*Inventory, page 7:* "The adopted approach is the simplest Tier 1 but with country-specific net calorific values."
• Energy Industries (46%)	Tier 1 approach but with country-specific net calorific values (NCVs), which were derived from the energy statistics maintained by Statistics Mauritius. Mass and volume data on fuel imports were provided by the State Trading Corporation (STC). Consumption data was obtained from CEB, IPPs and Statistics Mauritius. Default emission factors from the 2006 IPCC guidelines were used.	*Inventory, page 54:* "The activity data used for Energy Industries are quite detailed and obtained at plant level. However, this is not the case for EFs…It would be useful for the carbon content of fuels to be tested, so that country-specific carbon emission factors could be used rather than default ones from the 2006 IPCC guidelines."
• Manufacturing Industry and Construction (7%)	The activity data comprised the fuel used for the Manufacturing Sector in the Energy Statistics produced by Statistics Mauritius. The split among the manufacturing sub-categories required the estimations of fuels used in boilers based on the proportions of boilers available in each of the sub-categories.	*Inventory, page 55:* "The approach adopted was Tier 1 since not enough country-specific EFs were available."
• Transport (19%)	Tier 1 approach used. The NTA maintains a vehicle database containing information on types of vehicle (including light-duty and heavy-duty split into fuel-types), age of vehicle, and use of catalyst and fuel-injection technology. Fuel consumption and vehicle	*Inventory, page 61-62:* "The lack of country-specific EFs prevented use of Tier 2 or Tier 3 for CO_2 emissions." *Inventory, page 145:*

		km travelled estimated from sample surveys of large vehicle fleet operators.	"Need for [data relating to] vehicle kilometres (surveys), vehicle emissions (tests) and country-specific emission factors."
•	Energy Other Sectors (4%)	Tier 1 approach adopted. Activity data, primarily use of LPG by households and the commercial sector, was obtained from the national energy statistics.	*Inventory, page 69:* "The activity data used for this category was sufficiently detailed…Improved development of sub-sector EFs will ensure more accuracy."
	Industrial Processes and Product Use (IPPU) (1%)	Source categories covered by the inventory are Mineral Products (primarily Metal Production – Iron & Steel) and ODS substitutes. A Tier 1 approach was used.	*Inventory, page 72:* "Although Iron & Steel Production is a key category within IPPU, its contribution to GHG emissions is only minor." "Following 2006 IPCC guidelines, since IPPU is not a key category, not much time and effort was put to use to develop higher-tier methods for this category."
	Agriculture, Forestry and Other Land Use (AFOLU)	GHG sources include enteric fermentation, manure management, agricultural soils and field burning.	*Inventory, page 86:* "It is recognised that this sector needs improvement."
•	Agriculture (3%)	Most agricultural activity data was obtained locally, but EFs used were Tier 1 default factors drawn from the IPCC 2006 Guidelines.	*Inventory, page 94:* "Some activity data and EFs had to be estimated by using expert knowledge…It is anticipated to empower FAREI to improve collection of livestock population data and develop local EFs to reduce the uncertainty level."
•	Forestry (-8%, net sink)	Removals in the forestry sector were estimated using local activity data and default Tier 1 removal factors (gain-loss method). Above-ground biomass and the soil carbon pools were considered.	*Inventory, page 102:* "Most of the country-specific factors were not available (basic wood density, biomass expansion factors, root-to-shoot ratio, amongst others). The removal factors utilised were mostly default values." *Inventory, page 107:* "The major data gaps identified were lack of data and maps for general land cover changes and land uses for the past 10 years and lack of data on private forest lands." *TNC, page 150:* "Limited data on privately-owned forests, trees along rivers and roadsides; and on natural forests (types of trees, age distribution, annual increment)."
	Waste (20%)	GHG emissions were generally calculated using local activity data (e.g. amount of waste landfilled, population connected to the sewer network) using Tier 1 emission factors	*Inventory, page 121:* "The waste sector is reliant upon accurate and regularly updated data on solid waste composition. The activity data for liquid wastes needs to be studied with a view to develop country-specific EFs."
•	Solid waste (18%)	The IPCC waste model was used to estimate CH_4 emissions from the Mare Chicose sanitary landfill. A fraction of the biogas is captured and used to generate electricity, for which good data exists; the inventory quantifies the CH_4 emissions that are vented without capture and without oxidation in the cover of the landfill. Composting and waste incineration (clinical waste only) are minor emissions sources, for which default IPCC EFs are used.	*Inventory, page 127:* "Mauritius has country-specific and accurate [municipal solid waste] data." *TNC, page 150:* "Insufficient EF development for emissions from waste."
•	Liquid waste (1%)	Activity data were sourced from treatment plants, metered water statistics and hotel occupancy rates. Water characteristics were determined using laboratory analyses (SNC Report, 2010). Default CH_4 emission factors were used.	*Inventory, page 139:* "Data on population connected to each wastewater treatment plant is needed for calculations and can be provided by carrying out surveys in catchment areas of the unsewered network…Further waste characterisation will be carried out to have more accurate data for percentage of waste (paper, garden and others)."

		TNC, page 150:
		"Lack of data on emissions at treatment plants and records of population connected…Capacity building is needed on development of EFs."

In addition to data-specific issues, other barriers serve to hinder the GHG inventorisation process in Mauritius, and hence weaken the country's transparency and reporting obligations under the Paris Agreement.

To date, Mauritius has relied upon a system of temporary, *ad hoc* institutional arrangements to undertake National Communications and their associated inventories, whereby ministries and other institutions have supplied staff members to technical working groups for limited periods of time. This has led to coordination challenges (over 75 such institutions were involved in the Third National Communication), as well as limited institutional memory (as it is rarely the same staff members who work on successive National Communications), a lack of systematic data archiving and a heavy reliance upon short-term consultants. As Mauritius moves towards more frequent reporting, in the form of BURs and the upcoming Fourth National Communication, there is a greater need for institutional continuity and systematic procedures, including deeper engagement with civil society and the private sector. There is a pressing need to build internal capacities for data collection and GHG estimation to improve data supply and quality in the national greenhouse gas inventory.

There is a need to develop a sustainable solution for archiving the data collected; currently, data is fragmented across multiple computers, is not readily accessible and is difficult to reconstruct for the purposes of building time-series. The Climate Change Division (CCD) of the Ministry of Social Security, National Solidarity, and Environment and Sustainable Development (MoSSNSESD) operates an online Climate Change Information Centre (CCIC)[3], which offers a ready-made solution to the data archiving problem. Indeed, the CCIC could straightforwardly be upgraded to become a 'climate transparency portal' that hosts both outward-facing content (reports, strategies, public data-sets, etc.) and internal data (e.g. raw and processed inventory data, GIS files, Excel models, IPCC software files, etc.).

(b) The baseline scenario or any associated baseline projects

(i) Legal and regulatory framework for climate change

In view of its commitment to address climate change, Mauritius was among the first 15 countries to sign and ratify the Paris Agreement in New York on 22 April 2016. The government is also planning to introduce a Climate Change Act to serve as an organising framework for its broad array of existing policies, programmes and strategies relating to climate change:

Vision 2030. The government has set up a High-Powered Committee to prepare a Blueprint for Vision 2030, which will comprise action plans for immediate priorities such as sustainable development, poverty alleviation and the environment. The SDGs, including SDG 13 on Climate Action, are being integrated within Vision 2030.

Public Sector Investment Programme. The PSIP makes provisions for (among others) the purchase of critical disaster risk equipment for National Emergency Operations, the installation of a Multi-Hazard Early Warning, Emergency Alert and Advisories System, and the upgrading and construction of new drains in flood-prone areas.

National Climate Change Adaptation Policy Framework. The Framework integrates climate change into core development policies, strategies and plans.

Disaster Risk Reduction Strategic Framework and Action Plan. The DRR Strategic Framework and Action Plan addresses, in particular, the risks of inland flooding, coastal inundation and landslides. The government enacted an associated National Disaster Risk Reduction and Management Act in July 2016.

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[3] http://environment.govmu.org/English/Climate_Change/Pages/CCIC.aspx

Climate Change Charter for Local Authorities In order to mainstream climate change in the development agenda of local authorities, a Climate Change Charter for Local Authorities has been developed with the objective of initiating and upscaling actions on adaptation to the adverse impacts of climate change and on the mitigation of GHGs emissions at council and community levels.

Gender. MoSSNSESD is currently reviewing its Gender Policy Statement (originally formulated in 2012), which is consistent with the operational guidelines of the National Gender Policy Framework (2008). The Statement provides a framework for mainstreaming gender in climate policies, programmes and activities, thereby promoting women's equal participation with men as decision-makers in shaping a sustainable development society.

Relevant sector policies and plans include:

The ***Long-term Energy Strategy 2009-2025*** (LTES) is currently being updated and will cover the period up to 2030; the revised LTES will be prepared for the period 2019-2030 with a target of 35% renewable energy in the electricity mix by 2025, to be maintained until 2030. The ***Energy Efficiency Master Plan*** has been validated and the ***Renewable Energy Master Plan*** has been finalised.

