



# PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Medium-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

For more information about GEF, visit [TheGEF.org](http://TheGEF.org)

## PART I: PROJECT INFORMATION

Project Title:	Nationally Appropriate Mitigation Actions for Low Carbon Island Development Strategy		
Country(ies):	Mauritius	GEF Project ID: <sup>1</sup>	5649
GEF Agency(ies):	UNEP (select) (select)	GEF Agency Project ID:	01272
Other Executing Partner(s):	Ministry of Environment & Sustainable Development; Ministry of Energy & Public Utilities; Central Electricity Board	Submission Date:	2014-03-17
GEF Focal Area (s):	Climate Change	Project Duration (Months)	48
Name of parent program (if applicable):		Project Agency Fee (\$):	137,940
<ul style="list-style-type: none"> <li>• For SFM/REDD+ <input type="checkbox"/></li> <li>• For SGP <input type="checkbox"/></li> <li>• For PPP <input type="checkbox"/></li> </ul>			

### A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK<sup>2</sup>:

Focal Area Objectives	Trust Fund	Indicative Grant Amount (\$)	Indicative Co-financing (\$)
CCM-3 (select)	(select)	900,000	20,240,000
CCM-6 (select)	(select)	552,000	120,000
(select) (select)	(select)		
Total Project Cost		1,452,000	20,360,000

### B. INDICATIVE PROJECT DESCRIPTION SUMMARY

<b>Project Objective:</b> o ensure a low carbon path for the Mauritius, by establishing the national capacity for formulating and prioritizing NAMAs, particularly those found in “MID”, and further, develop the local capability to design and implement NAMA in the energy sector.						
Project Component	Grant Type <sup>3</sup>	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
COMPONENT 1: Building national capacity for cross-sectoral engagement in the formulation and implementation of NAMAs	TA	National Capability to identify, prioritize register and monitor NAMA's	1. Lead agency with convening power designated, supported by a strong study team involving key stakeholders 2. National reference GHG emission baseline established by sectors 3. NAMA projects identified from the	GEFTF	350,000	150,000

<sup>1</sup> Project ID number will be assigned by GEFSEC.

<sup>2</sup> Refer to the reference attached on the [Focal Area Results Framework and LDCF/SCCF Framework](#) when completing Table A.

<sup>3</sup> TA includes capacity building, and research and development.

			<p>MID projects and activities</p> <p>4. Programmatic Sectoral NAMAs developed</p> <p>5. A marginal abatement cost curve for the NAMAs</p> <p>6. Approaches &amp; methodologies for classifying and prioritizing NAMAs</p> <p>7. A national voluntary emission reduction targets formulated and integrated in the MID</p> <p>8. A National NAMA Registry (the MRV system will be completed under Component 4)</p> <p>9. A national NAMA list is constituted and submitted to the “International Registry”</p> <p>10. Partners for Supported NAMAs identified</p>			
<p>COMPONENT 2: Design &amp; Implementation of pilot NAMA in the Energy Sector</p>	Inv	Pilot energy sector NAMA designed and implementation started	<p>1. Pilot energy sector NAMA on utility-scale wind energy analyzed designed &amp; financed:</p> <p>1.a) detailed barrier analysis conducted</p> <p>1.b) techno-economic feasibility analyzed</p> <p>1.c) emission targets projected</p> <p>1.d) capability of private &amp; public sector entities in designing NAMA developed</p> <p>1.e) financing &amp; investments in energy sector NAMAs mobilized</p> <p>2. Wind farm projects operationalized contributing to GHG emissions reduction</p> <p>3. An attractive environment for investment for utility-scale wind energy is created:</p> <p>3.a) national strategy for implementing</p>	GEFTF	800,000	20,040,000

			NAMA in the energy sector adopted 3.b) supportive policy and legislative instruments & financial tools and incentives adopted 3.c) institutional mechanisms to facilitate partnerships established 3.d) Lessons learned analyzed, documented & disseminated			
COMPONENT 3: Establishment of MRV system and national registry for NAMAs	TA	Pilot energy NAMA monitored, registered and verified	1. MRV system incorporated in the national registry mechanism 2. Institutional and organizational linkages for MRV established 3. MRV technical committees specific to the two pilot sectors, energy & LULUCF, constituted 4. Key parameters to be monitored for the selected NAMAs selected 5. Monitoring plan designed & implemented for the elected NAMAs 6. National MRV guidelines & standard methodologies for selected sectors developed 7. MRV system for selected pilot NAMAs designed & implemented 8. Local technical professionals are fully capable and qualified to conduct MRV	(select)	170,000	120,000
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
			Subtotal		1,320,000	20,310,000

Project Management Cost (PMC) <sup>4</sup>		(select)	132,000	50,000
Total Project Cost			1,452,000	20,360,000

**C. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME IF AVAILABLE, (\$)**

Sources of Cofinancing	Name of Cofinancier	Type of Cofinancing	Amount (\$)
National Government	MOESD, MEPI, CEB	In-kind	160,000
National Government	MEPU, CEB	Investment	20,000,000
Other Multilateral Agency (ies)	UNEP	In-kind	100,000
Others	UNEP Risoe Centre	In-kind	100,000
(select)		(select)	
(select)		(select)	
<b>Total Cofinancing</b>			20,360,000

**D. INDICATIVE TRUST FUND RESOURCES (\$) REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY<sup>1</sup>**

GEF Agency	Type of Trust Fund	Focal Area	Country Name/Global	Grant Amount (\$) (a)	Agency Fee (\$) (b) <sup>2</sup>	Total (\$) c=a+b
UNEP	GEFTF	Climate Change	Mauritius	1,452,000	137,940	1,589,940
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
<b>Total Grant Resources</b>				1,452,000	137,940	1,589,940

<sup>1</sup> In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

<sup>2</sup> Indicate fees related to this project.

**E. PROJECT PREPARATION GRANT (PPG)<sup>5</sup>**

Please check on the appropriate box for PPG as needed for the project according to the GEF Project Grant:

	Amount Requested (\$)	Agency Fee for PPG (\$) <sup>6</sup>
• No PPG required.	-- 0--	--0--
• (upto) \$50k for projects up to & including \$1 million	50,000	4,750
• (upto)\$100k for projects up to & including \$3 million		
• (upto)\$150k for projects up to & including \$6 million		
• (upto)\$200k for projects up to & including \$10 million		
• (upto)\$300k for projects above \$10 million		

**PPG AMOUNT REQUESTED BY AGENCY(IES), FOCAL AREA(S) AND COUNTRY(IES) FOR MFA AND/OR MTF PROJECT ONLY**

Trust Fund	GEF Agency	Focal Area	Country Name/Global	(in \$)		
				PPG (a)	Agency Fee (b)	Total c = a + b
GEF TF	UNEP	Climate Change	Mauritius	50,000	4,750	54,750
(select)	(select)	(select)				0

<sup>4</sup> To be calculated as percent of subtotal.

<sup>5</sup> On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

<sup>6</sup> PPG fee percentage follows the percentage of the GEF Project Grant amount requested.

(select)	(select)	(select)				0
<b>Total PPG Amount</b>			<b>50,000</b>	<b>4,750</b>	<b>54,750</b>	

MFA: Multi-focal area projects; MTF: Multi-Trust Fund projects.

**PART II: PROJECT JUSTIFICATION<sup>7</sup>**

**A. PROJECT OVERVIEW**

A.1. Project Description. Briefly describe the project, including ; 1) the global environmental problems, root causes and barriers that need to be addressed; 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) incremental/additional cost reasoning and expected contributions from the baseline , the GEFTF, LDCF/SCCF and co-financing; 5) global environmental benefits (GEFTF, NPIF) and/or adaptation benefits (LDCF/SCCF); 6) innovativeness, sustainability and potential for scaling up

**A.1.1. The Global Environmental Problems And Barriers That Need To Be Addressed**

**National GHG Emissions**

As reported in Mauritius Second National Communications to the UNFCCC (2010), the country’s energy sector is the largest contributor of GHG emissions with the share from energy increasing from 59% in the year 2000 to 69% in 2006, while the waste sector is second at 30% but it has remained stable through the same period. The country’s historical trend in CO<sub>2</sub> emission is shown in Figure 1 below. The bar charts shown in red depict the projected CO<sub>2</sub> emissions under the ‘business-as-usual’ scenario until 2020. The black bar charts show the measured quantities of CO<sub>2</sub> emitted. Although these projections were made more than a decade ago, the measured data agree very well with the projected values of CO<sub>2</sub> emissions. The bar charts in white demonstrate the relatively unchanging CO<sub>2</sub> sequestration by sinks. The lower-than-expected emission in 2009 corroborates very well with a global dip in CO<sub>2</sub> emissions due to the global financial crisis. The increase in 2010 shows a recovery in economic activity but is still less than the projected emission. If this trend continues, per capita emissions may reach ~4.5 tCO<sub>2</sub> in 2020, and if extrapolated to 2050 will lead to a per capita emission equal to 10.25 tCO<sub>2</sub>.

