



GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

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PART I: PROJECT INFORMATION

Project Title:	Realising energy savings and climate benefits of implementing mandatory energy auditing in coordination with HCFC phase-out and HFC avoidance		
Country(ies):	Mauritius	GEF Project ID: ¹	9612
GEF Agency(ies):	UNDP	GEF Agency Project ID:	5509
Other Executing Partner(s):	Energy Efficiency Management Office (EEMO)	Submission Date:	19 July 2016 12 August 2016
GEF Focal Area(s):	Climate Change	Project Duration (Months)	60
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/> Corporate Program: SGP <input type="checkbox"/>		
Name of parent program:	[if applicable]	Agency Fee (\$)	430,556

A. INDICATIVE [FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES](#)²

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
CCM-1 Program 1	GEFTF	4,532,164	17,870,000
Total Project Cost		4,532,164	17,870,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To operationalise the new national energy audit scheme of the Republic of Mauritius by addressing and removing technical, institutional and financial barriers to the adoption of energy efficiency measures and exploit synergies to reduce ODS emissions and promote HFC avoidance in the RAC sector.						
Project Components	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
1. Enhancement of the national mandatory energy audit programme	TA	Mauritius has: a) a detailed plan for the roll-out and enforcement of the Energy Efficiency (Energy Consumer and Energy Audit) Regulations 2015, b) associated achievable and measurable CO ₂ emissions reduction targets; and c) the technical and institutional capacity to implement the plan.	1.1 National roadmap for the roll-out of a mandatory energy audit scheme 1.2 Minimum energy performance standards (MEPS) for boilers and RAC systems 1.3 Market development support for specialist energy service companies (ESCOs) 1.4 Penalties and incentives for compliance with Energy Audit	GEFTF	500,000	550,000

¹ Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

² When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#).

³ Financing type can be either investment or technical assistance.

			<p>Regulations</p> <p>1.5 MRV frameworks / systems established</p> <p>1.6 Study of electricity tariffs and incentive mechanisms for energy efficiency</p>			
2. Implementation of boiler and RAC energy efficiency recommendations for large energy consumers (including implications for SMEs) and the promotion of energy efficient low-GWP technology when replacing HCFC- or HFC-based equipment	TA	<p>The Energy Efficiency (Energy Consumer and Energy Audit) Regulations 2015 are understood and accepted by firms which adopt the regulations over a period of time (roadmap), driving mutual economic and climate benefit.</p> <p>The synergies between energy auditing and HCFC phase-out are exploited to avoid the adoption of HFC alternatives in RAC systems.</p>	<p>2.1 Detailed technical and economic analyses of energy audit recommendations relating to boilers and RAC systems</p> <p>2.2 Training of national specialists in energy auditing, performance analysis and alternative technology selection (including low-GWP) for boiler and RAC systems</p>	GEFTF	800,000	150,000
2. Implementation of boiler and RAC energy efficiency recommendations for large energy consumers (including implications for SMEs) and the promotion of energy efficient low-GWP technology when replacing HCFC- or HFC-based equipment	INV	<p>The Energy Efficiency (Energy Consumer and Energy Audit) Regulations 2015 are understood and accepted by firms which adopt the regulations over a period of time (roadmap), driving mutual economic and climate benefit</p> <p>The synergies between energy auditing and HCFC phase-out are exploited to avoid the adoption of HFC alternatives in RAC systems</p>	<p>2.3 Primer projects for high-efficiency boilers</p> <p>2.4 Primer projects for high-efficiency / low-GWP RAC systems, including natural refrigerant applications</p>	GEFTF	781,533	1,300,000
3. Provision of credit line for the implementation of energy audit recommendations	TA	Barriers to the adoption of energy efficient technology and implementation of audit recommendations	<p>3.1 National credit line for eligible large energy consumers⁴</p> <p>3.2 Funding models</p>	GEFTF	1,400,000	14,650,000

⁴ Eligibility will be defined as: (i) large energy consumers that have undertaken mandatory audits; AND (ii) whose audits identify significant energy-saving opportunities relating to boilers and/or RAC systems; AND (iii) whose 'deep dive' analyses confirm the viability of implementing boiler and/or RAC system interventions; AND (iv) implementation will result in boiler and/or RAC equipment that meets at least the energy performance to be imposed by the mandatory MEPS; AND (v) the company commits to implementing an ISO 50001-based energy management system on its premises to monitor ongoing energy savings. Relevant SMEs will also be included.

		are removed and firms understand and support EE Regulations.	and assessment criteria developed for local banks to process credit requests and channel loans			
4. Implementation of energy management and MRV systems in large energy consumers and relevant SMEs	TA	The adoption of energy management and MRV systems in a number of large energy consumers provides proof-of-concept for other firms in the sector. This acts as a catalyst for the uptake of energy management systems which unlocks the potential for more energy savings and provides a self-sustaining driver for ongoing energy efficiency activity within enterprises.	<p>4.1 National certification scheme for ISO 50001 developed and implemented by Mauritius Standards Bureau</p> <p>4.2 Accreditation and capacity development programme for MAURITAS and private sector certification bodies is launched and operational (taking into account gender targets)</p> <p>4.3 Register of ISO 50001 certified firms established</p> <p>4.4 ISO 50001-based energy management systems implemented by large energy consumers</p>	GEFTF	550,000	250,000
5. Promotion of scale-up and replication of EE activity across and within sectors	TA	Smaller energy consumers are aware of the potential energy efficiency interventions applicable to them, and have access to the relevant information and analysis tools to assess benefits and implement EE interventions and adoption of low-GWP refrigerants voluntarily	<p>5.1 Case-studies of large energy consumers' interventions compiled and disseminated, with a focus on boilers and RAC systems, and low-GWP RAC systems in particular</p> <p>5.2 Awareness-raising and capacity development for smaller energy consumers to promote voluntary energy efficiency interventions</p>	GEFTF	135,333	100,000

6. Project monitoring and evaluation		Project monitoring and evaluation implemented	6.1 M&E is applied to provide feedback to the project coordination process to capitalize on project needs 6.2 Lessons learned and best practices are accumulated, summarized and replicated at the country level	GEFTF	150,000	50,000
Subtotal					4,316,866	17,050,000
Project Management Cost (PMC) ⁵					215,298	820,000
Total Project Cost					4,532,164	17,870,000

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: (N/A)

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	Amount (\$)
Recipient Government	Energy Efficiency Management Office	In-kind	200,000
Recipient Government	Ministry of Industry, Commerce & Consumer Protection	In-kind	150,000
Recipient Government	Ministry of Environment / National Ozone Unit (NOU)	Grant	300,000
CSO	Université des Mascareignes	In-kind	100,000
Private sector	Business Mauritius	Grant	820,000
Private sector	Private enterprises	Grant	830,000
Private sector	Central Electricity Board	In-kind	300,000
Donor agency	AFD	Grant	1,200,000
Donor agency	AFD	Loans	13,200,000
Donor agency	Switch Africa	Grant	250,000
GEF agency	UNDP	Grant	100,000
GEF agency	UNDP	In-kind	20,000
GEF agency	CTCN (Green Cooling Africa Initiative)	Grant	100,000
GEF agency	GIZ	Grant	300,000
Total Co-financing			17,870,000

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS ^{a)}

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) ^{b)}	Total (c)=a+b
UNDP	GEFTF	Mauritius	Climate Change	n/a	4,532,164	430,556	4,962,720
Total GEF Resources					4,532,164	430,556	4,962,720

a) Refer to the [Fee Policy for GEF Partner Agencies](#).

⁵ For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

E. PROJECT PREPARATION GRANT (PPG)⁶Is 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**

Project Preparation Grant amount requested: \$130,000					PPG Agency Fee: \$12,350		
GEF Agency	Trust Fund	Country/ Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee ⁷ (b)	Total c = a + b
UNDP	GEFTF	Mauritius	CCM		130,000	12,350	142,350
Total PPG Amount					130,000	12,350	142,350

F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁸

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO _{2e} mitigated (include both direct and indirect)	1.95 Mt CO _{2eq.}

PART II: PROJECT JUSTIFICATION

1. *Project Description.* Briefly describe: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed; 2) the baseline scenario or any associated baseline projects, 3) the proposed alternative scenario, GEF focal area strategies, 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) and/or [adaptation benefits](#) (LDCF/SCCF); and 6) innovation, sustainability and potential for scaling up.