The ***Light Rail Transport (LRT) Metro Express Project*** was approved in 2016 and construction began in March 2017 on the occasion of the 25th Republic Day Anniversary in Mauritius. The project is intended to be complete by 2021, with Phase 1 between Port Louis and Rose Hill expected to be completed by September 2019 and Phase 2 – taking the line to 28km in length – between Rose Hill and Curepipe to be completed by September 2021. The Metro Express will be the only railway line in the country.

The ***Strategic Plan 2016-2020 for Food Crops, Livestock and Forestry*** focuses on promoting sustainable management of land, water and other natural resources, and on building capacity to enable farmers to transition to 'climate-smart agriculture'. A number of strategies and action plans have been formulated to halt and reverse the trend of forest loss and degradation, including the ***National Forest Policy*** (2006), the ***National Biodiversity Strategy & Action Plan*** (2016-2020) and the ***Protected Area Network (PAN) Expansion Strategy***.

(ii) <u>Institutional framework for climate action</u>

The National Environment Commission, chaired by the Prime Minister and consisting of relevant line Ministers, is responsible for setting national environmental objectives and targets, and for ensuring coordination between ministries, parastatals and local authorities engaged in environmental programmes. The Ministry of Social Security, National Solidarity, and Environment and Sustainable Development (MoSSNSESD) serves as the UNFCCC Focal Point. It coordinates Mauritius's actions on climate change, including the NDC, through its Climate Change Division (CCD). CCD contains nine (9) staff members, consisting of seven Environment Officers, one Divisional Environment Officer and one person attached to the CCD under the Service to Mauritius Scheme. All the staff of the CCD work on transparency issues as the latter encompasses mitigation, adaptation and monitoring, reporting and verification actions. Regarding matters pertaining to financial issues, the inputs of the Finance Section of the Ministry are also sought. More specifically, for the CBIT project, two officers of the CCD will be assigned to the project.

A Project Steering Committee (PSC), under the chair of the Permanent Secretary of MoSSNSESD, was set up to provide guidance and facilitate political and stakeholder acceptance of the outcomes of the Third National Communication (TNC, 2016). A Project Technical Committee under the chair of the Director of Environment was set up to provide operational leadership to the TNC process and to deal principally with technical aspects of the TNC. Five Technical Working Groups (TWGs) were established to oversee the implementation of climate change activities in key areas, namely: the GHG inventory; mitigation assessment and environmentally-sound technologies; adaptation; education, training and public awareness; and research and systematic observation. Four additional Working Groups were established to focus on: national circumstances and the integration of climate change considerations into sustainable development plans; knowledge, information sharing and networking;

capacity building; constraints and gaps; and related financial, technical and capacity needs. A total of 75 institutions were involved in the TNC process.

For the national GHG inventory, six Sub-TWGs were constituted, consisting largely of Ministries' and Departments' staff, as well as personnel from parastatals (such as the Central Electricity Board, CEB) and the private sector. These Sub-TWGs were: Energy Industries, Transport, Energy Other Sector, IPPU, AFOLU and Waste. Over 50 institutions were involved in collecting and processing inventory data. Notable participants included Statistics Mauritius, the Ministry of Housing and Lands, the Ministry of Energy and Public Utilities, the National Transport Authority, the Ministry of Industry, Commerce and Consumer Protection (Industry Division), the Mauritius Cane Industry Authority, the Forestry Service, the Food Agricultural Research and Extension Institute, the Solid Waste Management Division, the Wastewater Management Authority and others. The Climate Change Division (CCD) was responsible for coordinating data collection. Input of data into the 2006 IPCC inventory software was undertaken by consultants and some Team Leaders . Data processing – i.e. converting data into the form required for the IPCC software – was a laborious process that varied from sector to sector according to data availability and individual institutional capacities.

(iii) <u>Baseline barriers to enhanced GHG emissions transparency</u>

Figure 1 presents the baseline scenario problem tree. As outlined above, the national GHG inventory confronts four barriers to improvement: insufficient data (activity and/or emission factors) in Key Category sectors; a high-burden, *ad hoc* and not fully inclusive process by which the inventory is periodically updated; limited institutional capacities to process data in order to generate accurate GHG estimates; and an online Climate Change Information Centre that does not currently fulfil its potential for data archiving.

Capacities vary widely between institutions, with the result that data quantity, data quality and the degree of data processing also vary widely. In many cases, sectoral/sub-sectoral data submissions to the Climate Change Division (the entity responsible for coordinating the national GHG inventory process) are incomplete, in the wrong format or 'raw', requiring considerable follow-up work by CCD prior to entering the data into the inventory.

The result is an increasingly stressed MRV system that is struggling, and will continue to struggle, in the face of growing demands, notably the increasing frequency of reporting (BURs) and the growing need for GHG data to inform national policies and to track NDC progress.

(iv) <u>Baseline projects</u>

Table 2 provides an overview of relevant baseline projects. Together, these projects seek to address a number of the barriers described above. They present an opportunity for the GEF project to target its efforts in order to, at a minimum, avoid duplication and overlap but, more strategically, to build on and link with other initiatives so as to maximise GEF impacts.

The BUR-1 project is, for example, developing a number of crop-based emission factors and an ICI-funded project is quantifying wastewater GHG emissions in large hotels (which operate their own wastewater treatment plants and were not fully captured in the last GHG inventory): these are valuable activities that the GEF project need not undertake. Meanwhile, a UNDP-GEF SLM project is undertaking a detailed forest mapping exercise that will address the need for more comprehensive forest activity data (land area and tree-types); the GEF project can usefully complement this work by supporting the development of locally-calibrated carbon estimation factors that, together with the activity data, will allow the national GHG inventory to adopt Tier 2 estimation approaches in the Forestry sub-sector. Similarly, the GEF project can work with the new Mauritius Renewable Energy Agency (MARENA), created in 2016 with a mandate to promote renewable energy and currently receiving set-up and technical assistance from a UNDP-GCF project, to develop a real-time grid emission factor system that can more accurately quantify GHG emissions from the Energy Industries sub-sector (and from the increasingly-electrified Transport sub-sector) as well as inform MARENA's target-setting/tracking work. A UNEP-GEF NAMAs project will establish an MRV system for the Energy Industries sub-sector, facilitating collection of data relating to MWh

generated by different power plants; the GEF project can complement this activity-oriented MRV system with the development of Tier 3 emission factors.

Table 2: Baseline Projects and Initiatives

Initiative	Time Period	Budget	Activities
Relevant to the national GHG inventory			
Biennial Update Report (BUR-1)	2017-2019	USD 352,000 (GEF-financed, UN Environment-implemented)	• Update national GHG inventory for 2014-15 and revision of 2000-13 inventories • Development of selected Tier 2 emission factors (agriculture) • Capacity building on IPCC 2006 methodologies and geospatial analysis • Domestic MRV systems (sectoral)
Review and update of the NDC (NDC-2)	2019-2020	Euro 164,000 (Government of France)	• Update NDC target • Development of a domestic MRV system • Mechanism for assessing the carbon footprint of implemented measures
NAMAs for low-carbon island development strategy	2017-2021	USD 1.6 million (GEF-financed, UN Environment-implemented)	• Strengthened national capability to identify, prioritise and develop mitigation actions to meet NDC targets • Initiate implementation actions on renewable energy targets • MRV system for the electricity sector and to track NDC implementation for renewable energy actions
Shared Environmental Information System (SEIS)	2017-2019	USD 16,000 (UN Environment)	• Development of an Indicator Reporting Information System (IRIS) to help the Ministry and Statistics Mauritius to collect, analyse and publish quality information in a timely manner • For reporting on MEAs, SDGs and integrated environmental assessment processes
Relevant to the Energy Industries sub-sector			
Realising energy savings and climate benefits of implementing mandatory energy auditing in coordination with HCFC phase-out and HFC avoidance	2019-2024	USD 4.5 million (GEF-financed, UNDP-implemented) *(At CEO Endorsement stage)*	• Enhancement of the national mandatory energy audit programme • Implementation of boiler and RAC energy efficiency recommendations for large energy consumers and the promotion of energy efficient, low-GWP refrigerants • Provision of credit line for the implementation of energy audit recommendations • Implementation of energy management and energy MRV systems in large energy consumers and SMEs
Accelerating the transformational shift to a low-carbon economy in the Republic of Mauritius	2017-2024	USD 28.2 million (GCF-financed, UNDP-implemented)	• Institutional strengthening for renewable energy (MARENA) • Installation of battery energy storage system and accompanying software for the national grid to absorb up to 185 MW of intermittent renewable energy • 25 MW of rooftop PV installed
Relevant to the Transport sub-sector			
Promoting the low-carbon transport sector in the Republic of Mauritius	2020-2025	USD 3.7 million (GEF-financed, UNDP-implemented) *(At PIF stage)*	• Promote capital investments into developing sustainable transport infrastructure (electric buses) to reduce transport-related GHG emissions • Engage and build technical capacities of transport-related policy-makers, regulatory agencies, financial institutions and the private sector
Relevant to the Waste sector			
Transforming the tourism value chain in developing countries and SIDS	2017-2020	USD 600,000 (International Climate Initiative (ICI)-financed, UN Environment-implemented)	• Develop a national action plan to reduce GHG emissions and improve resource efficiency in selected tourism value chains • Identification of key emissions sources and potential mitigation interventions in hotels • Technical capacity building workshops for hotels
Relevant to the AFOLU sector			