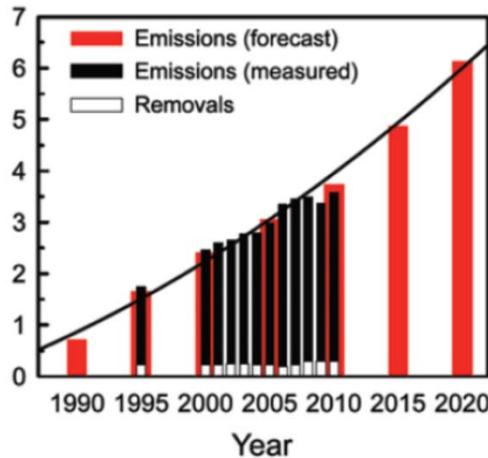


Figure 1. Projected (red) and measured (black) emissions of carbon dioxide (Sources: CSO, Energy and Water Statistics (annual indicators); Initial National Communication under the UNFCC, 1999).

Though the country’s absolute emissions are insignificantly small as compared to global emissions

<sup>7</sup> Part II should not be longer than 5 pages.

of GHGs, the per capita emissions are significantly high. And, although Mauritius was one of the front countries to ratify the Kyoto Protocol, it does not have national strategies to guide medium-to-long term mitigation actions to tackle climate change.

The Republic of Mauritius is already feeling the global impacts of climate change through stronger cyclone events, heavier rainfall episodes, warmer temperatures, and reduced rainfall. It is therefore, undeniably in the interest of this Republic to contribute to the reduction of GHGs, be it in an infinitely small amount.

### **Challenges and Barriers in Mitigating GHG Emissions**

The Republic of Mauritius consists of mainland Mauritius and its dependencies in the Indian Ocean namely Rodrigues, the Cargados Carajos (St Brandon), Agalega, Tromelin and the Chagos Archipelago, totalling a surface area of 2,040 km<sup>2</sup>. The estimated population is 1.29 million, growing at an estimated 0.5% per year, with a population density of 632 people per km<sup>2</sup>.

The Mauritian economy is a highly diversified one, based on tourism, textile and manufacturing, cane products, and financial services. In recent years, Information and Communication Technology, seafood, hospitality and property development, healthcare, education and training have emerged as important sectors, attracting substantial investment from both local and foreign investors.

Government has also initiated to develop the ocean (blue) economy. In parallel with this economic growth, there has been a sustained emphasis too on investment in social welfare, health and education. Now, the challenge is to further boost economic growth, develop human capital, and promote new emerging sectors in order to move Mauritius towards a more knowledge-based economy while preserving its ecosystems and its longstanding commitment to social welfare.

The Energy (which include fuel use for transport) and Waste sectors remained the largest contributors of GHG emissions with the share from energy increasing from 59% in the year 2000 to 69% in 2006 while that of the Waste sector remained stable at some 30 % (Figure 2). The share of Agriculture decreased from 6.0% to 4.5 % while that of the Industrial Processes sector regressed from 7.1% to 1.4%.

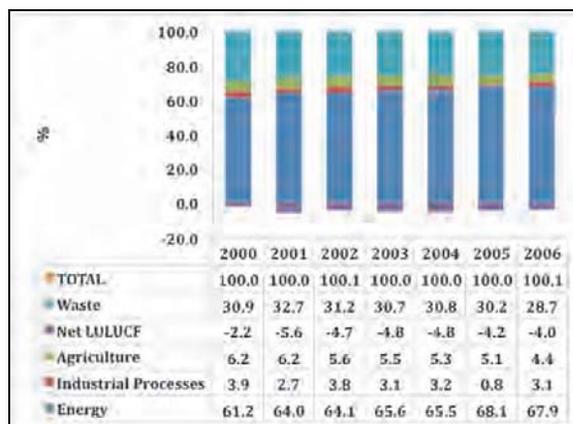


Figure 2. Share of GHG emissions by sector

During the last decade, national energy requirement has grown at an annual rate close to 5%. The two largest energy consumers are the transportation and manufacturing sectors. In 2011, 83.8% of the total primary energy requirement was met by imported fossil fuels, whilst 16.2% was derived from renewable energy (RE) sources. Bagasse contributes to about 94% of RE and 6% is derived from hydro, wind and fuel wood. Import of coal has considerably increased over the years and accounted for 49.5% of total fuel utilized for electricity production in 2011. Figure 3 shows the country's energy source mix.

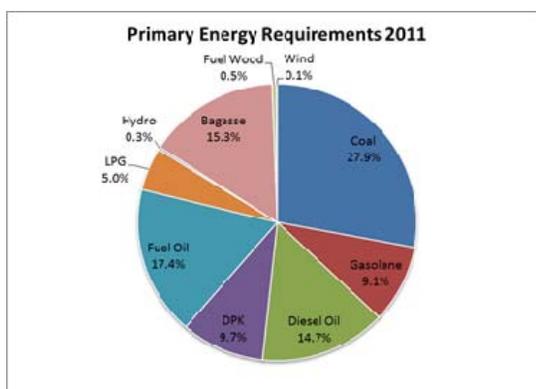


Figure 3: Primary Energy Sources, 2011 (in %)

Source: Statistics Mauritius – Digest of Energy and Water Statistics, 2012

The Central Electricity Board currently generates approximately 45% of the country's total power requirements from its four thermal power stations and nine hydroelectric plants; the remaining 55% is purchased from Independent Power Producers using a combination of bagasse and imported coal for generation. The country's energy strategy aims for the following:

- Increase the share of renewable sources of energy in electricity supply (from 17.5 % presently to 35% in 2025);
- Improve energy efficiency and conservation in all sectors through demand-side management measures (with targeted energy efficiency gains of 10% by 2025 over the 2008 baseline); and
- Create a financially sound and self-sustainable modern electricity sector, a transparent and fair regulatory environment that appropriately balances the interests of consumers, shareholders and suppliers, conditions that provide efficient supply of electricity to consumers and improvement in customer services.

The reliance on external sources of fossil fuels and vulnerability to external shocks are a major energy security concern but a key motivator for change. But low awareness and need for initial high investment costs limits the penetration of renewable energy and the adoption of energy efficiency and conservation measures.

Fuel use in transport is another major source of emission in the energy sector. The increasing number of vehicles has led to corresponding growth in fuel demand and carbon dioxide emission. Traffic congestion has become a serious problem costing the economy around 1.3% of GDP. Despite the relatively small size of the island, the average distances of commuting are high, and time and energy consuming. An integrated and sustainable approach to transport and land use should be promoted, which will offer a credible attractive alternative to private vehicles. Rationalization of land use could reduce the number of trips and the commensurate average distance travelled, as well as promoting the use of public transport. This would require interventions such as the densification of urban areas and the development of mixed use areas, in which employment, infrastructure, and houses are located together. This becomes not just an energy concern. The strategies will need a multi-sectoral approach. Interventions will also be capital intensive.

The waste disposal sector, including solid and liquid wastes, is the second major source of GHG emissions in the country. Liquid wastes include domestic and industrial effluents and run off from agricultural fields. Sewerage covers only 26% of households and the rest mainly used on-site wastewater disposal systems consisting of septic tanks, absorption pits and cesspits. The large industries (e.g. sugar industry) and also, the large tourist resorts, have wastewater treatment facilities. Most other industries are connected to the sewerage system, while smaller tourist resorts use septic tanks and absorption pit systems. For solid waste management, the major challenges are the ever growing volume of waste, limited disposal capacity and current low rates of recycling. Solid waste

management progressed from open dumps to a unique landfill in 2002 but part of the methane emitted from the landfill is just being flared.

The LULUCF sector comprised the sub-categories of Forest Land, Cropland, Wetlands, Settlement and Other land. During the period 2000-2006, the LULUCF sector represented a net removal of CO<sub>2</sub> from the atmosphere. The net removal was much lower in the year 2000, due to the conversion of some 300 ha of forest land to wetlands for the commissioning of a dam. The removals represented 7% of total national emissions in the year 2000 and 6% in 2006. Mauritius is densely populated and there is considerable pressure on agricultural land and forests. The proportion of land covered by forests has decreased from around 31% in 1995 to 25.5% in 2011. About 43% of the land area is covered by agriculture and approximately 28% by built up areas. One key strategy under the National Forest Policy is the enhancement of the carbon sink capacity of the environment by increasing forest and tree cover, thereby contributing to GHG mitigation efforts. However, though the policies on sustainable development and protection of lands are sound, they have not been particularly successful. Enforcement mechanisms are weak and as such, adherence to planning guidelines and legislation are loose.