Background

Mauritius is heavily reliant on fossil fuels to power its economy. Even relatively modest measures to reduce fossil fuel imports therefore have the potential to significantly enhance Mauritius's energy independence and reduce greenhouse gas emissions. This fact is recognised in the Government's Long-Term Energy Strategy 2009-2025, which explicitly recognises energy efficiency and energy conservation as priority strategies to deal with the country's energy and environmental challenges, particularly as the country's major source of renewable energy, bagasse (which accounts for 20% of Mauritian electricity generation and 89% of renewable electricity generation), is intrinsically unscalable due to land constraints and seasonal availability. The Strategy contains a target of improving overall energy efficiency by 6% by 2020 relative to a 2008 baseline. To do so, the Strategy envisages creating "a pool of qualified and certified energy auditors and an appropriate energy auditor certification scheme".

The Energy Efficiency Management Office (EEMO⁹) was established in 2011 with the purpose of systematising the Government's response to energy management, performing a number of tasks including: serving as the official 'energy observatory' and collating a national database on energy usage, promoting and raising awareness of energy efficiency, developing energy performance standards for buildings, appliances and

⁶ PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$50k for PF up to \$2m (for MSP); up to \$100k for PF up to \$3m; \$150k for PF up to \$6m; \$200k for PF up to \$10m; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

⁷ PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

⁸ Provide those indicator values in this table to the extent applicable to your proposed project. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and/or SCCF.

⁹ Energy Efficiency Management Office website: eemo.govmu.org

equipment, and providing support to Small and Medium-Sized Enterprises (SMEs). Currently, EEMO employs just two technical and one administrative staff members, and has limited capacity. Its existence and mandate serve as useful starting points, but additional support is needed to mainstream energy efficiency considerations into policy-making and investment decisions.

In 2012, the Ministry began implementation of a project, ‘Removal of Barriers to Energy Efficiency and Energy Conservation in Buildings’¹⁰, with funding from the Alliance of Small Island States (AOSIS) SIDS DOCK initiative (building on a GEF-financed project¹¹). Through this project, some 35 enterprises have acquired knowledge and skills in energy auditing and energy management. The enterprises have also been provided with a software tool for data analysis and energy-saving techniques, particularly relating to process heating systems, including boilers; steam systems; electric motor-driven systems including electric motors, variable speed drives and other controls; compressed air, pumps and fans; refrigeration and cooling; and industrial lighting. In addition, a Guidebook for Industrial Energy Audits and a Code of Practice in energy management have been developed.

The ‘Mapping of Energy Efficiency in Industry and Tertiary Sectors in Mauritius’ project¹², completed in 2012 and financed by Agence Française de Développement (AFD), estimated potential energy savings of approximately 14% across the 650 largest energy consumers in Mauritius, equivalent to 150 GWh per year or 40-50 MW of production capacity. Based on this mapping, a pilot project looking at energy savings potential in steam systems in 8 beneficiary companies was conducted in 2013/14 and this, in turn, led to the development of the National Energy Efficiency Programme¹³ (NEEP), a voluntary national programme aimed at conducting energy audits in 100 companies drawn from the 650 largest energy consumers. The audits are 60%-funded by the EU and AFD, and to date around 70 companies have undertaken or committed to undertake energy audits in the Programme. The first wave of initial audit reports indicates saving potentials of between 12-20% of site energy consumption.

Through the SUNREF¹⁴ programme, AFD has complemented its support to energy audits by providing local banks and private companies with concessional loans and tools for financing investments in energy efficiency. After the successful disbursement of the first SUNREF credit line of €40 million between 2009 and 2014, the programme was extended and the current phase (2014-2016) provides a €60 million credit line through partner commercial banks in the Indian Ocean region, along with a programme of technical assistance to help enterprises identify investment opportunities in energy efficiency and renewable energies and advise investors as they develop their projects. It also assists banks in marketing and communicating their financial offers to potential investors. Projects funded to date include replacing or upgrading energy-intensive equipment; cogeneration of heat and power and refrigeration; boiler replacement; and replacement of air-conditioning systems with more efficient chillers. The programme has to date provided funding for 25 projects in the energy sector, involving the deployment of 4.3 MW of renewable energy generation capacity and energy savings of 14,000 MWh per year.

Furthermore, the UNEP-funded Switch Africa Green¹⁵ project provides additional funding to incentivise the implementation of the recommendations of the audits carried out under the NEEP by paying for consultants to develop detailed Terms of Reference and technical specifications for the interventions identified in the audit reports.

The SIDS DOCK project and the NEEP have usefully built stakeholder networks and an on-the-ground understanding of manufacturing energy efficiency needs, but there remains considerable scope for reducing energy consumption and greenhouse gas emissions from the manufacturing sector, which accounts for 19% of GDP and 26% of employment. Mauritius continues to have a weak institutional framework for the promotion of energy efficiency management systems, and Mauritian firms are poorly sensitized to the benefits of adopting

¹⁰ <http://www.govmu.org/English/Events/Pages/%E2%80%9CRemoval-of-Barriers-to-Energy-Efficiency-and-Energy-Conservation-in-Buildings-in-Mauritius%E2%80%9D.aspx>

¹¹ PMIS 2241.

¹² http://www.afd.fr/webdav/shared/PORTAILS/PAYS/MAURICE/documents/Main%20findings_%20Mapping%20of%20EE%20in%20i ndustry%20and%20tertiary%20sector%20in%20Mauritius_VF.pdf

¹³ <http://www.pnee.mu/>

¹⁴ <https://www.sunref.org/en/>

¹⁵ SWITCH Africa Green is a UNEP programme to support 6 countries in Africa to achieve sustainable development by engaging in a transition towards an inclusive green economy: <http://www.switchafricagreen.org/sag2/>

energy efficiency technologies. Furthermore, there remain specific barriers in the manufacturing sector which limit effective energy management.

The Baseline Project

Sustained results in energy efficiency are only possible where firms demonstrate commitment to energy efficiency and dedicate the human and capital resources required for effective energy management systems. A strong incentive for such commitment has now been introduced by the Government. Within the framework of the Long-Term Energy Strategy 2009-2025, the Ministry of Energy and Public Utilities / Energy Efficiency Management Office (EEMO) has developed the 'Energy Efficiency (Energy Consumer and Energy Audit) Regulations 2015' under Section 23 of the Energy Efficiency Act. These Regulations, which are due to be promulgated imminently (by the end of 2016), will create a mandatory requirement for large energy consumers (those consuming more than 100 tonnes of oil equivalent per year or 1.16 GWh) to undertake energy audits based on ISO 50002. Moreover, the Regulations make the implementation of audit recommendations mandatory for these consumers. In 2015, there were approximately 300 commercial (55%) and industrial (45%) enterprises with annual energy consumption above the 100 tonnes of oil threshold. These enterprises cover a wide range of manufacturing facilities including textiles, food and beverages, chemicals and plastics. The largest commercial consumers include hotels, shopping malls (including supermarkets) and large buildings such as banks, hospitals and Government buildings.

The Government has also announced that investments in 'green technology' (including energy efficient equipment) in the manufacturing sector will now be eligible for accelerated depreciation. Whilst this policy is certainly progressive and clearly aims to establish a regulatory framework to foster accelerated low-GHG development and emissions mitigation, the Government accepts that the ability of many firms, and in particular manufacturing companies, to implement energy efficiency audits and investments is limited by their own technical capacity and by the absence of any certified auditors or certification scheme.

The implementation of the Energy Efficiency Regulations, the roll-out of the associated national audit programme and, most importantly, the mandatory nature of the audit recommendations are, in short, necessary but not sufficient conditions for the realisation of large potential energy savings for Mauritius. They constitute a powerful baseline project for achieving energy savings and climate mitigation benefits, but GEF support is needed to enhance the baseline and ensure the successful materialisation of global environmental benefits.

A further opportunity to enhance the baseline project is introduced by a related component of the Government's climate strategy: to promote low-GWP technologies for the replacement of ozone-depleting refrigerants in the Refrigeration and Air-Conditioning (RAC) sector. The Ministry of Environment intends to adopt policies to promote these low-GWP refrigerants, including natural refrigerants, and to disincentivise the adoption of high-GWP HFC refrigerants, building on the work of the current stage of the HCFC phase-out management plan (HPMP) implemented by MLF/GIZ in Mauritius. Since refrigeration and air-conditioning account for approximately 40% of all electricity consumed in sites covered by the audit regulations, there are clear multi-focal synergies between the national energy audit programme, the HCFC phase-out management plan and the promotion of low-GWP RAC technology. These synergies are neglected in the baseline but will be realised through GEF support.¹⁶

Energy auditing, if done comprehensively, highlights the process, operational and performance issues associated with energy-consuming equipment and systems. The mandatory audit regulations therefore inherently provide a mechanism for the audit and assessment of a large proportion of the refrigeration and air-conditioning systems in Mauritius. This has many benefits. It will highlight the potential energy savings that could be achieved through better maintenance, control and monitoring of RAC systems, essentially low- or no-cost interventions. Since in the majority of cases performance issues and refrigerant leakage are linked and proportional, it will also highlight the potential for leak reduction. And, most significantly, it will provide an opportunity to propose and demonstrate the energy and performance benefits of new systems or equipment, which in many cases could be based on low-GWP technology including CO₂, ammonia and hydrocarbon systems.