Mainstreaming sustainable land management and biodiversity conservation in the Republic of Mauritius	2019-2023	USD 1.7 million (GEF-financed, UNDP-implemented)	• Strengthen the policy and institutional framework for the promotion of SLM, including integration of LDN targets into sector policies • Develop an Integrated Land Information System as a decision support tool • Capacity development on carbon balance software tools (including Collect Earth, EX-ACT and WOCAT methodologies) • Landscape-scale terrestrial ecosystem and land-use assessment (including development of thematic maps) – for ecosystems, forests, agricultural and livestock productivity, and degraded land • Planting and restoration of forestland • Gender mainstreaming in project activities

(c) The GEF project scenario

Figure 2 presents the project scenario solution tree. Four sets of solutions to the identified barriers – graduation to Tier 2 and Tier 3 GHG estimation approaches, development of a streamlined inventory process, strengthened institutional capacities and a CCIC transparency portal – will, in conjunction with relevant baseline projects, establish a fit-for-purpose MRV system in Mauritius that is capable of informing policy formulation and NDC progress tracking.

Component 1: Improving the accuracy and localisation of the national greenhouse gas inventory

GEF budget: USD 1,010,000
Co-finance: USD 550,000 sourced from MoSSNSESD, relevant line ministries and parastatals (Central Electricity Board, National Transport Authority, Mauritius Renewable Energy Agency, Mauritius Cane Industry Authority, Forestry Services Department, Food and Agricultural Research and Extension Institute, etc.), Independent Power Producers, the University of Mauritius, UNDP

1.1 Development of Tier 2 emission factors for key fuels: coal, heavy fuel oil, gasoline, diesel, kerosene and liquified petroleum gas – for application in Energy Industries, Transport, Manufacturing Industry and Construction, and Energy Other Sectors

Mauritius uses 6 fossil fuels in its electricity generation, transport and industrial sub-sectors. All of these fossil fuels are imported and hence easily accounted for and testable. Working with the University of Mauritius, which has already undertaken some preliminary analysis of the coal emission factor, the GEF project will support laboratory testing to estimate Tier 2 CO_2 emission factors for these fuels. This will serve to improve the accuracy of the national GHG inventory across multiple sub-sectors that, together, account for almost 80% of national emissions. It will complement the improvements to activity-related data in the Transport sub-sector that will be supported under Output 1.3. It will also actively support mitigation measures being undertaken by other initiatives. For example, a national energy MRV system is being established under the UNDP-GEF project, 'Realising energy savings and climate benefits of implementing mandatory energy auditing in coordination with HCFC phase-out and HFC avoidance', which will monitor energy consumption (and energy savings) in industrial and manufacturing processes such as steam production. The availability of Tier 2 emission factors for fuel oil and LPG will facilitate more accurate estimates of GHG emissions (and GHG mitigation) from these processes.

1.2 Development of Tier 3 emission factors for Mauritius's 9 thermal power plants and a real-time grid emission factor – for application in Energy Industries and (increasingly) Transport

The 9 thermal power plants in Mauritius – which use coal, heavy fuel oil and kerosene– account for 85% of the country's installed power capacity.[4] The Central Electricity Board (CEB) operates 4 of these plants and Independent

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[4] Including the capacity of the 3 power plants that utilise bagasse in combination with coal.

Power Producers (IPPs) the remaining five. Online Continuous Emission Monitoring Systems (OCEMSs) are available in the majority of these power plants, the data from which can be used to develop plant-specific emission factors. Alteo Ltd., an IPP, has, for example, already developed a coal CO_2 emission factor for its plant using its OCEMS. In those plants without monitoring systems, temporary monitoring equipment will need to be installed. Working with the University of Mauritius, the Air Pollution Monitoring Unit of the Mauritius Cane Industry Authority (MCIA), the CEB and IPPs, the GEF project will develop Tier 3 CO_2 emission factors for the country's 9 thermal power plants. In conjunction with the improved plant-specific activity data that will be supplied by the MRV system being established by the UNEP-GEF NAMAs project, this will enable emissions to be accurately tracked – at Tier 3 level of accuracy – in the national GHG inventory.

Combined with CEB data relating to real-time power injections into the grid from the thermal power stations, bagasse plants, hydro-power plants, and wind and solar farms, a real-time weighted-average grid emission factor will, in conjunction with the Mauritius Renewable Energy Agency (MARENA), be developed and tracked on a second-by-second basis. By revealing diurnal and seasonal patterns in grid emissions, mitigation efforts – such as energy efficiency interventions in industry and buildings, and electricity tariff-setting – can be optimised for maximum emission-reduction benefits. Similarly, as battery recharging becomes more widespread as the transport sector electrifies, real-time grid emission data will be invaluable in guiding policy-makers, bus companies and private consumers with regard to the best (least-emission) times to plug into the grid.

1.3 Development of Tier 2 activity data for Mauritius's land transport sector (road, Metro), augmented by gender and socio-economic usage data

Mauritius has a well-developed road network system of 2,275 km, of which 99 km are motorways. The number of vehicles is known to be increasing by 5% per year (and more for certain vehicle classes – 9%/year for private cars and 12%/year for motorbikes, for example), and the motorisation rate – expressed in terms of vehicles per thousand people – increased by 38% between 2006-15. While the National Transport Authority (NTA) maintains detailed digital records of vehicle numbers, types and characteristics, there is considerably less information available about vehicle usage – journey frequencies, durations, average speeds and occupancy rates – that, in conjunction with the fuel emission factor (to be addressed under Output 1.1), determine GHG emissions from the land transport sector. The 2017 national GHG inventory used a top-down approach to estimate Transport sub-sector emissions, using the aggregate sectoral fuel consumption statistics published by Statistics Mauritius in conjunction with assumptions about vehicle usage. However, the survey information that informed those assumptions suffers from a number of deficiencies, notably its dated (in some case decade-old) provenance, its bias towards the bus fleet (which accounts for just 7% of Mauritian vehicles but for which detailed activity data is available) and, importantly, the fact that it does not capture the impact of the soon-to-be-opened (September 2019) Metro Express system which, as Mauritius's only railway and serving Mauritius's capital city, is likely to fundamentally transform driving patterns (modal shift from car to train, modal shift from bus to train, park-and-ride synergies between car and train, etc.).

Aside from the obvious GHG MRV benefits of undertaking updated and detailed travel surveys, granular information about journeys, travel times and public transport usage, particularly when combined with socio-economic and demographic data (i.e. information about the passengers themselves – age, gender, disabilities, employment status, etc.), can be invaluable for informing government policy on such diverse matters as infrastructure investment (road enlargement, bridge-building, etc.), planning bus routes, and calibrating fares and fare subsidies for public transport users. The GEF project will therefore assist the NTA to undertake a systematic survey programme to generate a detailed set of transport activity data that will enable the use of a Tier 2 estimation approach in the Transport sub-sector. Because the incremental cost of including socio-economic, gender and demographic data in such surveys is negligible, such data will also be collected for public policy purposes. During project preparation (PPG), the design and modalities of the systematic survey programme will be determined. At this stage, it is envisaged that traditional questionnaire surveys, road-count censuses and GIS analysis will be augmented by more cutting-edge approaches, potentially the use of volunteers' (vehicle owners, bus passengers, Metro Express users) mobile phones as journey tracking devices.

1.4 Development of Tier 2 enteric fermentation emission factors and model for livestock

In principle, there are more than 80 emission factors for the livestock sector that pertain to CH_4 from enteric fermentation, CH_4 from manure management systems and N_2O from manure management from a range of livestock – dairy cows, sheep, goats, horses, pigs, chickens, etc. In Mauritius, however, enteric fermentation accounts for approximately 60% of livestock emissions and ruminants (cattle, deer, goats, sheep) account for 75% of these enteric emissions, with cattle alone accounting for 37% of enteric emissions. Enteric fermentation emission factors for cattle vary considerably according to breed, region and feeding regime. The IPCC Tier 1 enteric fermentation emission factor for North American dairy cows (128 kg CH_4/head/year) is, for example, 64% higher than the equivalent emission factor for African and Middle Eastern cows. In its national GHG inventory, Mauritius uses the Tier 1 African and Middle Eastern emission factor. However, the Mauritian cattle production system differs considerably from that of the broader region (inasmuch as a single 'African' system can be said to exist anyway) – for instance, in the preponderance of the Friesen-Creole breed and in the unique molasses/bagasse/straw feed that is given to cattle (the raw materials being by-products of the local sugar industry). The actual emissions produced by Mauritian cattle can, as a consequence, be expected to deviate significantly from the generic IPCC emission factor.