### **A.1.2. Baseline Scenario**

#### **CC Mitigation Measures Already Adopted**

The SNC Report (2010) describes the following CCM measures that have already been adopted:  
*Energy Sector:*

- Replacement of household incandescent bulbs with energy saving lamps;
- Partial replacement of sodium vapour lamps for street lighting with energy saving lamps;
- Energy efficiency in buildings, electrical domestic appliances;
- Shift to energy-efficient appliances;
- Increasing the energy conversion efficiency of bagasse
- Phasing out of HFCs and PFCs;
- Promotion of solar water heaters through financial incentives;
- Installation of four wind turbines in Rodrigues;

*Waste Disposal:*

- Flaring of Landfill gas;

*LULUCF:*

- Setting-up of endemic gardens in schools to promote awareness on enhancing sink capacity;
- Planting of mangroves;
- Afforestation and tree planting campaign;
- Reforestation of about 770 hectares of state forest lands including some 20 hectares of degraded mountain slopes, which represent more than 1 million new trees.
- Planting of 100 000 trees and ornamental seedlings under the National Tree Planting Campaign,
- Reduction in the volume of timber exploited.

#### **Additional Mitigation Measures Identified in the SNC**

The 2010 SNC report conducted assessment of the following potential mitigation measures. In energy generation, the following scenarios were analyzed:

1. Wind Energy (6%, 12% and 18% of the *fuel mix* by 2020, 2030 and 2040, respectively).
2. Solar Energy (1%, 5% and 10% of fuel mix from 2020 to 2030)
3. Solid Waste-to-Energy from landfills (about 4% by 2040).
4. Geothermal Energy (8% in 2030 and 15 % in 2040).

## 5. Improvement in Transmission and Distribution System.

More recently, under the TNA Project for Mauritius, more detailed assessments were carried out for the energy sector, for which a technology transfer action plan was formulated for utility-scale wind energy as a key element of a sectoral programmatic approach to mitigation.

In the Transport Sector, the total reduction from the all measures discussed earlier (under the subsection on barriers and challenges to mitigation) represents 36%, 58% and 77% of the road transport emissions of the baseline emissions of the year 2000 in the year 2020, 2030 and 2040 respectively.

In Solid Waste Disposal, incineration would result in maximum GHG reductions. In the Wastewater Sector, mitigation options targeted for the Industrial (sugar sector), Domestic and Commercial Sectors will result to reduction of 45% of the base year emissions.

The SNC also analyzed LULUCF strategies that aim for carbon sequestration. It projected that 5, 000 ha of abandoned sugarcane targeted for afforestation will lead to increase net removals of CO<sub>2</sub> by 8.3%, 27.6% and 52.2% in 2020, 2030 and 2040 respectively compared to the business as usual scenario. In addition, combating deforestation and land degradation was shown to increase by 35.0 %, 57.0% and 106.9% in 2020, 2030 and 2040 respectively the net CO<sub>2</sub> removals.

### **Potential Mitigation Measures in the “MAURICE ILE DURABLE” (MID)**

The concept of Low Carbon Development Strategies (LCDS) has been introduced by the Conference of Parties to the UNFCCC as a common but differentiated approach to meet the overall emissions reduction objectives. In the case of the Republic of Mauritius, the country has adopted as the country's long term sustainable development strategy, the MAURICE ILE DURABLE (MID). The MID strategy can be considered as the foundation of the country's LCDS.

**MID Goal** - The goal of MID is to achieve sustainable development in five areas or “E’s”. A specific goal has been set for each of the five ‘E’s’:

- *Energy* – to ensure that the Republic of Mauritius is an efficient user of energy, with its economy decoupled from fossil fuel.
- *Environment* – to ensure sound environmental management and sustainability of ecosystem services.
- *Employment/Economy* – to green the economy with decent jobs, offering long term career prospects.
- *Education* – to have an education system that promotes the holistic development of all citizens.
- *Equity* – to ensure that all citizens are able to contribute to the Republic's continuing growth and share its combined wealth

The MID vision is for Mauritius to become a model of sustainable development. MID aims to facilitate economic growth that respects the limitations of natural resources; a growth that is delivered by an empowered population, able to grasp the new opportunities of a green economy; and also one that distributes wealth equitably. Many of MID sectoral strategies can readily be adopted as part of the country's LCDS by explicitly recognizing and documenting their contribution to GHG emission reduction.

**Potential NAMAs in ‘MID’ Sectoral Policies, Strategies & Projects** - The MID consists of not only strategies, but also policy measures and investment projects, which can contribute to the reduction of the country's GHG emissions. Some of these mitigation measures have already been presented earlier in the SNC report. All these policies, projects and activities contribute to achieving a low carbon development pathway. They are potential “Nationally Appropriate Mitigation Actions” or “NAMAs. *Since these mitigation measures have been defined under the **country-driven** MID Strategy, **national***

**appropriateness** should be assured, thus satisfying this key criterion for NAMAs. (Nationally appropriate is defined here as technically, financially, and according to national circumstances.) These potential NAMAs are shown in Table 1 below.

<b>A. Energy</b>					
	<b>Activities/Projects</b>	<b>Short/ Medium/ Long term</b>	<b>Cost Estimate</b>	<b>Monitoring and Evaluation</b>	<b>Implementing Agencies</b>
1	Consolidation of the Energy Efficiency Management Office	On-going	Rs 3m / year	Operationalisation of the Office	Ministry of Energy and Public Utilities
2	Setting up of the Utilities Regulatory Authority	On-going	Rs 10-15m	Establishing core regulatory capacities and functions as prioritised by Prime Minister and Government	Ministry of Energy and Public Utilities
3	Renewable Energy Plan	Short	Rs 4.5 - 6.5m	Implementation of the Renewable Energy Plan	Ministry of Energy and Public Utilities
4	Renewable Energy Deployment Plan	Short	Rs 5 Billion*	Publication	Ministry of Energy and Public Utilities
5	29.4 MW Plaine Sophie Wind Farm (PPP Project)	Short	Rs 75m/year subsidy	Operational	Ministry of Energy and Public Utilities
6	9 MW Wind Farm at Plaine des Roches (PPP Project)	Short	Rs 32m/year subsidy	Operational	Ministry of Energy and Public Utilities
7	Several solar PV farms (PPP Projects)	Short	Rs 49m/year subsidy	Operational	Ministry of Energy and Public Utilities
8	2 mini-hydro Plants by CEB (La Nicoliere and Midlands)	Commissioning stage	Midlands benefitted from a financial support of Rs 30m from MID Fund	Operational	Ministry of Energy and Public Utilities
9	Small Scale Decentralized Generation (SSDG), 3MW - Rs 48m annually being limited to 3MW SSDG project on LV 240/415V grid (CEB) - PPP Project	Short	Rs 48m/year subsidy	Operational	Ministry of Energy and Public Utilities
10	Landfill Gas to Energy (3MW) - PPP Project	Short	Rs 20m/year subsidy over 5 years	Operational	Ministry of Energy and Public Utilities
11	Solar PV projects in 10 schools	Short	Rs 7m	Operational and feeding into grid	Ministry of Education and Human Resources
12	Pre-feasibility study on geothermal power in Mauritius	Short	Rs 20m	Report delivered with recommendations	Ministry of Energy and Public Utilities
13	Energy Auditors – Accreditation and Certification	Short	Rs 11m	Fully qualified auditors and undertaking audits	Ministry of Energy and Public Utilities Ministry of Industry, Commerce and Consumer Protection
<b>B. Environment</b>					
1	Creation and embellishment of green spaces	Short	Rs 75m	Number of green spaces created and	Ministry of Environment and

				embellished	Sustainable Development
2	Home composting scheme	Short	Rs 30m	Tonnes of green wastes diverted from landfill.	Ministry of Environment and Sustainable Development
3	Market composting scheme	Short	Rs 10m	Tonnes of green wastes diverted from landfill.	Ministry of Local Government and Outer Islands
4	Selection of appropriate waste treatment and disposal technologies	Short	Rs 20m	New technologies identified	Ministry of Local Government and Outer Islands
5	Preparation and implementation of Action Area Plans	Medium	Rs 500m (1 Area Plan for 3 years)	Action Area Plan implemented	Ministry of Housing and Land Local Authorities Ministry of Public Infrastructure, NDU, Land Transport and Shipping Ministry of Energy and Public Utilities
6	Creation of 42 ha of Conservation Management Areas at Plaine Raoul in the Black River Gorges National Park	Short	Rs 5.5m	Ecological status of the forest	National Parks and Conservation Service
7	Creation of 5 ha of Conservation Management Areas on Gunner's Quoin Islet	Short	Rs 4.8m	Ecological status of the forest	National Parks and Conservation Service

### **Mitigation Measures in Energy Industry**

A more detailed analysis of mitigation technologies in the energy sector has recently been conducted under the Technology Need Assessment (TNA) Project for Mauritius. The TNA project study reported that since the inception of the Maurice Ile Durable (MID) project, transforming the power sector towards renewable energies and energy efficiency has featured prominently in national debates and has been high on the political agenda. Consequently, it is investment in these two energy sub-sectors where the TNA project saw its biggest catalyst role, and in which the best return on investment can be expected in a relatively short time (i.e.; within 5 years).