¹⁶ As detailed below, the GEF project will serve to coordinate EE and HPMP efforts, convene stakeholders and ensure synergies between EE and ODS phase-out are identified and acted upon. Financial support to ODS phase-out activities will be provided through co-finance and not by GEF budgetary resources.

However, these very valuable synergies will only be achievable if the appropriately trained and qualified auditors are available and this will require additional specialised training over and above that envisaged in the baseline project. The HPMP does not have the scope or the funding to address energy efficiency-related interventions, but does have the scope to improve technical capacity, including skills and knowledge, in the refrigeration service sector. In conjunction, the proposed GEF-funded project and the HPMP can therefore provide a vehicle to enhance the capacity of refrigeration professionals to also be energy audit and performance analysis specialists.

Harnessing the mandatory EE auditing programme to simultaneously identify, promote and – where feasible – implement opportunities for either HCFC phase-out under the HCFC Phase-out Management Plan (HPMP) of the Montreal Protocol or HFC avoidance strategies (in line with Programme 1 of the GEF CCM strategy) would serve to considerably magnify the mitigation benefits of the audit programme whilst also delivering another priority Government objective.

GEF Project Scenario

The principal roots causes of poor energy efficiency culture and barriers to improving it are technical, institutional and financial. There is a lack of technical capacity to analyse/audit energy efficiency and propose the appropriate interventions and investments to improve it; there is a weak institutional framework for promoting, enforcing or monitoring energy efficiency and there are insufficient credit lines to support enterprises willing to invest in energy efficiency projects.

The rationale of the GEF project is to assist EEMO to operationalise the mandatory energy audit scheme for large energy consumers by addressing and removing technical, institutional and financial barriers to the adoption of energy efficiency measures and, at the same time, capitalise on the synergies in the RAC sector around ODS emissions reductions and HFC avoidance. The components of the project are therefore aligned with barriers, and are designed to inter-lock in a coordinated manner.

- Component 1 seeks to support the operationalization of the national EE audit programme, specifically by developing an implementation roadmap agreed to by all stakeholders, and by linking the EE programme to the Government's parallel efforts under the HPMP. The concept of the roadmap has been welcomed by the private sector and is seen as a key engagement tool.
- Component 2 strengthens the EE programme's engagement with RAC and steam systems due to their central importance in EE efforts and the relatively complex nature of these systems.
- Component 3 addresses the financing barrier confronting the EE programme by developing a dedicated credit line for firms that are willing to invest in EE equipment and systems given the appropriate incentives and facilities
- Component 4 establishes the quality standards (ISO 50001 and related ISO standards) that will underlie the EE programme, as well as the ability of national stakeholders to apply and certify these standards.
- Component 5 seeks to diffuse the benefits from the EE programme more broadly across the manufacturing sector, giving smaller companies access to information and technical know-how in areas that are relevant to them albeit on a smaller scale.

The project leverages a number of stakeholders, initiatives and financial mechanisms. But the components are structured in a logical and coordinated fashion that will serve to unlock the promised mitigation benefits.

The project concept is a key recommendation of the National Portfolio Formulation Exercise (NPFE) held in Mauritius in 2015-16, which mobilised considerable stakeholder – public sector, private sector and civil society – engagement. It is also included in the INDC and other national policy documents, and is fully consistent with the UNFCCC National Communication and the Technology Needs Assessment. Furthermore, it complements and enhances the HCFC Phase-Out Management Plan.

The project has 5 components:

Component 1: Enhancement of the national mandatory energy audit programme

GEF budget: \$500,000

Co-finance: \$550,000: Energy Efficiency Management Office, Ministry of Environment Sustainable Development and Disaster and Beach Management / National Ozone Unit, Ministry of Industry, Commerce & Consumer Protection, Business Mauritius, Central Electricity Board, GCAI, GIZ.

A key enabler will be the development of a transparent and explicit roadmap for the national roll-out of the mandatory energy audit scheme, based on national stakeholder consultations and engagement. Without such a roadmap, the innovative legislation is unlikely to succeed in its objectives, as the private sector will see only the imposed costs and administrative burdens of the initiative and not the longer-term benefits.

The roadmap will indicate the timelines by which large energy consumers are expected to have undertaken audits and specific energy efficiency interventions in line with their audit findings. Through stakeholder engagement, an appropriate formula will be derived for the prioritisation of interventions, taking into account the magnitude of the energy savings potential, the technical complexity, the cost of implementation / availability of funding, and the financial calculus (NPV-positive or negative).

RAC and boilers (i.e. steam systems) are significant sources of energy consumption among the largest energy consumers (sites) in Mauritius, spanning sub-sectors as diverse as textiles, chemicals, manufacturing, hotels and retail (supermarkets). The issue of energy efficiency improvement of many sites therefore centres on improvements in RAC and boiler systems, and therefore these areas have been highlighted by EEMO as priority EE targets as they are also complicated systems that need specialist technical knowledge to assess and recommend interventions. A specific (but not exclusive) focus will therefore be paid to boilers and heating, ventilation and air-conditioning systems (HVAC) in this project.

Refrigeration and air-conditioning systems account for a large proportion of the electricity consumption of many large users, particularly in hotels, food processing, malls/supermarkets and large buildings. There are clear synergies between the processes, systems and training required to conduct energy audits of RAC systems and those required for the implementation of best-practice operation of systems relating to containment and phase-out of ODS refrigerants. Furthermore, the replacement of obsolete systems and the installation of new systems provide an excellent opportunity for the specification of high-efficiency systems using natural refrigerants or new generation Hydro-Fluoro-Olefin (HFO) refrigerants, with the triple benefit of ODS phase-out, direct CO₂ emissions reductions caused by refrigerant leakage and energy savings, as well as the adoption of continuous monitoring of system energy usage, performance optimisation and preventative maintenance. The GEF project will coordinate with the current activities of the HCFC Phase-Out Management Plan (HPMP) and, in particular, the work being done with assistance from GIZ¹⁷ and other parties to promote the use of natural refrigerants and develop a certification scheme for RAC technicians. Technicians will receive training in energy efficiency interventions with GEF-funded support, and in ODS containment/phase-out with co-financed (HPMP) support.

This component will also investigate the potential for offsetting large energy consumers' implementation risks by developing support mechanisms for Energy Service Companies (ESCOs), which could potentially implement energy-saving investments on a 'no savings, no fee' basis for large consumers. Although this model might be attractive to enterprises that fall within the Energy Audit Regulations, the small scale of operations at individual sites may render this approach unviable. This aspect will be further evaluated during the PPG stage.

Whilst energy performance standards for stand-alone equipment are relatively straightforward to define, based on existing international standards, it is more difficult, or at least more complicated, to define standards for systems with multiple components and variable operating conditions and applications. A minimum level of energy savings will be achieved by developing and implementing national mandatory minimum energy performance standards for selected appliances, equipment and, more importantly, 'systems' in addition to the appliances currently listed in the Energy Act. Standards will be developed for steam systems and RAC systems,

¹⁷ <https://www.giz.de/de/html/index.html>

and these standards will be incorporated into future training, policy development and compliance mechanisms. In this regard, the project will assist Mauritius in the development of suitable penalties and incentives for compliance with the Energy Audit Regulations, which could include continued access or removal of concessional electricity tariffs, tax relief on energy efficiency investments and other measures. This will, however, require a coordinated effort between various stakeholders, including technology and energy efficiency specialists and energy suppliers and regulators.

When a robust roll-out of the audit scheme is underway, it will become even more important to develop a culture of energy management across all industrial and commercial sectors – first, to measure the impact of ongoing interventions and, second, to drive further efficiencies and demonstrate the technical and economic benefits of energy management. The project will therefore assist Mauritius to develop Monitoring, Reporting and Verification (MRV) frameworks and plans to support the implementation of on-site energy management systems based on ISO 50001.

The electricity supply tariff has developed organically in recent years, partly to incentivise industrial development. The market is divided into three customer segments: the industrial sector, which currently pays a reduced tariff that incurs losses for the power utility, the Central Electricity Board (CEB); the domestic sector, whose tariff is set to allow CEB to break even; and the commercial sector, whose tariff is profitable for CEB.

The current electricity tariff structure does not incentivise energy efficiency for some of the larger consumers on the industrial tariff. Given the alignment of CEB's interests (a loss-making tariff on the industrial sector) with those of EEMO (to promote energy efficiency investments), there is considerable potential for revision of the electricity tariff structure to reinforce other energy efficiency incentives.