Although no research work has been undertaken to date to determine a local enteric fermentation emission factor, the Food and Agricultural Research and Extension Institute (FAREI), as the lead entity on the AFOLU Sub-TWG of the last national GHG inventory, is well aware of the current deficiencies in estimating livestock emissions and has expressed considerable interest in developing a Tier 2 factor. The GEF project will therefore assist FAREI in developing at least one Tier 2 livestock (dairy cow) enteric fermentation factor (i.e. a factor for converting the gross energy in cows' diet to methane), and potentially more than one if this is deemed useful (e.g. if statistical analysis reveals significant differences in emissions between cattle age-classes) and is possible given budgetary and time constraints. To estimate the emission factor(s), an empirically-calibrated statistical model will be constructed that evaluates the relationships between feed input characteristics (composition, digestibility, etc.), animal characteristics (metabolic energy requirements, lactation, locomotion, mass, milk production, etc.) and methane production. This model will be made freely available to inform future academic work in Mauritius and the development of emission factors elsewhere. The model will also be used by FAREI – outside of the framework of the GEF project – to develop cattle feed methane scenarios (i.e. scenarios involving different compositions and amounts of feed that lead to varying levels of methane emissions), so as to inform the Strategic Plan of the Ministry of Agro-Industry and Food Security, which includes an item concerning the reduction of CH_4 from ruminant feeding regimes.

1.5 Development of Tier 2 allometric equations, root-to-shoot ratios and carbon densities for 4 key tree species in the Mauritian context

Carbon stock changes in forest biomass are important because of: (a) the scale of forest cover, which accounts for one-quarter of the country's land area, and (b) the substantial fluxes that can arise from management and harvesting, natural disturbance, natural mortality and forest regrowth. Deficiencies in forest activity data are acknowledged in the National GHG Inventory Report and are partially addressed under Output 1.6 (see below). However, there are also considerable uncertainties associated with translating forest inventory data into carbon terms. Growing stock data are available for 6 key tree species (*Pinus elliottii*, *Eucalyptus sp*, *Araucaria sp*, *Tabebuia pallida*, *Cryptomeria japonica* and *Casuarina esqisetifolia*), derived from extensive data on tree species, tree heights, diameter-at-breast height (DBH) and tree cover maintained by the Forestry Service for public forests. But the inventory was able to use only IPCC Tier 1 factors to convert approximate biomass estimates into even more approximate carbon estimates. Furthermore, the inventory considered only above-ground biomass, not (typically substantial) below-ground root systems.

What is needed are: (a) nationally-calibrated allometric (non-linear regression) equations to estimate the biomass in above-ground tree components based on diameter at breast height (DBH) and height data; (b) nationally-calibrated root-to-shoot ratios to estimate below-ground biomass on the basis of above-ground biomass measurements; and (c) nationally-calibrated carbon density factors for converting biomass estimates into carbon estimates. The GEF project will support the Forestry Service to develop these elements for 4 key tree species (drawn

from the six species for which growing stock data is available) using a combination of survey plots, destructive testing and laboratory analysis. Although, for cost reasons, the focus will be on 4 tree species, it is likely that multiple equations and factors will be developed for each species, to differentiate, for example, between trees growing in the three key ecological zones of Mauritius: wet upland forest, moist forest and dry lowland forest. Future GHG inventories will, as a consequence, benefit from Tier 2 estimation methods in the Forestry sub-sector. The Forestry Service will also benefit from complementary bio-carbon training (e.g. on the FAO software package, EX-ACT) to be provided by a UNDP-GEF SLM project (see Table 2).

1.6 Ground-truthed forest inventory of privately-held forestland and non-forest tree cover (e.g. along river banks and roadsides)

There are two types of forest ownership in Mauritius: public and private. Publicly-owned (i.e. State-owned) forest cover is 22,000 ha, accounting for approximately 47% of the total forest area. The Forestry Service is responsible for the management of public forest, and undertakes regular surveys and inventories. Privately-owned forest land covers approximately 25,000 ha, roughly 53% of the total forest area. Only about 6,500 ha of private forestland (including river and mountain reserves) is protected. Public access to private forestland is limited and, because of accessibility and cost constraints, the Forestry Service has not conducted a comprehensive forest inventory of private forest for over a decade. Remote sensing data is available and the capacity of the Forestry Service to use this data in a GIS context (e.g. through the Collect Earth tool that can be used in conjunction with Google Maps) will be strengthened by a separate UNDP-GEF SLM project (see Table 2) – so, data on forest cover and (coarse) data on the types of tree species present in private forest is available and can be analysed. But there is currently no ground-truthed data on tree species, nor basic information such as tree heights, diameters and management regimes (rotational periods, use of agro-forestry, etc.).

The GEF project will work with the Forestry Service and Business Mauritius[5]– which has as members some of the largest land-owners in Mauritius – to develop a systematic programme of site visits and inventories of privately-held forests. During project preparation (PPG), key issues such as securing access and data confidentiality (e.g. relating to commercial timber plantations) will be addressed. It will not be necessary for 100% of privately-held forestland to be visited. As an indicative target (to be firmed up during project preparation), the project will aim to visit forest plantations that, in aggregate, account for at least 50% of privately-held forestland. Target sites will be chosen specifically to sample a broad cross-section of forest-types (indigenous vs. alien species, lowland vs upland, timber plantation vs hunting forest, etc.). For each site visited, data on tree species (including exact geographical coordinates of trees) and tree characteristics will be collected. Tree species data will be cross-referenced against remote sensing imagery. This will enable a spectral reflectance species identification model to be developed, which will, in turn, enable the species composition of unsurveyed private forests to be inferred from satellite imagery. The allometric equations and biomass/carbon factors developed under Output 1.5 will be applied to the species data collected under Output 1.6 to improve the accuracy of the national GHG inventory as it pertains to privately-held forestland. A similar approach will also be adopted in relation to non-forest trees, notably those planted along river banks and roadsides and in urban settings. These have hitherto not been included in forest surveys but the Forestry Service believes that, in aggregate, they contribute substantial carbon storage, potentially as much as an additional 4-7% of 'forest' sink.

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[5] Business Mauritius is an independent association that represents 1,200 local businesses and sectoral chambers of commerce.
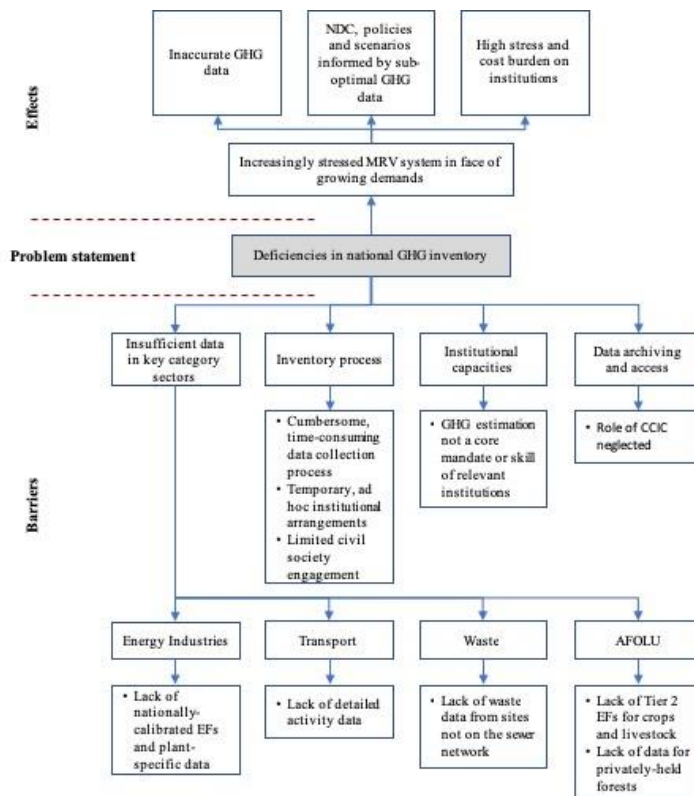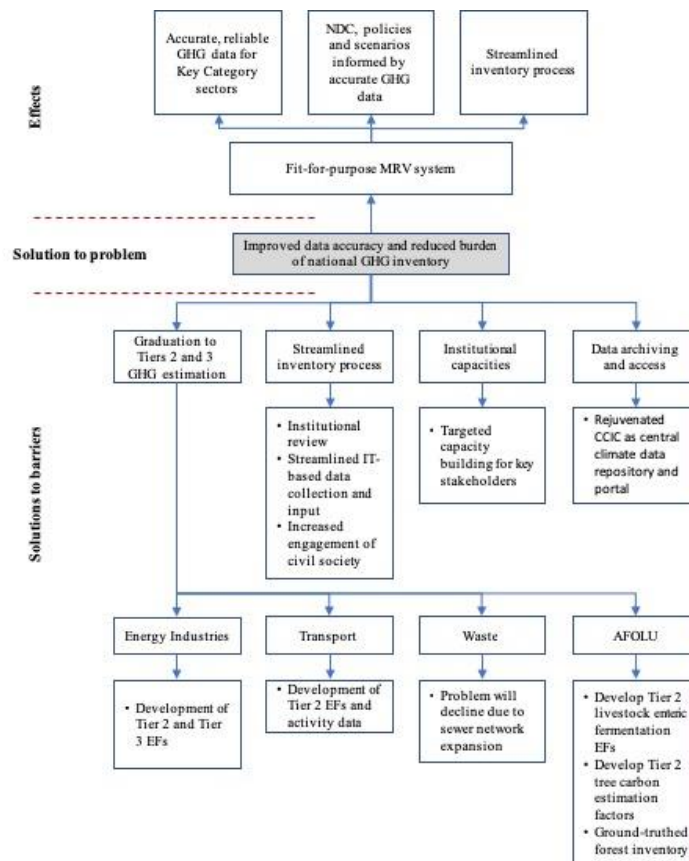
Figure 1: Problem Tree