The study re-affirmed that the burning of fossil fuels by the Energy Industry for electricity generation accounts for around 60% of national CO<sub>2</sub> emissions (Table 2).

**Table 2.** Sectoral CO<sub>2</sub> emissions from fuel combustion activities, Republic of Mauritius, 2008-2010.

Sector	2008		2009		2010	
	Quantity (1000 t)	%	Quantity (1000 t)	%	Quantity (1000 t)	%
Energy industries (electricity)	2,032.0	58.3	1,997.0	59.3	2,158.3	60.3
Manufacturing industries	456.0	13.1	351.6	10.4	360.4	10.1
Transport	813.0	23.3	844.8	25.1	887.0	24.8
Residential	131.0	3.8	122.8	3.6	135.6	3.8
Other (incl. Agriculture and Trade)	53.8	1.5	49.1	1.5	39.7	1.1
<b>Total</b>	<b>3485.8</b>	<b>100.0</b>	<b>3,365.3</b>	<b>100.0</b>	<b>3,581.0</b>	<b>100.0</b>

Source: CSO, Environment Statistics – 2010 (with corrections made to sectoral % emissions for 2008 and 2009 by the author).

Electricity generation has grown by 4-5% annually over the past decade reaching 2,687.7 GWh in 2010. Thermal energy currently generates 96.2% of this electricity and primary sources like hydro and wind the remaining 3.8%. Bagasse accounted for 21.3% of all thermal generation (and for 20.5% of total electricity generation). Fossil fuels, such as coal (38.7%), and diesel & heavy fuel oil (36.3%), accounted for 75% of electricity generation. The combination of hydro and bagasse meant that the share of renewable energy was 24.3%.

Three activities – domestic, commercial and industrial –account for over 98% of electricity use, and each activity uses approximately one third of the total electricity consumption. Thus, the TNA project also conducted an electricity end use analysis to identify mitigation technologies for demand-side management for the three end use sectors.

Based on the listing provided by the TNA Handbook, almost 60 technologies were assessed and prioritized vis-à-vis the need for and appropriateness of the technologies in the country. *Utility scale wind energy* was assessed as the top priority by the study. The TNA project went further to formulate a *Technology Action Plan (TAP)* for utility-scale wind energy. The action plan considered the cumulative installation of wind energy capacity to 2025, a programmatic approach for scaling-up emission reductions. The TNA study states that this aligned towards the development of sectoral Nationally Appropriate Mitigation Actions (NAMAs) for Mauritius.

### **Nationally Appropriate Mitigation Actions (NAMAs)**

The concept of Nationally Appropriate Mitigation Actions or NAMAs was introduced in the Bali Action Plan in 2007. The parties to the UNFCCC called for “*Enhanced national/international action on mitigation of climate change*” including “*Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner*”. In the Cancun Agreements reached on December 11, 2010, the Parties went to differentiate between NAMAs that are *domestically supported* and *internationally supported*, specifying that both are subject to being *measured, reported and verified* domestically but that the latter, will be subject to international measurement, reporting and verification (MRV). The political framework for NAMAs is still under development, but it is clear that NAMAs will become a core element of the future international climate policy regime.

In 2010, the parties to the UNFCCC agreed that developing countries can apply NAMAs to reach a deviation from business-as-usual emissions in 2020. Since then numerous countries have submitted NAMAs concepts to the UNFCCC and several more detailed NAMA proposals are under development, i.e.; the compilation of information on nationally appropriate mitigation actions to be implemented by Parties not included in Annex I to the Convention. These NAMAs address transport, energy, waste, industry, buildings and agriculture and cover a variety of actions that range from sketching low carbon strategies to plans for introducing certain policies and regulations to setting up specific projects.

### **Building Capacity for NAMA Formulation and Implementation**

Mauritius is one of the NAI Countries keenly interested, not only to compile information on NAMAs, but also formulate and implement NAMAs, particularly internationally supported NAMAs. Though the country’s absolute emissions are insignificantly small as compared to global emissions of GHGs, the per capita emissions are significantly high. Mauritius was one of the front countries to ratify the Kyoto Protocol, but it does not have national strategies to guide medium-to-long term mitigation actions to tackle climate change.

At COP 17, in Durban, the Parties recognized “the need for support for enabling activities to assist developing country Parties in the identification and preparation of nationally appropriate mitigation

actions for submission to the registry, and support for their implementation”. Mauritius is seeking the support of UNEP and funding resources from GEF for the establishment of a national NAMA Registry and the implementation of pilot NAMAs with MRV systems.

### **A.1.3. Proposed Alternative Scenario - Project Components and Expected Outcomes**

Through this GEF project, national capacities in identifying, formulating, and prioritizing NAMAs, particularly those found among the MID energy and environment strategies, projects and actions; will be established. In the process of prioritizing the NAMAs, the development and establishment of a national NAMA registry will be initiated. A monitoring, review and validation system (MRV) will be then be developed, starting with the NAMA that will be piloted for implementation under this GEF proposed project. The pilot NAMA project will be on utility-scale wind energy.

**PROJECT OBJECTIVE** – To help ensure a low carbon path for the Mauritius, by establishing the national capacity for formulating and seeking support for NAMAs, particularly those found in “MID”, and further, develop the local capability to design and implement NAMAs in the energy sector.

#### **COMPONENT 1: Building national capacity for cross-sectoral engagement in the formulation and implementation of NAMAs**

**Activity 1.1: Establishing institutional mechanisms for cross-sectoral engagement** - Consensus among policy makers and other stakeholders on lower carbon development path needs to be developed, and this has to be identified as a priority activity against other development strategy process. Low carbon strategy elements need to be mainstreamed into national development planning strategy, roadmap or other relevant framework. As such, national development goals will be met following a low carbon development pathway.

Technical and strategic capacity of government ministries along with other stakeholders for dialogue and thinking on low carbon policies and mitigation strategies across sectors and beyond traditional boundaries need to be built-up. Broad range of stakeholders, beyond the officially responsible ministries, like local government, community organizations, and the private sector will have to be included. An integrated view of low carbon growth opportunities and priorities across the economy is developed by building on existing expertise and knowledge of individual sectors.

The institutional process established for the MID provides an excellent starting point for this process. Under this proposed GEF project, the multi-sectoral “Commission on MID”, which operates under the aegis of the Prime Minister’s Office, will be strengthened to establish its capacity to adopt a “low carbon development path lens”, that will allow the commission to identify and highlight the GHG mitigation potentials and opportunities in the MID. This will explicitly recognize, document and promote the low carbon development strategies of the MID.

The “Commission on MID” will continue to interact with implementing ministries, including the *finance ministry*, for budget consultations to ensure that these low carbon development strategies have their financial resources. MOESD will be tasked and given convening power to lead the “NAMA process” in the MID.

**Activity 1.2: Establishment of National GHG Emission BAU Reference Baseline** – GHG inventories for will be established for sectors where potential NAMAs are identified. This activity will built on the current work being undertaken for the preparation of Mauritius Third National Communications (TNC), which is also being supported by UNEP. The preparation of the TNC includes a GHG inventory system. This GHG inventory system will also be integrated into this project; incorporating the said system into the National NAMA Registry.

**Activity 1.3: Identification and Analysis of Potential NAMA projects** – Some MID projects and activities that can be considered as potential NAMAs have already been identified (Table 1). These will be

further analysed for their mitigation potential. The required project documentations will then be prepared for their submission and inclusion in the *National NAMA Registry*, which will be set up under this project (see Activity 1.5). This activity will be done with the guidance of UNEP, using the approaches and methods developed by UNEP-RISOE.

Activity 1.4: Formulation of Programmatic Approach to Sectoral NAMAs – The 2010 SNC Report has conducted studies of the mitigation potential in the different GHG-emitting sectors of the economy. The results of that study are shown in the Table 3 below; with the sectors ranked according to the potential for GHG emission reduction in the sector. Note that there are specific projects and activities found in the MID that are elements of this sector-by-sector approach to mitigation. The 2010 SNC studies will be reviewed and updated, and a programmatic approach will be developed for selected sectoral/sub-sectoral NAMAs. The programmatic approach will be patterned after the Technology Action Plans (TAP) done under the TNA project. Note that such TAP has already been done for utility-scale wind energy. However, additional elements, such as detailed assessment of impacts on GHG emissions and a proposed MRV system (to be done under Components 3 & 4), need to be incorporated in order for the programmatic approach to be included in the National NAMA registry (see next activity). The sectors/ sub-sectors to be selected are those for which there already projects and activities found in the MID. LULUCF is the first to be selected as it has projects already lined up, government funding has been earmarked and mitigation involves both reducing and sequestering CO<sub>2</sub>. The selection of additional sectors/sub-sectors will be done during the PPG phase.