A technical study will be undertaken to explore the potential for tariff revision, and this will feed into the current plan – currently under implementation by the Government – to establish an independent electricity sector regulator with the power to set tariff rates. There is typically little incentive for an electricity utility to promote EE among end-users, as it represents a loss of revenue. However, the situation in Mauritius is different: because of Government-imposed tariffs, CEB loses money when supplying electricity to the industrial sector (the tariff is set below the utility's cost of generation). The GEF project will harness the support of CEB to propose rational tariff amendments that will serve both to improve the financial status of CEB (a parastatal) and to incentivize industrial consumers to invest in EE measures. Such tariffs will receive a positive reception in the current political climate, characterized by strained Government finances (and therefore limited ability to keep subsidising CEB) and the move to an independent electricity regulator with tariff-setting powers.

The data and learning acquired from the large energy consumer sector will be used to prepare accessible and relevant case-studies and awareness-raising schemes to promote replication of energy-saving measures among smaller energy consumers. Though not classified as large energy consumers, energy-intensive Small and Medium Enterprises (SMEs) will also be considered under the project.

In summary, the outcome of this component will be for Mauritius to have a detailed plan for the roll-out and enforcement of the Energy Efficiency (Energy Consumer and Energy Audit) Regulations 2015, with achievable and measurable CO₂ emissions / chemicals reduction targets; and the technical and institutional capacity to implement the plan.

Component 2: Implementation of boiler and RAC energy efficiency recommendations for large energy consumers (including implications for SMEs) and the promotion of energy efficient low-GWP technology when replacing HCFC- or HFC-based equipment

GEF budget: \$1,581,553

Co-finance: \$1,450,000: Energy Efficiency Management Office, Ministry of Environment / National Ozone Unit (NOU), Université des Mascareignes, Business Mauritius, private enterprises, Switch Africa, GIZ.

Component 2 will undertake more detailed analyses of on-site energy efficiency investment options for key technologies and will train engineers to implement interventions pertaining to these specific technologies. This will require detailed technical and economic analyses of energy audit recommendations relating to steam and RAC systems, and the subsequent training of trainers: i.e. national specialists for auditing and analysis of

boiler and RAC system operations and performance. This activity will be coordinated with the National Ozone Unit's (Ministry of Environment) current activities in the demonstration of natural refrigerants such as the application of CO₂ refrigeration systems, the use of ammonia chillers and hydrocarbon air-conditioning systems, which offer significant energy and direct emissions savings opportunities if scaled-up. This aspect of the project will be undertaken in close collaboration with, and co-financed by, the GIZ HPMP support programme

A national syllabus for training of refrigeration engineers has already been developed by the Université des Mascareignes with support from the Multilateral Fund through the HPMP, and this project provides an excellent opportunity to expand training and education in the sector to enhance the energy auditing and management aspects that are already a feature of best-practice operation of RAC systems. The Université des Mascareignes will provide in kind co-financing through the provision of consultancy and training development, and a small amount of GEF grant will be allocated to the provision of basic energy and performance monitoring equipment and software specifically to further enhance the capacity of RAC technicians and engineers to monitor, diagnose and improve RAC system energy performance (including preventative maintenance) and energy consumption.

This component will also support the understanding and promotion of new and alternative technologies for high-efficiency boilers and RAC (low-GWP) systems in key sectors and applications by funding primer projects that represent the most replicable and scalable energy efficiency interventions and provide examples and benchmarks for similar enterprises to follow. Care will be taken to ensure that the selection criteria for primer projects are clear and transparent, and also serve to maximize the promotional impact and take-up of technology.

Component 3: Provision of credit line for the implementation of energy audit recommendations

GEF budget: \$1,400,000

Co-finance: \$14,650,000: Energy Efficiency Management Office, Business Mauritius, private enterprises, AFD, Switch Africa.

The perceived benefits of energy efficiency do not outweigh the investment required, in the view of many industrial sector enterprises. Many local banks do not have the expertise and risk appetite to finance EE projects, and local interest rates on loans (8-10%/year) are high.

Component 3 will establish a national credit line for eligible large energy consumers¹⁸, utilising co-finance to support and promote the implementation of further boiler and RAC energy efficiency interventions. This will include the development of funding models and assessment criteria for local banks to process credit requests and channel loans.

During the PPG stage, UNDP will develop a credit/grant mechanism in collaboration with the Agence Française de Développement (AFD), through a proposed €60 million extension of the current SUNREF programme. The GEF-financed project will facilitate access to concessional loans to organisations seeking to implement their mandatory energy efficiency audit recommendations, subject to certain qualifying criteria relating to potential energy savings and the risks/financial viability of the investments. Loans will be coupled with an incentive grant based on a percentage of the total investment, to be paid through the partner bank upon successful implementation of the EE investment.

The modalities and institutional arrangements of the financial mechanism, including the appropriate grant percentage, will be elaborated during the project preparation (PPG) phase, but the aim will be to stimulate and assist as many cost-effective energy efficiency interventions as possible across both industrial and commercial sectors. It will also be important to design a governance mechanism specifically suited to the project, which will involve all stakeholders/co-financiers of the project and facilitate collaboration between AFD and UNDP in the design and follow-up of the implementation of the GEF project. The project will build on the previously established and successful relationships and the governance mechanism between Business Mauritius and AFD which were developed to the implement green credit lines and the NEEP in Mauritius.

¹⁸ Eligibility will be defined in detail during the PPG stage in collaboration with EEMO, AFD and other key stakeholders.

Component 4: Implementation of Energy Management and MRV systems in large energy consumers and relevant SMEs

GEF budget: \$550,000

Co-finance: \$250,000: Ministry of Industry, Commerce & Consumer, Business Mauritius, private enterprises, GIZ.

Component 4 aims to stimulate the natural progression from energy auditing and implementation of one-off interventions (the baseline project) to fully-fledged energy management as a formal business process, which would unlock the potential for further energy savings and provide a self-sustaining driver for ongoing activity within enterprises. If successful, this aspect of the project will act as a catalyst for the uptake of proactive energy management which would otherwise not be present within the baseline project. As McKane (2010)¹⁹ notes, capacity development is vital for successfully implementing industrial energy management systems: corporate managers are familiar with management systems (for example, for quality, safety and environment) but typically have no expertise in energy efficiency, while industrial energy experts are oriented towards the identification and implementation of energy efficiency projects but without a management system context. Training of managers and engineers is thus required to inculcate the joined-up skills required for strategic energy management and to embed the philosophy of energy management into business culture in the same way that quality assurance or even customer focus have been in recent years, not because it is a legal requirement but because it is good for business.

This component aims to work with up to ten enterprises (sites) that have, as part of the baseline project, completed an energy audit and implemented at least some of the recommendation therein, to implement an energy management system. The selected enterprises will receive technical and financial support to implement, and be successfully certified as using, ISO 50001. The choice of companies will be guided by: the level of interest expressed by company management; initial estimates, based on walk-through inspections, of the costs of conforming to the standard; the expected mitigation benefits of certification; and the desirability, for replication/demonstration purposes, of covering a range of sizes of firms and manufacturing sub-sectors.

These enterprise certifications will serve as proof-of-concept for other firms in the sector and will be used as case-studies to publicise the benefits and implications of energy management systems. A condition of support for this initial group of companies will be the proviso of access to relevant parties through site visits for capacity development and awareness-raising purposes. This is necessary to 'prime' the market and provide benchmarks for similar enterprises within the same sector, and stimulate the adoption of energy management tools and processes and full-blown energy management systems.

To achieve this, it will be necessary not only to support enterprises but also the development and implementation (by the Mauritius Standards Bureau) of a national certification scheme for ISO 50001 'Energy management systems', ISO 50002: 'Energy audits' and ISO 50003: 'Energy management systems - requirements for bodies providing audit and certification of energy management systems'. This will require the development of capacity in the national accreditation body of Mauritius, Mauritas, and a system for the registration of ISO 50001-certified firms. The project will therefore assist Mauritas in developing an accreditation programme for assessors and private sector certification bodies, including evaluation of the certification body's practices, staff and management. Certification Bodies will be evaluated against specific international standards (such as ISO/IEC 17021: 'Conformity assessment – requirements for bodies providing audit and certification of management systems', or ISO/IEC 17024: 'Conformity assessment – general requirements for bodies operating certification of persons', or ISO/IEC Guide 65: 'General requirements for bodies operating product certification systems'. In addition, this activity will include a gender target of at least 30% of all assessors to be female.