Figure 2: Solution Tree

Effects:
- Accurate, reliable GHG data for Key Category sectors
- NDC, policies and scenarios informed by accurate GHG data
- Streamlined inventory process

Fit-for-purpose MRV system

Solution to problem: Improved data accuracy and reduced burden of national GHG inventory

Solutions to barriers:
- Graduation to Tiers 2 and 3 GHG estimation
- Streamlined inventory process
  - Institutional review
  - Streamlined IT-based data collection and input
  - Increased engagement of civil society
- Institutional capacities
  - Targeted capacity building for key stakeholders
- Data archiving and access
  - Rejuvenated CCIC as central climate data repository and portal

- Energy Industries
  - Development of Tier 2 and Tier 3 EFs
- Transport
  - Development of Tier 2 EFs and activity data
- Waste
  - Problem will decline due to sewer network expansion
- AFOLU
  - Develop Tier 2 livestock enteric fermentation EFs
  - Develop Tier 2 tree carbon estimation factors
  - Ground-truthed forest inventory

Component 2: Strengthening the national greenhouse gas inventory process

GEF budget: USD 100,000
Co-finance: USD 45,000 sourced from MoSSNSESD

2.1 Implemented government roadmap for a permanent MRV structure, including firm government financing and institutional commitments

As outlined in the Third National Communication and the National GHG Inventory Report, the government is considering a number of options to strengthen the institutional framework for climate change in Mauritius. This reflects acknowledgement at the highest levels of government that climate change is becoming an increasingly important policy matter, both domestically and internationally, as well as the fact that the difficulties currently being encountered in data collection and processing are likely to grow in the future as climate reporting and transparency requirements become more frequent and more detailed. Another, potentially complementary, measure being considered is to include a recurring national budget line item to cover the costs of continuous MRV activities, including ongoing maintenance and improvement of the national GHG inventory. The MRV roles and responsibilities of new institutions such as MARENA and the Utilities Regulatory Authority (both established in 2016) also need to be considered.

During project preparation (PPG), a policy and institutional review will be undertaken in conjunction with relevant government bodies to map existing mandates, staffing and budgets as they relate to climate MRV. This will include current MRV needs (notably, MRV related to GHG emissions – i.e. the national GHG inventory, NCs, BURs, etc.) as well as future needs relating to broader transparency and reporting requirements under the Paris Agreement (mitigation actions, tracking progress relative to NDC targets, climate impacts and adaptation, technology transfer and capacity building, financial support, etc.). On the basis of this review, the government will put in place a roadmap of measures to improve the institutional and financing basis of climate MRV in Mauritius, and will proceed to implement this roadmap. International support will be sought for specific measures as required/relevant, in line

with Article 13 of the Paris Agreement. The GEF project design will incorporate activities to support the implementation of this roadmap, with a specific emphasis on measures that serve to improve the continuity and sustainability of the National Communication/BUR/GHG inventory process, and will provide a detailed description and justification in the CEO Endorsement Request. Government financing commitments arising from this roadmap will be included as co-finance in the CEO Endorsement Request and will be entirely additional to the USD 670,000 public sector co-finance that is already included at the PIF stage of project development.

2.2 Development of an IT-based system to simplify and streamline the inventory data collection process

As outlined in Section 1a, to date Mauritius has relied upon a system of temporary, *ad hoc* institutional arrangements to undertake National Communications and their associated inventories, whereby ministries and other institutions have supplied staff members to technical working groups for limited periods of time. Capacities vary widely between institutions, with the result that data quantity, data quality and the degree of data processing also vary widely.

Although improvements will be made to the institutional structure surrounding MRV (Output 2.1), the ongoing reliance of CCD upon a range of line ministries and other institutions for inventory data is inevitable and inescapable, as these ministries and institutions typically have the mandates, the data-sets and the sectoral expertise required. Instead, what is needed is a simplified, streamlined process that leverages the data actually available and converts this into the data required for the inventory while minimising the time, cost and analytical burden on the ministries and institutions involved. This need not require a 'high tech' solution and, indeed, given the variety of operating systems, software packages, data formats and technological skills deployed across the approximately 50 institutions involved in supplying data to the inventory, a 'low tech', 'lowest common denominator' solution is actually preferred. Accordingly, the GEF project will work with CCD, Statistics Mauritius and each of the ~50 data suppliers to develop a bespoke Excel workbook for each data supplier. CCD has prior, positive, experience developing Excel workbooks for earlier climate mitigation initiatives. Each workbook will be tailor-made to accept the raw data available to each supplier, to automatically convert the raw data into inventory-required data and to format it into the tabular form needed for subsequent entry into the IPCC inventory software. Data provenance, limitations and processing assumptions will be fully documented in the workbook, thereby providing a 'paper trail' that can be used for subsequent quality control/quality assurance purposes. Cells containing formulae, pivot tables and output tables will be locked, so as to ensure that only raw data can be inputted. The possibility of developing an application programming interface (API) that allows the output tables to be seamlessly imported from Excel into the IPCC software will be explored during project preparation. But, even if manual input of the data from the Excel tables into the IPCC software is still required, the use of bespoke Excel workbooks will ensure that the burden on data-supply institutions is markedly reduced and that the data submitted to CCD is of the appropriate form, quality and format. The Excel workbooks will be uploaded to (by data-supply institutions) and downloaded from (by CCD) a secure area of the enhanced Climate Change Information Centre (see Output 3.2 below). This will facilitate inventory-related data exchange. The upload/download area will have differentiated user access rights such that institutions can access only 'their' workbooks and not those of other institutions, thereby respecting Mauritius's strict data confidentiality rules as well as potentially commercially-sensitive information (such as, for example, IPPs' electricity generation data).

Component 3: Mainstreaming the national greenhouse gas inventory to enhance transparency and support policy-making
GEF budget: USD 55,000
Co-finance: USD 80,000 sourced from MoSSNSESD, UNDP, Business Mauritius

3.1 Targeted training on the use of the new IT-based system and on the use of the inventory for policy formulation, target-setting, scenario analysis and MRV of NDC commitments

The Excel template-based model for data collection, processing and submission will be made as straightforward as possible for data-supply institutions. Furthermore, each workbook will be developed in conjunction with each data-supply institution, so that it precisely matches the data availability and data constraints that each institution faces.

Nonetheless, training will subsequently be provided to the institutions on the use of the Excel workbooks and on the CCIC uploading service that will be used for submission of the completed workbooks. Although this training is not expected to be especially technical or conceptually 'difficult', it is considered useful for generating understanding and, critically, awareness of the new system. This training will be rather time-consuming, due to the fact that each workbook will necessarily be different (tailored to the precise needs of each institution). It is, therefore, envisaged that a number of training workshops will be required, each addressing a number (between 5-10) of institutions that share commonalities – e.g. institutions that cover similar sub-sectors or use similar data-types or face similar data constraints.

More strategically, the project will also support a training programme for institutions – including, but not confined to, institutions that supply data to the inventory – on how the inventory can be used to inform policy formulation, scenario analysis, target-setting and progress tracking (against targets). The intention is to 'liberate' the inventory from the confined – and somewhat solitary – status it currently occupies, which is essentially as a periodic obligatory reporting requirement of an international treaty, into a useful tool with ongoing, national applications. Institutions will be trained on the use of the inventory for baseline- and target-setting, as well as an appreciation of the strengths and weaknesses of the inventory in this context. Institutions will also be trained on the use of the inventory for 'what if' analysis: for example, what would be the impact on emissions from road transport if the government were to introduce mandatory 5% ethanol blending, a tax rebate on hybrid vehicles and a 5% reduction in the use of diesel oil for electricity generation? Or, for instance, what would be the impact on peak-time electricity-related GHG emissions arising from 2% annual growth in air conditioning combined with an abrupt reduction in bagasse use? The national GHG inventory is clearly not the only data-set or tool available to model such scenarios, and it is fully envisaged that the inventory will be used in combination with other data and analytical tools. But the inventory does provide the most comprehensive and 'official' breakdown of emissions by sector and sub-sector (and, often, even more granular levels) and its use across institutions will provide a degree of internal consistency (in terms of data and assumptions) across sectoral plans and strategies that is currently lacking. Many institutions, even those that supply data to the inventory, are simply unaware of the rich data-set that underlies the National GHG Inventory Report. With the improvements made to the CCIC (see Output 3.2 below), this data will, for the first time, be made available in digital, user-friendly form, thereby enabling the inventory to become a fully-fledged policy and MRV tool with continuous application and value. In addition to the policy-making benefits this will afford, greater use and awareness of the inventory is expected to increase institutions' 'buy-in' to the inventory and to facilitate ongoing engagement with, and data provision to, the inventory.