<b>Table 3: Projected GHG Emission Reductions – Mitigation by Sectors (Source: 2010 SNC)</b>		
<b>Target Sector &amp; Sub-sector Mitigation Measures</b>	<b>Total Projected GHG emissions reduction (Gg CO<sub>2</sub>)</b>	
	2010 to 2020	2010 to 2020
<b>Energy Generation</b>		
a) Utility-Scale Wind Energy	221.00	415.00
b) Geothermal	-	282.00
c) Solar	18.00	172.00
d) Waste to Energy	118.00	153.00
d) Transmission Lines	22.00	33.00
<b>TOTAL</b>	<b>357.00</b>	<b>1,022.00</b>
<b>Solid Waste Disposal</b>		
a) Recycling	41.70	96.40
b) Composting	211.30	213.30
d) Incineration	580.00	581.70
e) LFG to Energy	383.40	417.00
<b>TOTAL</b>	<b>621.90</b>	<b>615.80</b>
<b>Transport</b>	<b>252.00</b>	<b>400.00</b>
a) Fuel Switching	3.00	9.00
b) Increase vehicle load factor	2.00	28.00
c) Improve inspection & maintenance	51.00	65.00
d) Improve technical efficiency	59.00	76.00
e) Improve system efficiency	137.00	222.00
<b>TOTAL</b>	<b>252.00</b>	<b>400.00</b>
<b>Wastewater Handling</b>		
a) Extension of Sewerage Network	79.00	113.00
b) Anaerobic treatment of Sugar Industry Waste	245.00	234.00
<b>TOTAL</b>	<b>324.00</b>	<b>347.00</b>
<b>Net LULUCF</b>		
a) Cropland to Forests	15.00	43.00
b) Afforestation/reforestation	63.00	89.00
<b>TOTAL</b>	<b>78.00</b>	<b>132.00</b>

Activity 1.5: Establishing the National NAMA Registry - This will be done with the guidance of UNEP,

and will be based on the approach being developed by UNEP-RISO. This will mirror the International NAMA registry under the UNFCCC. The operation of the National NAMA Registry will be under the MOESD.

In Cancun, it was decided to set up a registry to record Nationally Appropriate Mitigation Actions seeking international support and to facilitate matching of finance, technology and capacity-building support for these actions. Further, it was decided to establish a separate section of the registry to recognize unilateral NAMAs of developing countries. The structure of the registry is not established, but it seems likely that it will be a web based platform to display the actions and support available and at the same time facilitate matching of support to action. Though the details of information to be reported and reflected in the Registry are yet to be finalized, the Cancun agreements call upon countries to submit “information on Nationally Appropriate Mitigation Actions for which they are seeking support, along with estimated costs and emission reductions, and the anticipated time frame for implementation [UNEP-RISO NAMA Primer].

Activity 1.6: Categorizing NAMAs - The establishment of the National NAMA Registry will also involve adopting approach and methods for categorization of NAMAs. This activity will be guided by UNEP and its Collaborating Centers.

From submissions made by Parties to the UNFCCC, it is evident that NAMAs will be a common terminology for a large variety of different action types. Significant attempts to structure and define NAMAs according to different criteria and principles have been made by a sizeable number of stakeholders in the UNFCCC negotiation process. The negotiations, however, are still proceeding to produce a final definition and modus operandi for NAMAs. Currently, negotiation texts differentiate only between supported and unilateral NAMAs for developing countries. Two broad categories emerging from national pilot efforts are “policy” NAMAs and “project” NAMAs. This categorization is not meant to be exclusive, but simply reflects actions indicated through national submissions. However, there seems to be an emerging analytical consensus defining three types of NAMAs [UNEP-RISO Primer on NAMA]:

- Unilateral NAMAs (domestically funded and unilaterally implemented)
- Supported NAMAs (implemented with financial, technological and/or capacity building support from developed countries), and
- Credited NAMAs (generating revenues from carbon offsets relative to the amount of emissions reduced). Credited NAMAs have not been formally agreed or accepted during negotiations and considerable disagreements remain. However, especially private sector entities consider crediting and carbon markets essential for attracting private finance for NAMAs.

Activity 1.6: NAMA Prioritization – Based on a methodology and criteria for prioritizing NAMAs that will be jointly defined by all key stakeholders and with technical guidance from UNEP (supported by UNEP collaborating institutions), the potential NAMAs will be ranked. One method that will be adopted is the *marginal abatement cost curve*. The ranking will be reflected in the national NAMA registry. A key input in this process is the *Technology Needs Assessment (TNA)* Report that already includes prioritization of technology needs for mitigation in the energy sector.

Practical requirement in the prioritization is the ability of countries to get stakeholder buy-in, finance (particularly for supported NAMAs) and implement NAMAs. Note that the MID actions and projects shown on Table 1, which can form as the initial list of NAMAs, have already the *buy-in of all involved stakeholders*. For NAMA implementation, prioritization may consider the following questions:

- How would the initiative be implemented?
- Who would be responsible and who would be targeted?
- When would a timely action have to be launched?

Expected Outcomes:

- *A multi-sectoral institutional mechanism that facilitates an integrated view & approach towards formulating a low carbon development pathway.*
- *Capacity for managing a National GHG emission data base established*

- Capacity for analyzing, formulating and preparing NAMA projects developed
- Capacity for formulating programmatic approach to sectoral NAMA built-up
- Operation of National NAMA Registry initiated
- Capacity for assessing and categorizing NAMAs built up
- National capacity for prioritizing NAMAs developed

Among the *Key Outputs* under Component 1 are the following:

- A marginal abatement cost curve for “NAMAs in the MID” developed, published and integrated in the MID
- National reference GHG emission baseline established by sectors
- A national voluntary emission reduction targets formulated and validated; and integrated in the MID
- A National NAMA Registry (the MRV system will be completed under Component 4)
- A national NAMA list for submission to the “International Registry”
- Partners for “Supported NAMAs” identified

### **COMPONENT 2: Design & Implementation of pilot NAMA in the Energy Sector**

Activity 2.1. Design of Pilot NAMA project - This will focus on utility-scale wind energy for which a *technology action plan* (TAP) was developed under the TNA project. The TNA Project considered a cumulative installation of wind energy capacity to 2025; a programmatic approach for scaling-up emission reductions (see Table 4).

The pilot NAMA project will involve the two wind energy projects that are targeted to start operation during the implementation of the GEF project. These are the 29.4 MW Plaine Sophie Wind Farm Project with investment cost estimated at \$73M, and the Plaines the 9.35MW Plaine des Roches Wind Farm Project with investment cost estimated at \$ 23M. The feasibility studies for the project have been completed and the potential investors identified. These wind farm projects will be submitted and will constitute the first list of projects in the National NAMA Registry, and subsequently, submitted to the International NAMA Registry, as “supported NAMAs”.

<b>Table 4: Utility Scale Wind Energy Program – 2015-2025 (Source: CEB Report)</b>	
<b>Target Wind Energy Projects</b>	<b>Date of Installation</b>
Plaine Sophie Wind Farm Project - Capacity: 29.4MW - Project Cost: 2.2Billion MRU (= \$73M) - Project Investor: Consortium Suzlon Padgreen Co. Ltd.	2015
Plaines des Roches Wind Farm Project - Capacity: 9.35MW - Project Cost: 700Million MRU (= \$23M) - Project Investor: Eole Plaines Des Roches	2015
Additional wind farms (at least 20MW/every three years)	2017, 2020, 2023

Activity 2.2. Review of BAU GHG emission baseline: As reported in the SNS, the three main sources of GHG emissions within the Energy sector are Energy industries (electricity generation) followed by Transport and Manufacturing Industries & Construction. Fuel combustion in the energy sector resulted in 2 315 Gg CO<sub>2</sub>-eq of GHG emissions in the year 2000. It increased to 3 154 Gg CO<sub>2</sub>-eq in 2006. If the utility scale wind program is implemented, the TNA Project study estimated that the cumulated emission reduction from 2013 to 2025 will be 1,640,856 tCO<sub>2</sub>. Given that there are already implementation changes in the national energy strategy since the TNA study was completed, including in the utility wind scale program (the program is now targeted to start in 2015), these baseline and alternative scenarios for GHG emission reduction in the energy sector will be reviewed and updated.