Awareness-raising and capacity development support will also be provided by the project to a broader group of companies and associated suppliers, consultants and service organisations to improve their awareness and understanding of the new standard and to enable them to adopt the standard. This capacity development will

¹⁹ McKane, A. (2010), 'How ISO 50001 energy management can make industrial energy efficiency standard practice', Lawrence Berkeley National Laboratory Paper 3323E.

cover issues such as defining the energy policy of the organisation, developing energy management plans, setting the energy management baseline, conducting energy reviews, establishing performance indicators and energy savings targets, and reviewing achievements and deviations.

The software tools and materials developed by the baseline SIDS DOCK project will be updated and extended so as to explicitly address ISO 50001 needs. (The materials developed under SIDS DOCK implicitly adopt an ISO 50001-compatible approach but do not explicitly reference the standard).

GEF support to the 10 target firms can be considered as catalytic investment: support for the design, implementation and tools/capacity needs of enterprise energy management systems built according to a recognized global standard, support for certification, and support to ESCOs and consultancy firms to identify and implement energy efficiency measures in conjunction with the enterprises. GEF support will not extend to actual hardware purchases associated with investment in energy efficient equipment (e.g. pipe insulation, energy efficient motors or pumps, boiler tuning, improved RAC systems, etc.); such investment will be financed by the enterprises themselves, utilising the concessional credit instrument described above as part of the enhanced baseline project. An indicative \$300,000 of funding is allocated to support 10 enterprises to implement energy management systems, over and above any project or private investment in energy efficiency interventions implemented as a result of the audits at these enterprises.

Without this GEF investment, it is very likely that adoption of energy efficient management practices would continue to be undertaken on a piecemeal basis to respond to ad hoc market shocks, the energy efficiency investments that naturally flow from the adoption of energy management systems would not materialise, and an opportunity to address a key source of greenhouse gas emissions would be lost.

The project acknowledges that ISO certification, in and of itself, does not necessarily improve energy efficiency: an energy-inefficient enterprise can be ISO 50001-compliant if it has in place the appropriate methodology for monitoring its energy use and, conversely, an energy-efficient enterprise can be non-compliant if it lacks the appropriate monitoring methodology. The premise underlying certification is that, once an enterprise is able to track and measure energy consumption, it will drive improvement in energy usage. The project will strengthen this premise through capacity development and awareness-raising, encouraging and facilitating enterprises to proactively use their new energy management systems to achieve cost savings. At the same time, it will support the development of established Mauritian ESCOs to become accredited ISO 50001 certifiers, thereby building the linkages between energy efficiency management and energy efficiency implementation, and facilitating new business opportunities for both energy efficiency consulting firms and certifying companies.

Component 5: Promotion of scale-up and replication of EE activity across and within sectors

GEF budget: \$135,333

Co-finance: \$100,000: Energy Efficiency Management Office, Ministry of Environment Sustainable Development and Disaster and Beach Management / National Ozone Unit, Ministry of Industry, Commerce & Consumer Protection, Business Mauritius, Central Electricity Board, GCAI, GIZ

Although the initial focus of the baseline project and the GEF project is naturally on large energy consumers, it is important that the project ensures that smaller energy consumers are aware of the potential energy efficiency interventions applicable to them, and have access to the relevant information and analysis tools to assess benefits and implement EE interventions and adoption of low-GWP refrigerants voluntarily.

Case-studies of interventions carried out by large energy consumers will be compiled and edited to make them relevant and accessible for smaller consumers. In some cases, this will simply require breaking down full case-studies into 'bite-sized' studies or guides addressing a single technology or intervention. These will be widely disseminated, with a focus on steam and RAC systems and, specifically, low-cost interventions that have been found to be particularly common or effective and which have broad replicability potential in small firms. Such studies or guides might pertain to only a particular process or technology, rather than a whole site or sector, but can serve to initiate interest in the availability and benefits of energy efficiency across a large group of stakeholders, including smaller consumers, with the aim of stimulating interest in a particularly relevant or straightforward intervention that would lead to further activity and more comprehensive interventions.

While large consumers are initially easier to target from an EE perspective, and represent ‘low-hanging fruit’ in that context, the importance of the SME sector should not be disregarded. SMEs account for 45% of employment and 35% of energy consumption in Mauritius: they are an important element of the climate change mitigation equation in Mauritius. While the GEF project will not have SMEs as its focus, it will ensure that learning is transferred to this important sector to ensure indirect mitigation benefits are maximized.

Given recent Government moves to incentivise and, indeed, mandate large energy consumers to adopt energy efficient practices, trade associations and individual firms are now extremely receptive to information and support relating to energy efficiency and energy management systems. The project will undertake an NPV-based cost-benefit analysis of energy efficiency in the key manufacturing and commercial sectors to provide associations and firms with the ‘ammunition’ (hard, objective facts and financial metrics) they need to justify embarking on the path of energy auditing and then to efficiency investments and then to ISO 50001 energy management certification.

The key partners in awareness-raising will be Business Mauritius and the Central Electricity Board, which, between them, have sector and consumption data for all concerned enterprises as well as established communication channels including online, face-to-face, press and invoice distribution.

Incremental Reasoning

The project’s incremental approach can be summarised as follows: The Government of Mauritius has clearly identified the importance of promoting energy efficiency in industry into key policy, regulatory and institutional frameworks and across key sectors. However, despite this strong policy commitment, the integration of energy efficiency in industry is not happening at the required pace as systemic and institutional barriers still remain to achieving the required changes, despite the urgency of the intertwined issues of climate change mitigation through improved energy management and the modernization of specific industrial processes to use less energy and lower-intensity GWP chemicals. In the baseline situation, the barriers and insufficient capacity for implementing energy efficiency measures means that a business-as-usual scenario would promote continued slow implementation of measures already identified in the TNA and SNC among the various sectors and stakeholders that manage or influence what is currently happening in industry. As a result, the implementation of energy efficiency in industry is likely to continue with an ad hoc approach, based on voluntary actions and with little sustainability, with the target of 10% mentioned in the INDC unlikely to be achieved.

In the alternative scenario enabled by the GEF, systemic and institutional barriers to implementing energy efficiency in industry will be removed at the national and local levels, backed by incentives for the implementation of actions identified through the energy audits. The integration of energy efficiency considerations into the various programmes and projects described in the baseline analysis will help to improve energy management in industry, thereby strengthening the national economy and local livelihoods, and generating global environmental benefits. The equipment to be funded through the project, stakeholder capacity development and local-level integrated energy management through well-defined management systems will help to ensure that interventions produce the intended results in terms of energy efficiency. Addressing knowledge gaps, strengthening capacity for more holistic energy management, and promoting inter-sectoral coordination and policy harmonisation should be considered to be a major contribution to the implementation of activities in the context of the Energy Action Plan up to 2025.

Benefits

The project is expected to have a number of social and economic benefits at the national level, notably through enhancing energy independence, improving competitiveness in industrial and commercial enterprises, and ultimately through introduction of a systematic approach to energy management that will have a long-term ongoing climate benefit.

The project will result in significant direct and indirect greenhouse gas emission reductions, as well as the reduction of HFC emissions. According to preliminary calculations, implementation of energy efficiency interventions, including no-cost (housekeeping), low-cost and investment activities, in 200 of the largest users

in Mauritius could amount to approximately 175,000 tonnes CO_{2eq} per year. This reduction assumes that, on average, 15% energy savings per facility²⁰ can be found from the implementation of energy audit recommendations in key areas, including improvements in :

- operational changes, controls and housekeeping
- steam and RAC systems
- thermal insulation
- motors and drives
- heat exchangers
- compressed air equipment

This project aims to support and enhance the mandatory energy audit regulations through capacity development and technical and financial assistance for at least 100 enterprises within the scope of the audit regulations and thereby generate a direct climate benefit of 87,500 tonnes CO_{2eq} per year, plus significant indirect benefits through replication and extension of energy efficiency activities. Over a 15-year (conservative) lifetime of equipment and processes, this direct benefit amounts to 1.3 Mt CO_{2eq}.

In addition to energy efficiency savings, the project aims to reduce refrigerant greenhouse gas emissions from refrigeration and air-conditioning systems by promoting and demonstrating the use and efficiency of low-GWP alternatives when enterprises replace or upgrade refrigeration and air-conditioning systems, either as a result of HCFC phase-out or when voluntarily modifying or replacing HFC-based RAC equipment. Since the refrigeration and air-conditioning load is a major element of total consumption for the majority of large energy consumers, the mandatory energy audit programme provides an ideal opportunity for qualified consultants and auditors to recommend alternative technology and systems – or, at a minimum, improved operational and maintenance procedures – to reduce leakage and improve performance.