The training programme will include a regional (Southern Africa, Indian Ocean) and international element that supports information exchange and strengthens Mauritius's engagement with relevant peer networks, notably the Global Support Programme[6] and the CBIT Global Coordination Platform[7].

3.2 Enhancing the role of the Climate Change Information Centre (CCIC) as a transparency portal

The online Climate Change Information Centre (CCIC) was established by the Climate Change Division in 2013 as a source of climate change information for researchers, students, NGOs, the private sector and the general public. The website is regularly updated with news items and reports but is under-utilised – attracting approximately 4,000 visitors per year – and would benefit from cosmetic ('look and feel') improvements and, above all, a renewed sense of purpose. The CCIC represents a ready-made solution to three separate problems: (a) the need for a simplified, standardised process by which institutions can supply GHG inventory data to CCD, (b) the need for a digital archive for systematic, centralised storage of inventory-related data, and (c) the need for a 'transparency portal' that provides easy access to climate information (including but not limited to GHG inventory data) to users – not just to the general public but also to institutions that wish to use inventory data for detailed policy and scenario planning purposes.

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[6] http://www.un-gsp.org/
[7] https://www.cbitplatform.org/

The GEF project will work with CCD, the Central Informatics Bureau and the Central Information Systems Division to upgrade the CCIC. This will require increased allocation of server processing capacity and bandwidth to the CCIC (as response speeds on the website are currently slow), as well as increased allocation of disk space to enable greater data storage. The website's HTML 'front end' will be modernised and accompanied by improvements to the structure of the website and enhanced search functionality. The CCIC will be partitioned into internal and external sections, with the – modernised, improved – main website continuing to serve as an external portal for the general public to access climate information for Mauritius while a password-protected internal section will serve as a data repository. The internal section will provide: (a) an upload/download area for Excel workbooks as an element of the improved national GHG inventory data-collection process (see Output 2.2), and (b) a structured data archive for inventory data and related documents. Institutions will have differentiated access rights to different parts of the internal section of the CCIC, reflecting their needs and mandates. In order to facilitate greater functional use of the inventory (see Output 3.1), inventory data will be made publicly available on the CCIC in a searchable and manipulable format (such as SQL or as Excel files) rather than as PDF or other text-based formats. The GEF project will also support MoSSNSESD and Statistics Mauritius, in the context of the baseline Shared Environmental Information System (SEIS) project, to link the SEIS Indicator Reporting Information System (IRIS) to the CCIC, such that inventory data can be 'pulled' from the CCIC and displayed in IRIS on an ongoing basis.

(d) Alignment with GEF focal area and/or Impact Program strategies

The project is fully aligned with Climate Change Objective 3, Component 8: Capacity Building Initiative for Transparency. As outlined on page 41 of the GEF-7 Programming Directions, CBIT aims:

- To strengthen national institutions for transparency-related activities in line with national priorities.
- To provide relevant tools, training and assistance for meeting the provisions stipulated in Article 13 of the Agreement.
- To assist in the improvement of transparency over time.

The project addresses all three of these aims through, for example, improvements to the national GHG inventory and to the underlying inventory process; to training on enhancements to the inventory process and on better application of the inventory for policy formulation and policy tracking (including NDC tracking); on better integration of the inventory in national development policies and programmes, such as energy diversification, electrification of the transport sector, promotion of forestry and promotion of a sustainable livestock sector; and broader institutional engagement in GHG transparency from the private sector and from civil society.

(e) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing

Improved quantification and reporting of greenhouse gas emissions has clear and immediate benefits in the form of: improved tracking of emissions progress against the NDC target; an improved basis for future revisions to the NDC target; improved international reporting (the National Communication and Biennial Update Reports); identification of GHG mitigation opportunities (and potentially greater ease of attracting international support for addressing such mitigation opportunities); and improved evidence-led policy-making.

As described in Section 1b and in Figure 1, the baseline scenario is characterised by a number of barriers that require GEF assistance to address. Without GEF intervention, these barriers will continue to prevail, thereby preventing Mauritius from accessing the benefits listed above. The GEF project builds on a solid baseline of past National Communications and national GHG inventories, as well as a rich ecosystem of baseline projects (see Table 2), in order to advance transparency and address the identified barriers. The co-finance mobilised by the project – indicatively, USD 790,000, but potentially considerably more depending upon the results of the policy and institutional review undertaken during project preparation (see Output 2.1) – represents a large amount for a project that is, at root, a rather technical intervention focused on a public good (the national GHG inventory). Furthermore,

the range of institutions engaged in the project (at least 11 co-financing institutions are anticipated) is extremely high given the fact that the project is an MSP requesting USD 1.3 million of GEF support.

(f) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)

The project's global environmental benefits come in two forms:

- The project will indirectly support national mitigation efforts through an enhanced understanding of GHG emissions/sequestration from the Energy Industries, Transport, Forestry and Livestock sub-sectors, as well as identification of potential emerging shortfalls in mitigation efforts relative to the NDC target.
- The project will indirectly support international mitigation efforts through improved accuracy of GHG emissions data which, among others, can inform the periodic Global Stocktake of collective progress towards climate goals.

(g) Innovation, sustainability and potential for scaling-up

The project is innovative. It applies IPCC best practice by supporting the development of higher-Tier GHG estimation approaches for Key Category sectors/sub-sectors. Upgrading of the Climate Change Information Centre into a climate transparency portal represents an innovative (but least-cost) approach to the twin problems of (a) maintaining a comprehensive data archive and (b) ensuring stakeholders, both domestic and international, are able to straightforwardly access the full range of public documents and data-sets relating to climate change in Mauritius.

The project is intrinsically sustainable. It addresses a future need that is (a) recurring and (b) imposed on Mauritius by international treaty (UNFCCC) requirements – that of a periodically updated national GHG inventory that informs National Communications and BURs. By not only improving the quality of the inventory (through, for example, the development of nationally-calibrated emission factors) but also by improving the *process* by which the inventory is compiled and by building the *capacities* of relevant institutions to contribute to the inventory and to better incorporate use of the inventory to inform other policy development/implementation needs, the project will ensure that its benefits are sustained into the future.

The project has high scale-up potential. Building on their experience and expertise developed during the project, Mauritian stakeholders can apply similar approaches to developing Tier 2 and Tier 3 emission factors for other sectors and sub-sectors, as well as improving activity data where required (e.g. in the marine transport sub-sector and the liquid wastewater sector). Emission factors, allometric equations and other outputs of the project will be uploaded to relevant databases (e.g. the IPCC emission factor database, the GlobAllomeTree database, etc.) for application elsewhere.

1b. *Project Map and Coordinates.* Please provide geo-referenced information and map where the project interventions will take place.

In general, the project is not specifically focused on particular geographical regions or sites. Some project Outputs (e.g. Output 1.1: development of fuel emission factors, or Output 3.1: training on the GHG inventory) have no spatial dimension. Other Outputs (e.g. Output 1.2: development of Tier 3 emission factors for the electricity sub-sector, or Output 1.3: development of Tier 2 activity data for Mauritius's land transport sector) do have an underlying geographical basis (e.g. the locations of power plants and of transport routes) but this geography does not have a bearing on the project's impacts or benefits. Nonetheless, Figure 3 below provides a map of the national electricity grid of Mauritius – indicating the locations of the country's 9 thermal power plants – and also shows the route of Phases 1 and 2 of the Metro Express light railway system.

Figure 3: Map of the Main Island of Mauritius (showing the locations of thermal power stations and the Metro Express)

2. *Stakeholders.* Select the stakeholders that have participated in consultations during the project identification phase:

☐ Indigenous Peoples and Local Communities; (Mauritius does not have indigeneous peoples)
☒ Civil Society Organizations;
☒ Private Sector Entities;
☐ If None of the above, please explain why.

In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement.

Table 3: Stakeholders Consulted During the Project Identification Phase[8]

Stakeholders Consulted During Project Identification	Stakeholder Description	Stakeholder Role During Project Preparation (PPG)
Public Sector – government entities and parastatals		
Ministry of Social Security, National Solidarity, and Environment and	MoSSNSESD serves as the UNFCCC Focal Point. It coordinates Mauritius's actions on climate change, including the NDC, the National	CCD will coordinate the project preparation process, including stakeholder consultations, mobilisation of co-finance and detailed project design. CCD will also supervise the policy and institutional review to be

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[8] This is a non-exhaustive list. Other stakeholders consulted included, for example, the GEF OFP, the Ministry of Energy and Public Utilities, the Ministry of Industry, Commerce and Consumer Protection, the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping, the Wastewater Management Authority, the Energy Efficiency Management Office, Mauritius Ports Authority, the Civil Aviation Department, the Central Informatics Bureau, the Central Information Systems Division and others.

Sustainable Development (MoSSNSESD)	Communications and the BURs, through its Climate Change Division (CCD).	undertaken during the PPG phase that will inform roadmap support activities to be included under Output 2.1. As the Executing Entity of the BUR-1, NDC-2 and UNEP-GEF NAMAs project, CCD will play a key role in coordinating the 'ecosystem' of MRV-related projects and ensuring that the GEF project maximises synergies with them.
National Transport Authority (NTA)	The NTA is a department operating under the Ministry of Public Infrastructure and Land Transport. It was established under the Road Traffic Act in 1980 and has, as its main responsibilities, the registration and licensing of motor vehicles; the regulation and control of road transport; monitoring public transport; maintaining statistics relating to motor vehicles; and planning of new transport services. The NTA was the Chair of the 2017 National GHG Inventory Transport Sub-TWG.	The NTA will work with the project preparation team to design a systematic survey programme for the land transport sub-sector (private road vehicles, buses, the Metro Express). This programme will be implemented under Output 1.3 to generate Tier 2 activity data and policy-relevant socio-economic, gender and demographic data.
Central Electricity Board (CEB)	CEB is a parastatal body wholly owned by the Government of Mauritius and reporting to the Ministry of Energy and Public Utilities. CEB produces around 40% of the country's total power requirements from its 4 thermal power stations and 8 hydroelectric plants, the remaining 60% being purchased from Independent Power Producers. Currently, it is the sole organisation responsible for the transmission, distribution and supply of electricity to the population. CEB was the Chair of the 2017 National GHG Inventory Energy Industries Sub-TWG.	CEB will work with the project preparation team and UoM to develop a data collection and site visit programme for the calculation of Tier 3 emission factors for CEB's 4 thermal power stations, as well as explore options for an appropriate data and institutional framework (in conjunction with MARENA) for the real-time grid emission factor. Both activities will be implemented under Output 1.2.
Mauritius Renewable Energy Agency (MARENA)	In line with the government's target of increasing the share of renewable energy to 35% of the energy mix by 2025 and maintaining it at this target to 2030, MARENA was set up in 2016 with the princial objective of promoting the adoption and use of renewable energy. MARENA operates under the Ministry of Energy and Public Utilities.	MARENA will support the policy and institutional review to be headed by CCD during project preparation, and will work with CEB to develop a framework for the real-time grid emission factor (to be subsequently implemented under Output 1.2).
Mauritius Cane Industry Authority (MCIA)	MCIA is a government body under the Ministry of Agro Industry and Food Security. Its role is to promote the development of the sugarcane sector and its clusters through policy measures, creating an enabling environment, research and development, and technology transfer. MCIA supports the use of bagasse as a fuel for electricity generation: 3 power plants currently use bagasse in combination with coal and one uses solely bagasse. MCIA houses the National Air Pollution Monitoring Unit.	MCIA will work with the project preparation team, UoM and relevant IPPs to develop a data collection and site visit programme for the calculation of Tier 3 emission factors for the 3 thermal power stations that use coal/bagasse in combination. MCIA's National Air Pollution Monitoring Unit will also develop an action plan and budget for all of those power stations that will require the installation of temporary monitoring equipment. This will support the implementation of Output 1.2.
Forestry Service (FS)	FS is a department under the Ministry of Agro Industry and Food Security. Its principal responsibility is to manage publicly-owned forestland (22,000 ha), to ensure sustainable services from forest (ecosystem, leisure, timber, etc.) and to undertake periodic forest inventories. Together with FAREI, FS was the Chair of the 2017 National GHG Inventory AFOLU Sub-TWG.	FS will engage with Business Mauritius and private land owners to develop a programme of site visits to privately-owned forestland and will make internal preparations for developing allometric equations, root-to-shoot ratios and carbon density factors, potentially stratified across different ecological zones. This will inform the implementation of Output 1.5.
Food and Agricultural Research and Extension Institute (FAREI)	FAREI is a parastatal under the Ministry of Agro Industry and Food Security. Its core responsibilities are to conduct research in non-sugar crops and livestock, and to provide agricultural extension services to farmers. Together with the FS, FAREI was the Chair of the 2017 National GHG Inventory AFOLU Sub-TWG.	FAREI will develop a detailed action plan and budget for calculation of enteric fermentation emission factors, including – as necessary – negotiated access to farms in order to undertake measurements on livestock. This will inform subsequent implementation of Output 1.4.

Statistics Mauritius	Statistics Mauritius is the statistical agency of Mauritius, responsible for the collection, compilation, analysis and dissemination of official statistical data. During the 2017 National GHG Inventory process, Statistics Mauritius worked closely with the CCD to secure access to data and to check the consistency of different data-sets (e.g. reconciling fossil fuel import records with fossil fuel consumption data provided by sectoral ministries).	Working with CCD, Statistics Mauritius will explore initial requirements for the streamlined inventory data collection process (Output 2.2) and required design elements for the enhanced CCIC, including potential links with the SEIS Indicator Reporting Information System (IRIS) under Output 3.2.
Ministry of Gender Equality, Child Development and Family Welfare (MGECDFW)	The Ministry serves as the lead institution responsible for the oversight, coordination, monitoring and evaluation of gender mainstreaming policies, strategies and programmes at national level. It is working with the UNEP-GEF NAMAs project to develop a Gender Action Plan (GAP) for the NDC.	The Gender Unit of the Ministry will work with the NTA to ensure that the systematic survey programme for the land transport sub-sector (Output 1.3) captures appropriate information about differentiated gender use, needs and challenges (e.g. with regard to the use of public transport) and is coordinated with NDC GAP needs.
Private Sector		
Independent Power Producers (IPPs)	12 IPPs operate in Mauritius, supplying 60% of the country's electricity. Five of these IPPs operate plants that use fossil fuel (coal) or a combination of coal and bagasse.	5 IPPs will work with the project preparation team, MCIA and UoM to develop a data collection and site visit programme for the calculation of Tier 3 emission factors for the 5 IPP fossil fuel thermal power plants. This will inform the implementation of Output 1.2.
Business Mauritius	Business Mauritius is an independent association that represents 1,200 local businesses and sectoral chambers of commerce. Business Mauritius is active in the energy and environmental areas, coordinating corporate social responsibility (CSR) activities, a Board member of Statistics Mauritius and MARENA, and a participant in the Third National Communication.	Business Mauritius will work with the project preparation team, private land owners and FS to develop a programme of site visits to privately-owned forestland (Output 1.5), and with private bus companies to participate in the land transport survey programme (Output 1.3).
Civil Society Organisations		
University of Mauritius (UoM)	UoM is the national university of Mauritius. The Department of Chemical and Environmental Engineering has expertise and experience in estimating fuel emission factors, as well as monitoring smoke-stack emissions (the National Air Pollution Monitoring Unit, now part of MCIA, used to be housed in the University).	UoM will design a testing action plan and GEF-supported budget for development of Tier 2 emission factors (for Output 1.1), and will work with CEB, MCIA and IPPs to develop a plan of action for calculating Tier 3 emission factors for 9 thermal power plants (for Output 1.2).

3. Gender Equality and Women's Empowerment. Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis). Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? yes ☒ /no ☐ / tbd ☐ ; If possible, indicate in which results area(s) the project is expected to contribute to gender equality:

☐ closing gender gaps in access to and control over natural resources;
☒ improving women's participation and decision-making; and/or
☒ generating socio-economic benefits or services for women.
Will the project's results framework or logical framework include gender-sensitive indicators? yes☒ /no ☐ / tbd ☐

The project is designed to conform to the 2018 guidance from the GEF on gender equality,[9] and it will meet the following requirements during the project preparation phase:

- A gender analysis will be conducted as recommended under GEF procedures.

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[9] GEF (2018), *GEF Policy on Gender Equality.*

- A gender action plan will be included in the CEO Endorsement Request in order to ensure that differences identified will be addressed.
- The project results framework will include gender-specific activities. The framework will also include targets for women's meaningful participation in project activities, and the project monitoring and evaluation budget will support the collection of gender-disaggregated data where relevant.

Gender equality and women's empowerment will be addressed throughout the project cycle in the following ways:

- The project will monitor the share of women and men who are direct project beneficiaries, and it will also monitor the nature of these benefits.
- Gender-sensitive targets and activities will be monitored in project reporting, both in annual reports and PIRs and in the mid-term evaluation and the terminal evaluation.
- The project will take into account the *Gender Responsive National Communications Toolkit* developed by the Global Support Programme through UNDP and in collaboration with UNEP and the GEF.