Activity 2.3. In-Depth Barrier Analysis - The TNA project has already completed the barrier analysis for

utility scale wind energy (a summary is given below). A review and revalidation of this analysis will be undertaken by the GEF Project:

- *Technical* - The main technical issue related to applicability of wind technology in Mauritius is its suitability to operate in cyclonic conditions, when wind gusts exceeding 250 km/hr can be experienced. This is a serious issue since wind energy demonstration projects in the 1980s were damaged by cyclones. Hence, turbines with wind Class II ratings would be needed for weather conditions of Mauritius. One example is the newly designed 1 MW GEV HP wind turbine by Vergnet that is proposed to be installed in Mauritius at Plaine des Roches that can withstand Category 5 hurricanes (i.e. wind speeds up to 300 km/hr). Suzlon's Class IIa S95- 2.1MW generator is also expected to be used at Plaine Sophie. The 2-blade rotor is designed such that it can be lowered with minimum effort during cyclones.
- *Economic and financial* - Investing in utility-scale wind energy is capital intensive and an investor's perspective is rather on ROI (defined in IRR terms) that is intricately linked with the issue of differential tariff that would be proposed to prospective investors for the sale of electricity to the CEB. The needs for financial instruments to address barriers and reduce investment risks are already recognized by policy makers, but they will still need to be developed and legally established.
- *Regulatory framework* - Currently, Mauritius lacks a strong, independent regulator. The Utility Regulatory Authority Act 2004 (No. 42 of 2004) provides for the establishment and management of a Utility Regulatory Authority (URA) that would act as an independent regulator. Despite the presence of supportive legal and policy frameworks, the URA is yet to be set up.
- *Wind energy resources assessment* - The lack of a wind energy resources atlas has two consequences (1) potential investors do not have a good understanding of practical wind-energy development in Mauritius; and (2) it makes it difficult to set up a dynamic FiT for wind energy for Mauritius.
- *Human and institutional capacity* –Mauritius has no human and institutional capacity for a utility scale wind energy program. The use of the PPP modality for developing wind farms in Mauritius is a useful one to overcome shortcomings in human and institutional capacity. Operational barriers are not expected to pose a problem for the diffusion of utility-scale wind energy with the proposed increase in base load power generation, and as long as grid stability is closely monitored with the increasing penetration of wind energy.

Activity 2.4. Barrier Removal - The TAP study identified the actions needed to remove the barriers for the implementation of a utility-scale wind energy program, paving the way for investments in the technology. These actions are summarized below. The GEF project will formulate a comprehensive work plan for barrier removal starting from these recommendations:

- *Establish financial incentive in the form of FiT.* The updated Energy Strategy Action Plan 2011-2025 proposes two supporting initiatives, namely: (i) the setting of cost-reflective electricity tariffs and financial support schemes for renewables over the 2012-2013 timeframe, and (ii) introducing preferential FiTs for electricity generation from renewable energy sources for plants above 50 kW. Lessons learned from the FiT scheme for SSDGs (Small-Scale Distributed Generations) can be used to design a FiT for utility-scale wind energy.
- *Set up the Utility Regulatory Agency (URA)* as an independent energy regulator; fully functional and capacitated to fulfil its mandate. The regulatory framework for setting up the URA has been in place for several years. However, the setting up needs a political process, and will need to address in particular development of needed policies, regulations and incentive mechanisms.
- *Establish a wind energy resources atlas* that will provide the multiple benefits of: (i) providing visibility to potential investors; (ii) forming the basis for establishing a dynamic FiT scheme; and (iii) allow the determination of the threshold wind energy potential needed for the technology to be financially viable.

- *Promote investments.* BOI must be fully capacitated to market investment in wind energy in Mauritius, working in close collaboration with the key stakeholders. Since the technology would be transferred from overseas, there would be the requirement for business facilitation. The BOI, as per its mandate, is identified as the first point of contact for potential investors that can provide this business and extension service. BOI is tasked in marketing Mauritius as a destination for foreign investment. This should include investments in wind farm projects.
- *Provide market information.* This is required in order to lower the transaction costs of wind energy developers to a minimum. The type of information that would be required are: (1) wind energy resources potential in Mauritius; a wind atlas that would allow identification of most promising sites for wind energy development and allow potential project developers to develop their financial model based on practicable wind electricity generation capacity. This service should be provided by the Ministry of Energy and Public Utilities, together with the Mauritius Research Council (MRC) and the University of Mauritius (UoM).
- *Public awareness and information.* This will be targeted to general public, particularly local communities for enhancing the social acceptability of this new technology. Such awareness would be crucial at the stage of public consultations that are mandatory during the process of obtaining an EIA.
- *Training and capacity building.* This will be targeted mainly to provide skilled technicians for the maintenance of wind technology. The banking sector is well-developed in Mauritius, and commercial banks are expected to provide financial and banking services, but they need to be oriented to wind energy.

Activity 2.5. Implementation of pilot Energy NAMA project - The work plan for barrier removal will be formulated on the basis that the utility-scale wind energy program has started. This means that the investments for the first two wind farm projects have been facilitated and the wind farms are operational, at the latest the last year (i.e. fourth year) of this GEF project (refer to Table 3 again). During this time, utility-scale wind energy should already be contributing to the reduction of GHG emissions, and these have to be monitored, reported and validated (see Component 4).

Activity 2.6. Formulation of Programmatic NAMA for the Energy Sector – Based on the results of the pilot NAMA project, supported NAMAs based on the programmatic approach for utility-scale wind energy will be formulated and submitted to the International NAMA Registry, primarily to obtain external support. This should then pave the way for additional wind farm investments as targeted under the National Energy Strategy.

*Expected Outcomes:*

- *Capabilities for formulating wind energy NAMAs established.*
- *Capacity for financing feasible NAMAs developed.*
- *Capability for mobilizing technical assistance and financing for supported NAMA demonstrated.*
- *Sectoral capacities for implementing NAMA built-up*
- *Capability for formulating programmatic utility-scale wind energy NAMA and obtaining international support for it developed from experiences/ lessons from the pilot NAMA*
- *Enabling framework for utility-scale wind energy established including supportive policy and legislative environment and financial incentives*

### **COMPONENT 3: Establishment of MRV system and national registry for NAMAs**

For national approval, countries will have to develop in-country institutional arrangements for considering and proposing NAMAs to the UNFCCC and to manage the NAMA Cycle at the national level, including designating a national focal point in communicating with UNFCCC. For Mauritius, this will be achieved under the Commission of MID, with MOESD as the lead agency. This is the target of Component 1. Component 1 will also initiate the establishment of a national NAMA Registry, but the

completion of the establishment and the operation of the registry, will be undertaken under Component 4.

Activity 3.1. Formulation & Establishment of MRV System - Measurement, Reporting and Verification or “MRV” (national and/or international) mechanism serves the purpose of assessing results of actions, and where relevant, report to the international level, probably linked to NAMA registry. Mitigation actions by developing countries shall be communicated every two years via BURS to the NATCOMS. MRV of unilateral NAMAs will be conducted domestically in accordance with general guidelines to be developed under UNFCCC. Supported NAMAs will be monitored, reported and verified domestically according to guidelines developed by COP and will be subject to international verification. [UNEP-RISO NAMA Primer]

The establishment and implementation of the MRV systems for Mauritius will have the following considerations and elements:

- MRV system incorporated in the national registry mechanism
- institutional and organizational linkages for MRV established
- MRV technical committees specific to the two pilot sectors, energy & LULUCF, constituted
- key parameters to be monitored for the selected NAMAs selected
- monitoring plan designed & implemented for the elected NAMAs
- National MRV guidelines & standard methodologies for selected sectors developed
- MRV system for selected pilot NAMAs designed & implemented
- Local technical professionals are fully capable and qualified to conduct MRV

Note that monitoring and evaluation is also part of the MID process. As stated in the MID document, the most valuable input to the development of policy, strategy and action is the information that guides it. Information is the principal tool for understanding how effective a policy process has been in contributing to the Government objectives and in turn the development of Mauritius. To deliver a comprehensive policy, strategy and action plan, consideration must be given to its implementation and the monitoring of the policy success. The MRV will take into consideration the M&E process used by the MID.

Activity 3.2. Establishment of Sectoral MRV Expert Teams – For each of the two pilot NAMA projects, an expert team will be established to develop and implement the MRV system. This will be guided by UNEP, together with the Collaborating Centres.

Activity 3.3. Reporting Mechanism to the International NAMA Registry- With the operation of the MRV system, the country’s national NAMA Registry should be fully functional. The final step is establishing reporting mechanism to the International NAMA Registry.