Consumption²¹ of HFC and HCFC refrigerants rose sharply between 2013 and 2014; in 2015, the consumption of HCFCs levelled off but the consumption of HFCs continues to increase, driven by the increasing numbers of refrigeration and air-conditioning systems in use and the phase-out of HCFCs underway through the HPMP.

Based on the current refrigerant consumption trends, if 30% of the existing HCFC refrigeration and air-conditioning systems were replaced with low-GWP / natural refrigerant technology over the period of this project, this would result in a reduction in emissions of 50,400 tCO_{2eq} per year. If a further 10% of existing HFC systems were converted or replaced with low-GWP technology, a further 26,000 tonnes CO_{2eq} per year of emissions reduction would be realised (76,400 tCO_{2eq} in total). Over a 15-year period, this amounts to a total of 1.65 Mt CO_{2eq}. These figures represent reasonable estimates, although further analysis will be needed during the PPG stage to establish more accurately the status of existing banks of both HCFC- and HFC-based equipment and the potential for adoption of low-GWP refrigerants. It will also be important to establish more accurately the extent of the energy efficiency / refrigerant emissions reduction synergy within the sites coming under the Regulation: i.e. sites with high energy consumption above 100 tonnes of oil equivalent. Initial analysis indicates 41 hotels, 8 malls and 24 large buildings (banks, hospitals, computer centres) within the top 200 energy consumers where refrigeration and air conditioning is a major energy load; however, further analysis is needed in the industrial sector. The PPG will also provide an opportunity to develop a robust estimate of causality. While the GEF project will raise awareness, convene stakeholders and draw linkages between EE and ODS efforts that simply do not exist in the baseline, the actual ODS containment/phase-out efforts on the ground will be financed through co-finance, not by the GEF. This will need to be acknowledged when attributing emission reduction/ODS reduction benefits to the GEF project.

Further significant indirect emission reductions can be expected from GEF technical assistance, capacity development, awareness-raising activities and concessional credit support. Assuming, highly conservatively, that the replication factor of energy efficiency activities within the large industrial and commercial energy consumers is 50% (it is likely to be considerably higher), the total emission reductions attributable to the project will be 1.95 Mt CO_{2eq} at a cost to the GEF of \$2.3/tCO_{2eq}.

²⁰ This figure is supported by the first round of draft audit reports conducted under the NEEP.

²¹ The latest data from the National Ozone Unit.

It is important to note that the national energy management standard and institutional architecture put in place by the project will not be restricted solely to the largest energy consumers but can, in fact, be applied in the vast majority of businesses. Significant sectoral spill-over benefits, which are not accounted for here, are therefore envisaged for the project. Detailed direct and indirect emission reductions will be calculated during the PPG phase using transparent assumptions and fully-referenced data sources.

Innovation

The project is intended to deploy GEF resources in a complementary manner to the HPMP work being funded by the MLF. The project is innovative and could represent a powerful template for GEF/MLF synergies in the future.

ISO 50001 is a relatively new standard, having been introduced globally only in 2011. As of September 2014, approximately 11,000 sites worldwide have been certified according to the standard²². The global importance of the standard was highlighted recently by the launch of the Energy Management Campaign²³. An international assembly of high-level clean energy leaders, attending the 7th Clean Energy Ministerial, launched the campaign as a clear call to action in a high-level international effort to promote ISO 5000. The Campaign aims to achieve 50,001 global certifications to ISO 50001 by 2020. No firms in Mauritius are currently certified; in seeking to establish a national ISO 50001 certification system, implement energy management systems and certify 10 firms, this project is undoubtedly progressive and demonstrates clear support for the initiative.

The proposed project will deploy limited GEF funds (and substantial co-financing) to focus on precisely those energy management elements that are sustainable without continued infusions of grant funding: i.e. it will focus on developing a national energy auditing scheme, the implementation of permanent interventions, and certification and accreditation systems (using well-respected and proven existing architecture – the relevant ISO standard and the existing bodies in Mauritius responsible for certification). Energy efficiency investments will be financed by the private sector using balance sheet financing and loans, which are inherently more sustainable than grants.

Scaling-Up

At the national level, although the project will touch a significant number of enterprises directly, there will be many more outside the scope of the project where the same approach to energy auditing, energy management and performance improvement of RAC systems would deliver further energy savings and climate benefits as well as cost savings and competitiveness improvements.

Furthermore the technology, approaches and systems deployed through the projects are demonstrable and replicable on a cross-sectoral basis. For example an energy saving intervention which reduces steam consumption in the production of textiles can be promoted and replicated across the sector, whilst improved refrigeration performance and reduced energy consumption through condenser improvements is an intervention that could be replicated across all sectors where refrigeration condensers are employed.

2. ***Stakeholders.*** Will project design include the participation of relevant stakeholders from [civil society organizations](#) (yes ☒ /no ☐) and [indigenous peoples](#) (yes ☐ /no ☒)? If yes, identify key stakeholders and briefly describe how they will be engaged in project preparation.

Project Stakeholders	Relationship With The Project
Energy Efficiency Management Office (EEMO)	EEMO, which falls within the Ministry of Energy and Public Utilities, has general responsibility for energy efficiency in Mauritius. It was established with technical and financial support from the GEF and SIDS DOCK. EEMO will be the executing partner of the project and will act as the primary Government contact during the PPG stage. It will also contribute to the design of the structure and management of the project. EEMO is highly supportive of the proposed project's

²² Latest data reported by ISO.

²³ <http://www.cleanenergyministerial.org/energy-management-campaign>

	focus on establishing a clear roadmap for the roll-out of the mandatory energy audit regulations and facilitating the implementation of audit recommendations through credit lines. It will coordinate the contributions and inputs to the project design from other Government departments.
Ministry of Industry, Commerce and Consumer Protection (MICCP) - Industry Division	MICCP is responsible for matters concerning the regulation of the industrial sector in Mauritius, including those elements of the Long-Term Energy Strategy that pertain to manufacturing and industry. The Ministry will benefit from the technical assistance aspects of the project and will, in turn, provide in-kind co-finance (staff time and office space) to the project and technical support to project beneficiaries. During the PPG stage, MICCP will also contribute to the consideration of minimum energy performance standards (MEPS) for boilers and RAC systems, as well as aspects relating to the market development support for specialist energy service companies (ESCOs) and consideration of electricity tariff analysis/reform.
Ministry of Environment / National Ozone Unit (NOU)	The NOU, as the agency responsible for the HCFC phase-out management plan, the improvement of service practice in the RAC sector and the evaluation and promotion of low-GWP technology, will be an active partner in the implementation of the project. During the PPG stage, the NOU will be a key contributor to the design of Components 1 and 2 of the project, particularly in relation to analysing and maximising the potential multi-focal synergies between energy efficiency auditing and interventions and RAC service practice and HFC avoidance.
Mauritas	Mauritas, a department of the Ministry of Industry, Commerce and Consumer Protection, is the sole national accreditation body in Mauritius. It is responsible for accrediting calibration and testing laboratories, inspection bodies and certification bodies, including bodies responsible for ISO certification. Mauritas currently offers an accreditation programme for the ISO 14001 (Environmental Management Systems) certification scheme (among others) and will work in the PPG stage to establish the scope of guidelines and systems required to accredit conformity assessment bodies (CABs) – i.e. MSB and private-sector energy auditors/certifiers, including ESCOs – against ISO 50001.
Mauritius Standards Bureau (MSB)	MSB is a parastatal organisation responsible for standardisation, quality assurance, testing and metrology. MSB operates national management system certification schemes for ISO 9001, ISO 14001, ISO 27001 and ISO 22000. During the PPG stage, MSB will be involved in the preparatory development of a national certification scheme for ISO 50001, strengthening the role it will play in project implementation and addressing key capacity gaps.
Ministry of Energy and Public Utilities (MEPU)	MEPU is the central ministry responsible for formulating and implementing the Government's energy policy. In the specific area of energy efficiency, MEPU is entrusted with formulating policies, plans and programmes for the management of the energy sector. MEPU was the Executing Partner of the UNDP-implemented, GEF-financed 'Removal of Barriers to Energy Efficiency and Energy Conservation in Buildings' ²⁴ project as well as the baseline SIDS DOCK project, 'Removal of Barriers to Energy Efficiency and Energy Conservation in Buildings and Industry', and in this context is expected to provide invaluable technical and networking support to the development of the full project during the PPG stage.
Business Mauritius / Private Sector Organisations	Business Mauritius (formerly the Joint Economic Council, JEC) is the coordinating body for the National Energy Efficiency Programme (NEEP) and has experience in implementing energy audits with private sector entities in Mauritius, in collaboration with AFD and UNEP in the context of concessional loans for EE investments. It will be involved in the PPG stage as the key representative of the private sector investors and potential project beneficiaries, particularly in relation to the proposed design of the roll-out plan for the regulations and the details of the credit line and associated mechanisms for implementation of recommended energy efficiency interventions.
Central Electricity Board (CEB)	The Central Electricity Board (CEB) is a parastatal body wholly owned by the Government of Mauritius and reporting to the Ministry of Energy and Public Utilities. Established in 1952 and empowered by the Central Electricity Board Act of 25 January 1964, CEB's business is to "prepare and carry out development schemes with the general object of promoting, coordinating and improving the generation, transmission, distribution and sale of electricity" in Mauritius. CEB

²⁴ PMIS 2241.