The project's technical work, directed at improving the quality, continuity and availability of the national GHG inventory, will benefit men and women alike – through improved transparency, improved policy-making and an improved ability to measure mitigation efforts against the NDC target. The enhanced CCIC (Output 3.2) will have a section dedicated to gender-specific information, publications and activities as they pertain the climate change impacts and climate change mitigation/adaptation efforts. Training provided by the project (Output 3.1) will be gender-balanced, ensuring at least 40% of beneficiaries are women (a ratio that is broadly reflective of the gender composition of the public sector). Output 1.3 (Development of Tier 2 activity data for Mauritius's land transport sector) will specifically collect data on the gender (as well as socio-economic and demographic characteristics) of private and public transport users so that future government policy-making and investment decisions can incorporate gender considerations.

4. Private sector engagement. Will there be private sector engagement in the project? (yes ☒ /no ☐). Please briefly explain the rationale behind your answer.

The private sector will be involved in two principal ways: (1) IPPs will work with the University of Mauritius, the CEB and the MCIA to develop Tier 3 emission factors for the 5 privately-owned power plants that use fossil fuels; and (2) Business Mauritius will coordinate with key private sector actors (notably private bus companies, taxi companies and private forestland owners) to supply data (e.g. vehicular activity data), participate in project data-collection activities (e.g. facilitate questionnaire surveys of bus and taxi passengers) and facilitate access to land (forests). In addition to improving the quality of the national GHG inventory, the engagement with the private sector will have spill-over engagement benefits, notably in the context of enhanced private sector involvement in the Fourth National Communication (2020) and in the context of the National Energy Efficiency Programme – a joint initiative of the Energy Efficiency Management Office and Business Mauritius – which is generating considerable data and expertise in the reduction of energy consumption in industry/manufacturing and which will be complemented by a greater (Tier 2) understanding of associated GHG mitigation benefits.

5. Risks. Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved or may be resulting from project implementation, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable).

Table 4: Project Risks

Risk	Risk Category	Mitigation Approach
Political risks associated with changes in	L	As a climate-vulnerable SIDS, the Republic of Mauritius is a strong supporter of the UNFCCC and Paris Agreement. Furthermore, the GEF project supports obligatory (as opposed to optional) GHG reporting requirements under the UNFCCC, notably in the form of the national GHG inventory. Accordingly, it is extremely unlikely that government support for the project will decline from its

government priorities		currently high level. Continuous engagement with a broad range of stakeholders will further minimise impacts of any political changes on the project, as will the fact that the Executing Entity (MoSSNSESD) also serves as the UNFCCC Focal Point for Mauritius.
Inadequate participation and support of all stakeholders and partners, and poor cooperation between participating institutions	L	The project responds to explicit requests for assistance articulated in the Third National Communication and the National GHG Inventory Report, and as further reinforced in other official reports (such as the Technology Needs Assessment and the National Capacity Self-Assessment) and during stakeholder consultations undertaken for PIF development. The level of stakeholder interest and engagement is extremely high and all project interventions are explicitly aligned with the relevant institutions' strategies and policies (e.g. the Long-Term Energy Strategy, the MARENA Action Plan, the Strategic Plan of the Ministry of Agro-Industry and Food Security, etc.). Inadequate participation is, accordingly, considered to be a low risk, further mitigated by the project's intention to engage in continuous liaison with institutions, regular reporting, monitoring of progress and acknowledgement of efforts and achievements by each institution. Participating institutions have been actively involved from the beginning in design, implementation and management decisions, and will be fully involved in project preparation. Explicit roles and responsibilities will be allocated, in line with institutional mandates and institutional roles in the national GHG inventory.
Climate change risks	L	The mean surface temperature of Mauritius is increasing by approximately 0.16˚C per decade. Annual rainfall over mainland Mauritius (i.e. excluding the outer islands) has reduced by approximately 63mm per decade over the past century. Rainfall variability has increased significantly, exacerbating water stress in the western and northern districts while simultaneously producing more flash floods. The frequency of intense tropical cyclones (with wind gusts greater than 234 km/hour) is increasing. The Technology Needs Assessment (TNA) notes that the indigenous component of the electricity mix (i.e. bagasse, wind and mini-hydro) is vulnerable to this increasing climate variability. There is a risk that growing electricity demand will need to be met through increased imports of fossil fuels. Given that the reduction of energy imports is a central government policy objective and forms the centrepiece of the Long-Term Energy Strategy, any threats to the potential of domestic electricity generation to reduce energy dependence will be monitored closely. The project's support to greater transparency in the Energy Industries sector will assist such monitoring. Notably, the real-time grid emission factor developed with GEF project support will provide a key summary indicator for quantitatively assessing the evolving contribution of renewable energies to the electricity mix.

6. Coordination. Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.

The project Executing Entity will be the Climate Change Division (CCD) of the Ministry of Social Security, National Solidarity, and Environment and Sustainable Development (MoSSNSESD) – mirroring the coordination role that CCD plays in the context of National Communications, BURs and national GHG inventories. Project oversight will be provided by a Project Steering Committee (PSC) made up of the GEF OFP's Office (in the Ministry of Finance), MoSSNSESD, UNDP, MARENA, MCIA, Statistics Mauritius and the Chairs of the relevant inventory Sub-Technical Working Groups (CEB – Energy Industries, NTA – Transport, FAREI and the Forestry Service – AFOLU), as well as Business Mauritius and the University of Mauritius. Independent evaluations will be commissioned by UNDP at the project mid-point and project-end.

A full mapping of relevant baseline initatives – both GEF-financed and others – was undertaken for preparation of the PIF (see Table 2). The GEF project has been explicitly designed to build on and support these baseline iniatives – see Sections 1b and 1c for details. Coordination during project preparation and project implementation will be emphasised; this task is made easier by the fact that CCD is also the Executing Entity of the BUR-1, NDC-2 and UNEP-GEF NAMAs project.

7. Consistency with National Priorities. Is the project consistent with the National strategies and plans or reports and assessements under relevant conventions? (yes ☒ /no ☐). If yes, which ones and how:

National Communication (NC) under UNFCCC: The project responds to, and is supportive, of the National Communication process. The project design directly responds to inventory deficiencies identified in the Third

National Communication and the latest National Greenhouse Gas Inventory Report. For example, the Inventory Report states (p.141): "It is recommended that, during the development of future BURs and NCs, the methodology is improved further, taking into account the development of national emissions factors in key sectors for GHG emissions and use of data from emissions monitoring systems. In addition, the development of a sustainable national inventory system, involving key organisations,in the regular update and improvement of the GHG inventory, should be established."

Biennial Update Report (BUR) under UNFCCC: The first BUR is currently under development. The improvements to the national GHG inventory supported by the GEF project will benefit future BURs.

Nationally Determined Contribution (NDC) under the Paris Agreement: The improvements to GHG accounting brought about by the GEF project will enable more accurate tracking of national and sectoral GHG emissions and will, therefore, facilitate comparisons between actual emissions and emission targets, thereby enabling corrective policy actions to be adopted as and when necessary.

Technology Needs Assessment (TNA) under UNFCCC: The TNA (2012) identifies one priority mitigation sector (Energy Industries) and three priority adaptation sectors (Water, Agriculture and Coastal Zone). The GEF project directly supports two of these (Energy Industries – locally-calibrated emission factors, and Agriculture – livestock emission factor).

National Capacity Self-Assessment (NCSA) under UNCBD, UNFCCC, UNCCD: The NCSA (2005) identified priority issues that are addressed by the GEF project. These include:
- Biodiversity: incomplete forest inventory.
- Climate change: use of renewable energy and energy efficiency; and the need for improved data management in the transport sector.
- Land degradation: clearing/conversion of forest on privately-held land; and an unsustainable livestock production system.

8. Knowledge Management. Outline the "Knowledge Management Approach" for the project and how it will contribute to the project's overall impact, including plans to learn from relevant projects, initiatives and evaluations.

The project is intrinsically 'knowledge-oriented'. Its main objective is to improve the quality of the national GHG inventory and the data collection/storage/dissemination processes associated with the inventory, thereby improving reporting and transparency and providing a firmer basis for evidence-based policy-making. The project design responds directly to the learning from past National Communications and national GHG inventories. The project will systematise knowledge gathering and subsequent storage and dissemination – notably through an improved online Climate Change Information Centre (CCIC) serving as both an inward-facing data repository and an outward-facing transparency portal.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter(s) with this template. For SGP, use this SGP OFP endorsement letter).

NAME	POSITION	MINISTRY	DATE *(MM/dd/yyyy)*
D.D Manraj, G.O.SK	Financial Secretary & GEF Operational Focal Point	**MINISTRY OF FINANCE & ECONOMIC DEVELOPMENT**	XXX