Expected Outcomes

- *Capacity for monitoring, reporting and validating (MRV) NAMAs, and the operation and maintenance of Mauritius NAMA National Registry, developed and established*
- *Capacity for reporting to the International NAMA Registry established*

**A.1.4 Incremental Cost Reasoning & Expected Contribution (Baseline, GEFTF and Co-Financing)**

At COP 17, in Durban, the Parties recognized “the need for support for enabling activities to assist developing country Parties in the identification and preparation of nationally appropriate mitigation actions for submission to the registry, and support for their implementation”. (Report of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention - Draft decision [-/CP.17]) In this line the Government of Mauritius is requesting support for the definition, design, and implementation of NAMAs in the energy generation and end-use sector with the objective of achieving the country’s GHG emission reduction voluntary target.

This GEF project will strengthen the capacity of the government to identify and structure NAMAs, primarily in the energy sector, as well as to conduct the upstream studies and actions necessary to

refine and reach its voluntary mitigation target in all GHG emitting sectors.

As described in the previous section, the Republic of Mauritius has adopted as the country's long term sustainable development strategy, the MAURICE ILE DURABLE (MID). The MID vision is for Mauritius to become a model of sustainable development. MID aims to facilitate economic growth that respects the limitations of natural resources; a growth that is delivered by an empowered population, able to grasp the new opportunities of a green economy; and also one that distributes wealth equitably.

However, there is a need to expand and integrate in these efforts, under a structure that focuses in integrating LDCS into national long term economic plans and strategies and highlighting its importance and prioritization. And from here, NAMAs are identified and formulated, and the enabling environment for their implementation set-up and institutionalized.

The project is structured into three components, which are the necessary steps to refine Mauritius voluntary mitigation targets and trigger an enabling framework for the identification and implementation of NAMAs in the country. The GEF project is designed specifically with the objective of leading the NAMA development and implementation process within the MID strategy. The project defines a framework to formulate NAMAs which integrates all on-going activities so that they contribute efficiently towards this objective.

The GEF project will then carry out the additional activities within this framework necessary to the establishment of the NAMAs. The GEF project will pilot the implementation of a NAMA project in the energy sector that has already been targeted under the country's long-term development strategy (i.e.; MID), which has also been identified as priority in the recently finished TNA Project.

Investments for energy projects/programs have been planned and are now being solicited. Preliminary estimates of their potential contribution to the GHG emissions reduction have been done. For the wind farm projects that will be targeted as pilot NAMAs, investments will be from Public-Private Partnership (PPP) arrangements. Thus, this is where the bulk of co-financing will come from for this GEF project. The wind farm projects have not been explicitly defined yet as NAMAs. The process of doing that and also, the building of local capacity for designing these projects to be the NAMA projects; and having these projects recognized as NAMAs (by having them accepted and registered in the international registry) will be funded by the GEFTF. The GEF financing will be used for the needed capacity development and institution building to make these pilot energy projects, including the programmatic sectoral NAMAs formulated under Component 1, officially recognized as Mauritius' NAMAs.

#### A.1.5. Global Environmental Benefits

The development of Nationally Appropriate Mitigation Actions consists of the identification and implementation of suitable national mitigation options that foster the MID Policies, Strategies and Actions – Mauritius long term sustainable development strategy. As such, the project is embedded in a context in which the delivery of national socioeconomic benefits will be equally important to the country's contribution to GHG Emission Reductions. The voluntary nature of NAMA development and implementation ensures that the Government will seek to implement mitigation measures that have a clear positive impact on the national economy and are fully aligned with national sustainable development goals. The identification of cost effective mitigation measures, and their implementation as NAMAs will provide a clear demonstration of effective mechanisms to integrate national sustainable development and greenhouse gas mitigation goals.

Table 2 above shows the mitigation measures identified in the SNC study and their potential contribution to GHG emission reduction; a total estimate of 2, 516.80 Gg CO<sub>2</sub> for a twenty-year period (base year of 2010). This is currently being updated as part of the preparation of the Mauritius TNC. However, as described in Component 1, more detailed studies will be conducted for selected sector/sub-sectoral mitigation measures to transform them into NAMAs, thereby ascertaining and

making timelier the estimates of their contribution to global GHG emission reduction; as was done for wind energy under the TNA project.

Based on the 2012 study done under the TNA project, a 10-year programmatic approach on utility-scale wind energy, (that will be initiated by the pilot NAMA projects to be implemented under this project), is expected to have a total cumulative reduction of 1,640,856 tCO<sub>2</sub> by 2025. These estimates will be validated/updated during the project formulation stage. Computations will also be done to estimate the portion of the total GHG emission reductions that can be directly attributable to the pilot NAMA projects implemented under this GEF project. With the completion of this GEF Project, all these mitigation measures shall become officially recognized Mauritius NAMAs, included in the international NAMA registry, and concretely contributing, on behalf of Mauritius, to the global GHG emission reduction efforts.

Furthermore, this project will form part of the ongoing process of defining a Green Economy, which is also a major component of the MID. The green economy is an opportunity for the Republic of Mauritius to leapfrog in its sustainable development pathway. At national level, there is strong political will and commitment to advance the country on the path of inclusive and green growth. In fact, since 2008, annual budget exercises coupled with firm public policy decisions have provided the impetus for actively realising sustainability goals and the transition towards a green economy. These include among others: integrated policy and planning, sustainable consumption and production practices, the imposition of green taxes and levies, energy efficiency and renewable energy programmes, poverty alleviation, social development projects and the setting up of the 'Maurice Ile Durable' Fund to finance sustainable development projects. The NAMAs can then become one of the strong features for implementing and realizing the Green Economy.

#### A.1.6. Innovativeness, Sustainability And Potential Scaling-Up

Climate mitigation measures have already been a part of Mauritius development strategies and programs, most notably in the energy sector. There have also been initiatives in transportation and LULUCF areas. There are already a number of renewable energy and energy efficiency actions in the energy sector. There are also initiatives to improve transport efficiency, and carbon sequestration under LULUCF.

What will be innovative in this project is establishing a national framework that will integrate these measures into an overall national plan, which will then be further integrated and made more supportive of the overall national sustainable development strategy. This will assure that Mauritius national sustainable development strategy follows a low carbon pathway, which can be a model for other small island development states (SIDS).

But what will really be most innovative in this project, and one that will help assure sustainability, provision of feedback, and bases for scaling-up is the development and establishment of an MRV process. Successful NAMAs will be identified and the bases and factors for success analysed, from which scaling-up strategies and programs can be formulated. Even if there will be unsuccessful actions, MRV can be used to gather valuable lessons to help developed follow-up improved and better actions.

The first major output of this enabling project is a National NAMA Registry, and the second major output is the initiation of two pilot *supported NAMAs with MRV systems*. It is expected that towards the end the project, that there will be more NAMAs initiated, and thus, Mauritius NAMA implementation, particularly supported NAMAs, will be expanded and scaled-up.

A.2. Stakeholders. Identify key stakeholders (including civil society organizations, indigenous people, gender groups, and others as relevant) and describe how they will be engaged in project preparation:

The lead agency for this project is the Ministry of Environment and Social Development or MOESD. The Ministry has the Climate Change Division responsible for enabling activities related to the compliance with the reporting requirements of the UNFCCC, such as NATCOMs, BURs and now NAMAs. Key stakeholders coming from the government sector are the following:

- Economic/environmental policy and planning: Commission on MID
- Budget & finance: Ministry of Finance & Economic Development
- Energy: Ministry of Energy & Public Utilities (Renewable Energy Division); Central Electricity Board, Energy Efficiency Management Office
- Transport: Ministry Public Infrastructure, Land Transport and Shipping
- Academe & S&T: Ministry of Industry, Science and Research
- Waste: Wastewater Management Authority
- Agriculture: Ministry of Agro-Industry and Fisheries (AREU); Forestry Services; Mauritius Sugar Authority
- Governance: Ministry of Local Government, Outer Islands and Rodrigues

Non-governmental stakeholders include representatives from: Industries & Enterprises (i.e.; Omnicane); NGOs & communities (i.e.; MACOSS); and technology products/services providers  
International organizations include primary UNEP and other international donors/partners

UNEP-RISO, at the request of the government, stands ready to support their capacity in drafting the NAMA. RISO has a growing body of experience in drafting NAMA's and can bring this experience to bear in Mauritius.

A.3 Risk. Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable):

<b>Risks</b>	<b>Rating</b>	<b>Mitigation Measures</b>
Continued strong political support	low	The National NAMA plan will be integrated in both the MID and relevant sectoral policies and strategies.
NAMAs not accepted by target sectors	low	Effective stakeholder involvement will be assured starting in the project formulation stage.
Availability of investments and funding for NAMAs	Medium	Respective ministries and agencies responsible of projects and investment activities which can be classified as NAMAs will propose inclusions of such projects and activities in either their budget allocations or investment plans or both.
Support from International Donors	low	Country-driven and well-prepared proposals are submitted for external support. A good knowledge and understanding of the criteria used for external support is developed by the study team.
Climate Change risks (extreme weather events)	medium	Adaptation elements should be integrated in formulating/ designing the NAMAs
Supply of technology services (including expertise) and product are not adequately available locally.	medium	Local capacity building, complemented by identification of foreign expertise needed should be incorporated in the formulation of NAMA strategies. Market chains and linkages for mitigation technology products should be incorporated in the NAMA strategies.

Adequate local capacity	medium	Local capacity building, including training, even potential for measures for local production should be incorporated in NAMA strategies.
<b>The following are additional risks identified in the TNA Study for Wind Energy</b>		
<b>Regulatory risk:</b> The setting up of the URA may be further delayed that would slow down the penetration of wind energy due to lack of transparency in the setting of electricity tariffs and contract negotiations;	Low	Effective stakeholders' consultation should be assured by the energy ministry and the prime minister's office. As this will be facilitated within the MID process, such should be guaranteed.
<b>Financial risk:</b> The FiT scheme is predicated upon the availability of substantial amount of funding, and funding on a regular and timely basis. This is important in the context that guaranteed access to the grid will be granted for 15 years;	Medium	Adequate local and foreign investments are the target of this project. If the barriers to investments identified in this document are addressed successfully by the project (e.g.; strengthening capacity of BOI, better market information with complete wind resource data, URA is in-place and operational), the financial risk should be minimized.
<b>Wind potential risk:</b> There is a risk that wind energy potential assessment is not completed or delayed in its implementation that would jeopardize site selection for wind farms;	Low	This will be priority activity of the project and should be target for completion within the first one to one-a-half year period of the project
<b>Social risk:</b> Mauritius is a small island and there is a high likelihood that suitable wind farm sites may be close to communities, environmentally sensitive areas, have detrimental impacts on bird life; be seen to be aesthetically unpleasant, among others. Wide-scale communication campaigns will be necessary and communities must be engaged at the early stage of wind project development;	Low	One of the activities of the project is creating public awareness about wind farms, particularly in the local communities where the projects will be installed.
<b>Technical risk:</b> There is a low risk that the technologies adopted by promoters do not respond well in the cyclonic conditions that may prevail over Mauritius periodically; and Operational risk: The penetration of wind energy is predicated upon the increase in base load power production in the network. The targets set for the penetration of wind energy to 2025 is therefore dependent upon the timely commissioning of other power generation units detailed in the Long-Term Energy Strategy 2009-2025.	Low	This is already being addressed in the on-going design and equipment selection process of the wind farm projects.

#### A.4. Coordination. Outline the coordination with other relevant GEF financed and other initiatives:

The Ministry of Environment and Sustainable Development (MOESD), as the national executing agency for this project, will be coordinating and leading the execution of this project, through its Climate Change Division. The other government stakeholders, identified above (A.2) will be the executing entities.

This project will build upon the outputs of the Third National Communications (TNC) to the UNFCCC that is currently being prepared by Mauritius with the assistance of UNEP. The most relevant outputs of the TNC are the greenhouse gas inventory and its preliminary assessment of mitigation options for the country. Other relevant GEF projects that can provide inputs to this project, particularly for Component 1 are; "CCM-UNDP: Removal of Barriers to Energy

Efficiency and Energy Conservation in Buildings”; “CCM- UNDP: Removal of Barriers to Solar PV Generation”; “CCM-UNEP-Global Fuel Economy Initiative”.

**B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:**

B.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAs, NAPs, NBSAPs, national communications, TNAs, NCSAs, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.:

“Maurice II Durable” – Long-Term Sustainable Development strategy of the Republic of Mauritius. As have been discussed repeatedly in this project document, the national NAMA plan will be formulated based on the sectoral policies, strategies and action defined under the ‘MID’. As presented before, the ‘MID’ theme work areas that will be targeted for NAMAs are energy, environment and economy/employment. The national NAMA plan will be integrated into ‘MID’ Strategy, assuring that the sustainable development strategy follows a low carbon development pathway.

Technology Needs Assessment - TNA is a country driven activity to assist in identifying and analyzing the priority technology needs for mitigating and adapting to climate change. It provides an opportunity to realize the need for new techniques, equipment, knowledge and skills for mitigating greenhouse gas (GHGs) emissions and reducing vulnerability to climate change. Upon exercising the assessment, it will enable the countries to identify and determine technology priorities based on the circumstances of each countries. Activities, identified in the TNA report, could ensure the flow and delivery of simple, as well as, the most advanced technologies to promote sustainable national development, through efficient use of resources. The execution of prioritized projects needs to be carried out through well and fully defined programmes. The national NAMA plan provides such framework. The climate change mitigation technologies identified under the TNA, will be among the climate change mitigation measures to be considered and included in the NAMAs. In particular, the Technology Action Plan formulated by the TNA project for utility-scale wind energy, provide the basis for the pilot NAMA project under this proposed GEF project.

B.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities:

The project objective is to support the formulation and initial implementation of appropriate climate change mitigation actions as part of the initiatives to achieve the voluntary GHG emission reduction targets of the Republic of Mauritius. The expected outcomes from the various components of the project that will contribute to the realization of this objective are in line with the following GEF-5 climate change mitigation focal area strategic objectives:

<p><b>CCM-3: Renewable Energy:</b> Promote investment in renewable energy technologies</p>	<p>Outcome 3.1: Favorable policy and regulatory environment created for renewable energy investments</p> <p><i>Indicator 3.1: Extent to which RE policies and regulations are adopted and enforced (score of 1 to 5)</i></p> <p>Outcome 3.2: Investment in renewable energy technologies increased</p> <p><i>Indicator 3.2: Volume of investment mobilized</i></p>	<p>Output 3.1: Renewable energy policy and regulation in place</p> <p>Output 3.2: Renewable energy capacity installed</p> <p>Output 3.3: Electricity and heat produced from renewable sources</p>
--	--	---

<p><b>CCM-6: Enabling Activities:</b> Support enabling activities and capacity building under the Convention</p>	<p>Outcome 6.1: Adequate resources allocated to support enabling activities under the Convention <i>Indicator 6.1: Percentage of eligible countries receiving GEF funding</i></p> <p>Outcome 6.2: Human and institutional capacity of recipient countries strengthened <i>Indicator 6.2: Countries and institutions supported by the GEF</i></p>	<p>Output 6.1: Countries receiving GEF support for national communication, etc.</p> <p>Output 6.1: National communications, etc. completed and submitted to the UNFCCC as appropriate</p>
--	--	---

### B.3 The GEF Agency’s comparative advantage for implementing this project:

Since 2008, UNEP has identified climate change as one of six thematic priorities/focus during 2010-2013 as per decision taken by the Governing Council / Global Ministerial Environment Forum as well as the global framework agreed through the UNFCCC. So far, UNEP has been developing a strategic process to identify areas where UNEP skills and capabilities are distinctive in the area of climate change. These include (i) a broad environmental perspective that treats the range of environmental issues and development concerns in an integrated manner. (ii) a global mandate for action that allows UNEP to both work with developed and developing countries on normative frameworks and undertake projects in developing countries. (iii) scientific expertise and a science based approach that is strongly supported by a wide network of scientific institutions and UNEP collaborating centres and (iv) convening power and a proven ability to work in a multi-stakeholder manner, including with the private sector. UNEP climate change strategy is structured around four themes – mitigation, adaptation, science, and communication.

UNEP has experiences in developing NAMAs as well as supporting TNA (Technology Needs Assessments). These mitigation activities/projects and TNAs are implemented in UNEP-ROAP, as well as the UNEP RISOE Center.

The project will contribute to "Expected Accomplishment (b)" of the proposed UNEP 2014-2017 Climate Change Programme of Work; "Energy efficiency is improved and the use of renewable energy is increased in partner countries to help reduce greenhouse gas emissions and other pollutants as part of their low emission development pathways."It will also contribute to "Expected Accomplishment (c): Transformative REDD+ strategies and finance approaches are developed and implemented by developing countries that aim at reducing emissions from deforestation and forest degradation and bringing multiple benefits for biodiversity and livelihoods".

**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**

**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 [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Mr. Ali Mansoor	Financial Secretary & GEF OFP	MINISTRY OF FINANCE & ECONOMIC DEVELOPMENT	AUG 16, 2013

**B. GEF AGENCY(IES) CERTIFICATION**

<b>This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for project identification and preparation.</b>					
Agency Coordinator, Agency name	Signature	DATE (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Brenna VanDyke; Director, GEF Coordination Office		03/17/2014	Conrado S. Heruela, Task Manager	+6622881202	conrado.heruela@unep.org