	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. During the PPG stage, CEB will contribute to the design of the project in relation to tariff structures and incentives, as well as the provision of detailed market and sector consumption data.
Agence Française de Développement (AFD)	Agence Française de Développement (AFD) is a financial institution and the main implementing agency for France's official development assistance to developing countries and overseas territories. Since 2006, AFD has financed many projects in Mauritius across a range of policy instruments. It is the organisation responsible for the management and disbursement of the SUNREF credit line, supporting local banks and private companies by providing financing mechanisms for investments in renewable energy, energy efficiency, pollution abatement and clean technology businesses. During the PPG stage, AFD will contribute to the design of the proposed credit line for the project and will contribute its experience in managing the disbursement of concessional loans and grants for energy efficiency interventions to the design of the proposed structure and management of the project.
SBM Bank (Mauritius) Ltd, Mauritius Commercial Bank (and others)	SBM and Mauritius Commercial Bank currently work in coordination with AFD in the context of SUNREF. These banks are the principal point of contact for private sector enterprises wishing to finance energy efficiency investments. They will be consulted during the PPG stage in relation to optimising private sector engagement and communications, designing EE loan products, and appropriate grant/loan ratios.
Université des Mascareignes	The Université des Mascareignes houses the Faculty of Sustainable Development and Engineering, within which the main departments for tertiary education in refrigeration and air-conditioning and renewable energy are located. It is the beneficiary, through the HPMP, of advanced training equipment for the use of CO ₂ in refrigeration systems, and is a key stakeholder in the development of academic and vocational training courses in refrigeration and air-conditioning as well as the development of operational codes of practice for industry and R&D in the field of application of natural refrigerants. It will be a key contributor during the PPG stage to the design of proposal development of energy audit specialists and the potential synergies between RAC service practice and energy management.

Other industry associations and interested parties – such as the Mauritius Industry Export Association and the Rotary Club (which operates an EE programme) – will, of course, be consulted at the PPG stage and full details will be provided in the CEO Endorsement Request.

3. Gender Equality and Women's Empowerment. Are issues on [gender equality](#) and women's empowerment taken into account? (yes ☒ no ☐). If yes, briefly describe how it will be mainstreamed into project preparation (e.g. gender analysis), taking into account the differences, needs, roles and priorities of women and men.

The GEF's 2012 Gender Equality Policy has 7 criteria that the GEF Secretariat and its Partner Agencies need to meet when designing and implementing projects, the most relevant to this project being:

- Strengthen gender mainstreaming capacity institutionally;
- Identify measures to avoid, minimise and/or mitigate adverse gender impacts;
- Address gender-sensitive activities in policies, strategy, action plans;
- Put in place a system for monitoring and evaluating progress in gender mainstreaming, including use of gender-disaggregated indicators; and
- Monitor and provide support for policy implementation, including ensuring the participation of gender experts.

The UNDP Mauritius Country Office has embraced the UNDP Gender Equality Strategy 2014-2017, which seeks to contribute to the eradication of poverty and to the reduction of gender inequalities by empowering

women. In line with the UNDP Mauritius Country Programme for the period 2017-2020, gender-disaggregated indicators will be used for this project.

The Government of Mauritius adopted a rights-based National Gender Policy Framework (NGPF) in 2008, which stipulates that Ministries, Departments and Agencies develop their own specific gender policies to achieve gender equality and women's empowerment in their sectoral mandate areas. These policies are to be implemented through their programmes, interventions, human resource and operational management, budget allocations, execution monitoring and evaluation.

Since the project will involve a substantial amount of personnel training and development, there is ample opportunity to ensure that gender analysis is carried out on the various professional and vocational roles associated with the project. These factors will be mainstreamed into the project preparation through the establishment of clear targets for gender representation in the training, development and certification of personnel appointed or involved with the project and its activities.

4 Risks. 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).

Risk	Risk Category	Mitigation Approach
Climate change risks	L	<p>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.</p> <p>The Technology Needs Assessment (TNA) notes that the indigenous component of the electricity mix (i.e. bagasse and mini-hydro, and wind power if/when it is developed) 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 (coal, heavy fuel oil, diesel). 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 is likely to be met with an increased focus by the Government on energy efficiency measures (which already occupy a prominent role in energy policy).</p>
Lack of Government commitment to energy efficiency	L	<p>With an energy dependence rate of 84% (up from 78% in 2002), Mauritius is extremely vulnerable to energy shocks. The country's oil price vulnerability, as defined by the World Bank, increased from 3.9 in 2003 to 8.9 in 2008 (the most recent year available; the vulnerability has increased in the meantime). A number of Government economy-wide and sectoral strategies, including the Long-Term Energy Strategy, the Industrial and SME Strategic Plan and the INDC, identify the reduction of energy dependence as a pressing national priority. The project has the full support of EEMO, the Government body mandated for energy efficiency matters.</p>
Lack of interest of firms to take part in energy audits and/or introduce an energy management system	L	<p>Lack of enterprise-level interest in energy management has been a traditional barrier to energy efficiency improvements in the private sector in Mauritius. This barrier is diminishing rapidly in importance, driven by a number of factors: (1) the imminent introduction of the mandatory Energy Efficiency Regulations (2015), mandating compulsory EE audits and EE implementation for large energy consumers; (2) new Government incentives to address energy consumption, including continued access to preferential electricity tariffs; (3) greater private-sector awareness of the beneficial financial impacts of energy efficiency, driven in part by SIDS DOCK and NEEP efforts and by the harmful impact on the manufacturing sector of the 2008 and 2016 oil price spikes; and (4) the growth in Corporate Social</p>

		<p>Responsibility (CSR) schemes in Mauritius in the past decade, many of which contain energy components.</p> <p>Building on this promising context, the project will develop a systematic awareness-raising and capacity development programme for the manufacturing sector to build further engagement. Moreover, the encouragement of, and support to, private-sector energy auditors (CABs) is likely to lead to a sustained market dynamic of marketing and business development that opens up further energy efficiency opportunities in the manufacturing sector, facilitated by the concessional lending scheme leveraged by the project.</p>
Over-ambitious project target	M	<p>From a starting point of no firms in Mauritius being certified under ISO 50001, the project proposes to certify 10 firms within the 5-year project lifetime. ISO 14001 (Environmental Management Systems) was introduced globally in 2004 and even now, 12 years later, only 30 organisations in Mauritius are certified. The project is thus setting itself an ambitious target which inevitably has risks attached to it. These risks are mitigated to an extent by the project's use of existing institutions and infrastructure – existing CABs, existing accreditation body – as well as by addressing an increasingly recognized national challenge (as reflected by its centrality in Government policy-making) and an increasingly receptive audience (in the form of private-sector firms obliged to comply with imminent mandatory EE auditing requirements), whereby a limited number of certifications will be used to provide examples and benchmark implementations to stimulate wider take-up of energy management systems.</p>
Financial and credit constraints prevent enterprises from investing in energy audit recommended efficiency measures	M	<p>During the recent global economic downturn, the Mauritian manufacturing sector was hard hit: in 2008, the growth rate of the sector fell from its historical 5%/year rate to 3.6%, and between 2009-2012 the sector actually shrank by 1%. The sector is now growing again, albeit slowly. Faced with an increasingly competitive global market and erosion of traditional sector strengths (low wages, import tariffs, preferential access to the European market), profit margins are under pressure. This may have the effect of deterring investment expenditures for energy efficiency, thereby undermining the objective of the project. However, it also represents a significant opportunity to present firms with the business case for energy efficiency, both in its own terms as a positive-NPV cost-cutting measure but also as a means of accessing Government financial incentives and, more strategically, as a means of positioning firms – particularly vis-à-vis overseas export markets in Europe and North America – as 'green', socially responsible organisations. Manufacturing sector awareness of, and interest in, energy management is at an all-time high. Investment rates in the manufacturing sector are high by regional and global standards, and the sector has a well-deserved reputation for agility and innovation. Access to credit, when needed, is facilitated by the presence of Africa's second most developed banking sector (after South Africa's).</p>

5. *Coordination.* Outline the coordination with other relevant GEF-financed and other initiatives.

This project will be coordinated closely with the activities of the UNEP 'Nationally Appropriate Mitigation Actions for Low-Carbon Island Development Strategy' project (GEF Project ID 5649), in particular Component 3 thereof which seeks to establish a national Measurement, Reporting and Verification (MRV) system and national MRV guidelines and standard methodologies for selected sectors, as well as training local professionals to conduct MRV.

It will also draw on the learning generated by the 'Removal of Barriers to Energy Efficiency and Energy Conservation in Buildings'²⁵ SIDS DOCK project which is in its final phase, and it will build on the work done to train energy auditors and develop a guidebook for industrial energy audits and a code of practice in energy

²⁵ <http://www.govmu.org/English/Events/Pages/%E2%80%9CRemoval-of-Barriers-to-Energy-Efficiency-and-Energy-Conservation-in-Buildings-in-Mauritius%E2%80%9D.aspx>

management. Similarly, the project will coordinate with the National Energy Efficiency Programme²⁶ (NEEP), which will provide an established channel to the private sector through Business Mauritius and AFD.

The project will also be intrinsically linked to the final tranche of the MLF/GIZ-funded HCFC Phase-Out Management Plan, a key component of which is to improve service practice and deliver the technical skills required to properly evaluate and monitor the operation of RAC systems to improve performance and reduce ODS and HCFC emissions.

6. Consistency with National Priorities. Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes ☒ /no ☐). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.

The project supports the **Intended Nationally Determined Contribution (INDC)**, which was submitted on 28 September 2015. Following the signing and ratification of the Paris Agreement on 22 April 2016, as per paragraph 22 of 1/CP.21-Adoption of the Paris Agreement, the INDC is now considered to be the first Nationally Determined Contribution for Mauritius.

As outlined in the INDC, Mauritius is working towards mitigating its emissions and implementing adaptation actions. However, the proposed adaptation and mitigation activities can only be implemented in the medium- and long-term with necessary support from international funding agencies, grants from climate funds, transfer of appropriate and affordable adaptation and mitigation technologies, technical assistance and capacity development. Specifically, for the GEF project the following two priorities listed in the INDC report are relevant:

- Efficient use of energy through the deployment of appropriate technologies in all sectors of the economy and awareness raising on energy conservation;
- Leapfrogging to low global warming potential refrigerants.

It may further be noted that the Action Plan for the INDC, approved by the Government of Mauritius in March 2016, specifically refers to the need for efficient use of energy through the deployment of appropriate technologies in all sectors of the economy, including an eco-friendly manufacturing sector, and awareness-raising on energy conservation. The goal in terms of energy efficiency is to achieve 10% gains as compared to BAU by 2025.

The project is also in line with the Energy Action Plan update of 2014²⁷, which refers specifically to energy efficiency for industrial processes.

The project is in line with the **Long-Term Energy Strategy of Mauritius, 2009-2025**, which outlines three interrelated approaches to energy reform: energy efficiency, through the use of more efficient appliances, devices, equipment, lamps and vehicles; enhancing security of supply, weighing the costs and benefits of using fossil fuels and renewable energy; and, third, sustainable living, involving a reduction in the need for energy services by changing commercial and domestic behaviour. The Strategy establishes a target national energy efficiency gain of 10% by 2025 relative to 2008. The proposed project supports the Ministry of Energy and Public Utilities' / EEMO's contribution to meeting this goal.

The **Industrial and SME Strategic Plan**²⁸ highlights the importance of manufacturing in Mauritius, noting that it employs 26% of the workforce, accounts for 80% of total domestic exports and contributes 19% of GDP. However, the Plan also notes that the sector's traditional competitive advantages of low-cost labour, tariff protection and preferential access to European markets have been eroded, and that a new focus on technological innovation and 'green' production is required. The Plan identifies high and volatile energy costs as a major threat to the manufacturing sector and proposes a number of responses, including the promotion of energy efficiency, the introduction of environmental management systems and a greater emphasis on ISO quality standards.

²⁶ <http://www.pnee.mu/>

²⁷ Available at <http://publicutilities.govmu.org/English/documents/energy-strategy.pdf>, Page 7.

²⁸ <http://industry.govmu.org/English/DOCUMENTS/TES.PDF>

The **Mauritius Environmental Outlook Report**²⁹, an official Government publication, notes that Mauritius has over-shot its targets for CO₂ emissions, CO₂ emissions per capita and CO₂ emissions per unit GDP. The MEO states that “energy-saving activities constitute the most effective means for a sustainable energy future” but goes on to note that “both energy efficiency and energy conservation are in their infancy in Mauritius, despite the rapid growth in electricity demand during the last 20 years. This can be attributed to a number of interrelated market, policy, finance, business management, information, awareness as well as technology barriers” – a sub-set of which are directly addressed by the proposed project.

The **Digest of Environment Statistics 2014** (2016) notes that, in 2014, CO₂ emission from the energy sector stood at 4 million tonnes, up by 3.5% from 2013. The manufacturing sector registered an increase of 4.9% in CO₂ emissions in 2014 (from 317.2 to 332.7 thousand tonnes). The fossil fuels consumed by the sector went up by 4.6%, from 96.2 ktoe in 2013 to 100.6 ktoe in 2014.

The **National Capacity Self-Assessment** (2005) notes that “there is plenty of room for improvement in the efficiency of energy utilisation in the various sectors of the economy – industrial, hotels, transportation, residential and commercial. The culture of energy management to improve energy efficiency must be widely encouraged and vigorously pursued.” The NCSA identifies “inadequate use of energy efficiency technologies” as a priority mitigation issue and “capacity enhancement for the development and implementation of a national mechanism for carrying out energy audits or assessment and review” as a capacity building priority.

The **Technology Needs Assessment** (2013) identifies the industrial sector as being responsible for 31% of Mauritian electricity use and details a number of prioritised (using multi-criteria analysis) interventions that offer cost-effective mitigation potential. Three of the ten priorities identified relate to energy efficiency.

The **Second National Communication to the UNFCCC** (2010) notes that Mauritius’s overall greenhouse gas emissions are growing by 2.7%/year and those from the energy sector specifically by 5.4%/year. The share of energy sector emissions in the total GHG inventory increased from 59% in 2000 to 69% in 2006. Manufacturing accounts for 15% of energy-related emissions and 10% of total national emissions; manufacturing energy-related emissions grew by 15% between 2000-2006. The mitigation potential of the energy sector is greater than any other, and the SNC notes that energy efficiency can be implemented rapidly and at low cost when compared with renewables.

7. Knowledge Management. Outline the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

The project will initially collate and assess the existing knowledge base of the baseline project and associated initiatives, including energy consumption data, refrigerant consumption data, recommended interventions from already-completed energy audits, and any related cost data relating to interventions. It will also update and maintain an energy consumer database of sites above the 100 tonne oil equivalent threshold.

As new project activities begin to generate data and learning, this will be captured in a central database which will, at a minimum, contain enterprise data, energy consumption data, RAC systems data, audit recommendations and potential savings, and estimated implementation costs.

As the project progresses and implementation results become tangible and demonstrable, the knowledge management system will be used to develop sector consumption benchmarks for sectors, applications and processes; lists of recommended interventions and technologies and associated savings; and fully developed case-studies for general circulation and promotional activities.

The knowledge management system will also take advantage of the ongoing monitoring and collation of data from installed energy management systems, which will provide robust supporting evidence of energy savings

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<http://environment.govmu.org/English//DOCUMENTS/MAURITIUS%20ENVIRONMENT%20OUTLOOK%20REPORT%20SUMMARY%20FOR%20DECISION%20MAKERS.PDF>

from industrial and commercial activities, and a supporting framework for the development and implementation of MRV systems required for this project and in the context of the Nationally Determined Contribution.

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

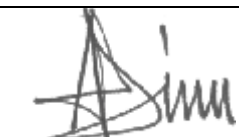
A. RECORD OF ENDORSEMENT³⁰ OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

(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	August 11, 2016

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies³¹ and procedures and meets the GEF criteria for project identification and preparation under GEF-6.

Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Adriana Dinu UNDP/GEF Executive Coordinator		August 12, 2016	Robert Kelly RTA - EITT	+251 91250 3306	Robert.kelly@undp.org

C. ADDITIONAL GEF PROJECT AGENCY CERTIFICATION (APPLICABLE ONLY TO NEWLY ACCREDITED GEF PROJECT AGENCIES)

For newly accredited GEF Project Agencies, please download and fill up the required [GEF Project Agency Certification of Ceiling Information Template](#) to be attached as an annex to the PIF.

N/A

³⁰ For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

³¹ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF