



REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: MEDIUM-SIZED PROJECT

TYPE OF TRUST FUND: GEF TRUST FUND

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A. PART I: PROJECT INFORMATION

Project Title: Deployment of Renewable Energy and Improvement of Energy Efficiency in the Public Sector			
Country(ies):	Jamaica	GEF Project ID: ¹	5843
GEF Agency(ies):	UNDP	GEF Agency Project ID:	4900
Other Executing Partner(s):	Petroleum Corporation of Jamaica (PCJ)	Submission Date:	17 March 2016
GEF Focal Area (s):	Climate Change	Project Duration(Months)	36
Name of Parent Program (if applicable): ➤ For SFM/REDD+ <input type="checkbox"/> ➤ For SGP <input type="checkbox"/>	n/a	Agency Fee (\$):	119,223

B. FOCAL AREA STRATEGY FRAMEWORK²

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Co-Financing (\$)
CCM-2	Outcome 2.1 Appropriate policy, legal and regulatory frameworks adopted and enforced	2.1 Energy efficiency policy and regulation in place	GEFTF	218,791	995,857
	Outcome 2.2 Sustainable financing and delivery mechanisms established and operational	2.2 Investment mobilized		617,868	6,169,980
		2.3 Energy savings achieved			
CCM-3	Outcome 3.1 Appropriate policy, legal and regulatory frameworks adopted and enforced	3.1 Renewable energy policy and regulation in place	GEFTF	127,567	660,295
	Outcome 3.2 Investment in renewable energy technologies increased	3.2 Renewable energy capacity installed		290,761	2,922,622
Total Project Cost				1,254,987	10,748,754

¹ Project ID number will be assigned by GEFSEC.

² Refer to the [Focal Area Results Framework and LDCF/SCCF Framework](#) when completing Table A.

C. PROJECT FRAMEWORK

Project Objective: To reduce GHG emissions from fossil fuel-based power generation through energy efficiency and by demonstrating the exploitation of renewable energy resources for electricity generation in Jamaica.

Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount (\$)	Confirmed Co-financing (\$)	
1. Individual and institutional RE and EE knowledge and capacity strengthening in Jamaica's public sector.	TA	Technical knowledge and institutional capacity strengthened for clean energy development.	1.1 Training for technicians in renewable energy particularly in the solar photo-voltaic subsector: 1.2. Training selected staff from financial institutions in matters of RE and EE; 1.3. Awareness raising programmes for selected senior management and senior maintenance staff at the hospitals 1.4. Building relevant institutional capacity within public institutions	GEFTF	225,148	74,000 (JPC)	
2. Regulatory development for the deployment of RE and EE promotion in Jamaica's public sector	TA	A supportive legal and regulatory framework to facilitate the deployment of small decentralised RE power generation (notably solar PV) and EE programmes in Jamaica's public sector	2.1 Review and strengthening of the legal and regulatory regime to facilitate scale-up of RE and EE. 2.2. Procedure and guidelines for disposal of waste from PV systems and related components	GEFTF	126,000		
3. Economic and fiscal instruments to facilitate the uptake of RE and EE technologies in the Jamaica's public sector	TA	Feasible stand-alone solar PV electricity generation investments to demonstrate the benefits of RE and EE are successfully demonstrated	3.1.Pilot financing incentive scheme (EPC) and a network of financial institutions to support the uptake of RE and EE.	GEFTF	139,750	46,000 (JPC)	
	Inv		3.2. Investments in Solar PV, solar water heaters and energy efficiency retrofits and enhancements in the health sector and other selected public sectors ³	GEFTF	650,000	10,628,754 (DBJ, PCJ, GEF SGP, UNDP, MOH)	
Subtotal						1,141,637	10,748,754
Project management Cost (PMC) ⁴				GEFTF	114,089		
Total project costs						1,254,987	10,748,754

³ The distribution of \$650,000 GEF funds between RE and EE projects is assumed to be consistent with the Table B distribution, with RE projects receiving \$207,999 and EE projects receiving \$ 442,000

⁴ PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

D. SOURCES OF CONFIRMED COFINANCING FOR THE PROJECT BY SOURCE AND BY NAME (\$)

Please include letters confirming cofinancing for the project with this form

Sources of Co-financing	Name of Co-financier (source)	Type of Co-financing	Co-financing Amount (\$)
National Government	PCJ	Cash	1,361,240
National Government	DBJ	Investment	8,368,143
National Government	DBJ	Investment	491,071
National Government	MOH	In-Kind	65,000
National Government	Jamaica Productivity Centre	Investment	120,000
UNDP (National Government)	UNDP	Cash	30,000
IDP	GEF SGP	Associated	313,300
Total Co-financing			10,748,754

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount (\$)	Co-financing (\$)	Project Total (\$)
International Consultants	8,000		8,000
National/Local Consultants	263,150		263,150

G. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? No

(If non-grant instruments are used, provide in Annex D an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/NPIF Trust Fund).

PART II: PROJECT JUSTIFICATION**A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF⁵**

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

1. NA

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

⁵ For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter “NA” after the respective question.

2. NA

A.3: The GEF Agency's comparative advantage:

2. N/A.

A.4. The baseline project and the problem that it seeks to address:

1. During the research stage of the PPG, the information in the PIF has been used to build a more comprehensive profile of the energy situation in Jamaica with reference to the public sector and with emphasis on the hospital sector. There has been new or additional baseline information to what was presented in the PIF. The additional information with relevant data was necessary to reflect the reality of the existing situation in the energy sector and particularly the public sector in Jamaica, and thereby highlighting the case for the GEF intervention. The new or additional information include:
 - A brief overview of the socioeconomic and energy situation in Jamaica including several barriers that restrict the scale up of RE and EE in the country.
 - An analysis of the energy expenditure and consumption in the Public Sector of Jamaica and specifically the electricity consumption within the hospital sector.
 - An examination on the impact of the high electricity usage on the hospitals' ability to function in an environment where the government is experiencing financial challenges

Baseline Analysis

Energy Situation in Jamaica

2. Jamaica is approximately 90% dependent on fossil fuels for its energy needs with the electricity sector accounting for over one-third of its oil consumption. Ninety five percent (95%) of Jamaica's installed electrical capacity is oil-based with electricity prices averaging around US \$0.25/kWh in 2015⁶Jamaica has the fourth highest electricity prices amongst CARICOM member states (excluding Belize, Dominican Republic and Montserrat) and spent US\$2.2 billion on imported oil in 2012 (about 15% of GDP). The country's heavy reliance on imported fossil fuels and susceptibility to oil price fluctuations has greatly impacted the country's economy and overall competitiveness particularly in the manufacturing sector.
3. Jamaica is endowed with natural assets including arable lands, scenic beauty, high levels of biodiversity and modest mineral resources. Much of the country's early growth was generated from a vibrant tourist industry, sugar, bananas and significant bauxite mining. Sugar and bananas are in decline partly due to the removal of trade preferences on the European market⁷. The agriculture sector currently contributes approximately 5.6% to the Jamaican economy and employs about 18.9% of the labour force. For many years, Jamaica had one of the most diversified economies in the Caribbean.
4. Most of the renewable sources currently come from wind, hydro, fuelwood, bagasse, solar and ethanol (used in the transportation sector). The electricity sector consumed the largest volume of petroleum amounting to 6,529,445 bbls (30.8%) for the generation of power mostly from old and inefficient generation plants.

⁶ [http://www.jamaicaobserver.com/business/Understanding-the-cost-of-energy-in-Jamaica---Part-1_18837470:](http://www.jamaicaobserver.com/business/Understanding-the-cost-of-energy-in-Jamaica---Part-1_18837470)

⁷ Vision 2030, National Development Plan.

Approximately 5.6% of the electricity supply mix came from renewable sources for power generation namely hydro, wind and some amount from biomass for both heat and power.⁸

5. The renewable energy sources include 13% from hydropower, 7.9% wind and 79% from bagasse⁹. The GoJ plans to cut public sector energy consumption by 15% through significant improvement in energy efficiency (EE) and the deployment of RE technologies (RETs). The total public sector electricity bill for 2012 was J\$15.4 billion (US\$171.1 million) with energy consumption approx. 477 GWh. The health sector accounted for 6% of total public sector electricity bill in 2012 at a cost of J\$919.171 million (US\$10.2 million), and 30 GWh/yr of energy consumption (an equivalent of 20.7 metric tonnes of CO₂ equivalent annually). Few investments in sustainable energy measures have been conducted to date. In 2006, UNDP supported the audits of 22 hospitals, however, they did not result in investments in RETs and EE improvements despite the possible near- and long-term savings benefits. This was partially due to lack of adequate funding to carry out the necessary interventions.
6. Jamaica's current net installed capacity of all generation plants is 848.9 MW, of which almost 33% of the net thermal capacity is comprised of oil-fired plants with ages over 40 years. Jamaica Public Service Company Ltd has an oligopoly in the electricity generation sector with approximately 588 MW of gross power or over 66% of the total current generation capacity, of which 65 MW which comes from renewable energy. Three hundred megawatts (300 MW) of this capacity has been provided by independent power producers (IPP) who sell power to JPS via power purchase agreements (PPA) for delivery into the grid.
7. Jamaica has a solar irradiation that ranges between 5 to 7 kWh per square meter per day (kWh/m²/day) throughout most of the country. This is suitable for small to large-scale solar power generation. Solar power proliferation has been encouraged facilitated by a Net Billing Policy and supported by a rapid growth in the practitioner/installer market and high price of electricity. Wigton Wind Farm Ltd was Jamaica's first commercial scale wind park with an initial capacity of 20.7 MW (23 NegMicon x 900 kW) which later expanded to 38.7 MW (9 Vesta x 2 MW).

Analysis of the Energy expenditure and Consumption in the Public Sector of Jamaica

8. Electricity was the main fuel cost for the hospitals with total annual cost of J\$167,019,490 (US\$2,530,598) for total annual electricity consumption of 13,858,103 kWh and peak electrical demand of 3,445 kVA. Almost half of the cost (49%) was spent on electricity for air-conditioning and 23% on lighting. Air conditioning and lighting should therefore be considered for any planned interventions.
9. This financial burden on the public sector and high demands from the health sector bill has challenged the Government to explore alternative options to adequately finance and maintain the health facilities and provide the desired level of care for the population. Energy savings and the use of renewable energy are solutions to this sector challenge.
10. Previous efforts in the health sector to assess and achieve greater energy efficiency utilizing renewable energy technologies and energy efficiency have not resulted in significant investments despite its importance. While

⁸ Energy Economics and Planning Unit, Energy Division, Ministry of Science, Technology, Energy & Mining, 2012.

⁹ Source: Energy Economics and Planning Unit, Energy Division, Ministry of Science, Technology, Energy & Mining, 2012.

various root causes exist for not achieving a reduction in energy consumption the UNDP-GEF project provides an opportunity to advance the efforts at energy efficiency, energy conservation and reduced contributions to the emissions levels from the hospital sector using the 3 platforms for the transformation:

- Institutional knowledge and capacity improvements.
- Regulatory development.
- Economic and fiscal instruments.

11. As an external driving force, reduction of the public sector energy bill and increasing energy efficiency are currently components under the current agreements with the International Monetary Fund (IMF) and this may be a significant impetus for achievements in the current dispensation. The target for the public sector energy reduction is projected for as much as 15% using energy efficiency and the deployment of RE technologies an achievable target should the corresponding funding be available.
12. In 2006 UNDP funded the Environmental Management in Hospitals and Schools Programme (for 22 public hospitals and 1 private hospital) from which the Energy Efficiency Unit (EEU) of the Petroleum Corporation of Jamaica (PCJ) contracted Eco-Tech to conduct energy audits of the selected hospitals. Based on the report - "Hospital Energy Audit Project Summary & Efficiency Improvement Investment Packages". The hospitals energy efficiency investment package summarized approximately 33 energy efficiency measures (EEM) for the twenty-two hospitals and the associated recommended for implementation.
13. Because of its historical high energy cost, the government of Jamaica has taken the initiative (through the newly established Energy Efficiency Unit (EEU) of Petroleum Corporation of Jamaica) to increase efficiency of public sector facilities. The hospitals have been targeted first as they are among the most energy intensive of the public sector facilities. To this end, the Hospital Energy Auditing Programme was conceived and developed by PCJ and funded by United Nation Development Programme (UNDP). The energy audits identified and documented cost effective energy and water savings
14. Given the country's high debt burden and economic challenges, it has been difficult for the GoJ to provide adequate and additional resources to defray the cost of its public sector commitments. In particular, the government has fallen behind in upgrading public health facilities. This state of affairs has contributed to low power factor in hospitals, high and inefficient electricity consumption, or lack access to hot water, undermining the quality of service. As a consequence, the government is now focusing on public sector energy reduction measures in the health sector. In 2012, the health sector accounted for 6% of total public sector electricity bill at a cost of J\$919.171 million (US\$10.2 million), and 30 GWh/yr of energy consumption.

The Baseline Project and the Problem that it seeks to Address

15. The problem that this project seeks to address is to remove the barriers that would retard uptake of renewable energy (particularly for solar PV on roof tops, solar water heating and energy efficiency) or to make those barriers less impactful on efforts to scale up renewable energy in Jamaica. Among the barriers to be addressed include:
16. Strengthen the regulatory framework that governs the development and deployment of RE and EE technologies. Notwithstanding the fact that several energy issues have been addressed through appropriate policy and strategic documents, the legislative framework to support them have been rather weak. In several instances the supporting legislation and regulations are rather antiquated and not relevant to what is required to advance a modern energy sector forward. As a consequence, initiatives to promote renewable energy cannot obtain the impacts as often envisaged. Efforts in renewable energy and energy efficiency are therefore often lagging, isolated or

unsustainable. Critical is the need for an ESCO policy and legislation, and consistency in the Net Billing programme.

17. It has been recognised that there is limited technical expertise in public sector institutions (particularly in Jamaica's health sector) tasked to oversee electricity equipment purchases and performance (e.g. quality standards, cost-benefit analysis. Some training and certification in capacity strengthening are on-going at the post-secondary, tertiary and professions levels under different projects. This output will however, provide targeted training in renewable energy technologies and energy efficiency with emphasis on solar photo-voltaic system and solar water heating design and installation, quality control and certification schemes, product performance and maintenance, and retrofitting of solar thermal systems and energy efficiency systems. Such training will build relevant technical capacity in the sector¹⁰. GEF assistance will be required for the following activities. To avoid duplication, the project will support ongoing training programmes in the country. The activities will involve the following.
18. There is no mandatory and modernized legislative building code in Jamaica and the integration of an appropriate building architectural that would give effect to energy efficient designs is lacking. Consequently, it encourages developers including the government to deviate from standards that promote energy efficiency in buildings (natural lighting and cooling) to more convenient cosmopolitan "sealed box" designs that require greater energy to maintain comfortable building envelope.
19. The capacity to develop standards and test energy product is also critical but lacking. The Bureau of Standard Jamaica of Jamaica (BSJ) is the only entity mandated to test and certify PV power inverters (none of the other grid connected equipment components is being tested). It has a defunct laboratory for testing solar water heaters and an inadequately equipped laboratory for testing miscellaneous energy efficient standards.
20. The EU-ESCO project has identified a gap in capacity development at the secondary, primary, and vocational levels (wide variations in content, levels, and skill adumbrated in the curriculum) for future sustainability of the industry. The ESCO sector needs to be developed to deliver the services critical to the sector. There is need for legislative intervention to support the ESCO sector.
21. The upfront investment cost of purchasing RE equipment and making investment in EE building retrofits is either prohibitive for many potential customers or requires them to secure debt financing. Since the lending market for RE and EE is relatively young in Jamaica, many financial institutions lack a full understanding of the risks, opportunities, and paybacks of investments. This leads to the structuring of lending terms that are not optimally structured for RE and EE investments. This can lead to high interest rates, collateral requirements or short tenors which lead many consumers to decide that a loan is not worthwhile. This situation proves especially challenging for the lowest income groups who lack access to finance and where savings in electricity costs could be especially beneficial. A financing derisking mechanism (Energy Performance Contracting) is being proposed to address this issue.

¹⁰ Where there gaps in the programmes, the project will support curriculum enhancement.
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22. One of the most effective method of advancing the case for renewable energy is through public display and demonstrations of solar-PV installations on rooftops of public buildings that would stimulate interest in the use of the technology and encourage replicate its application elsewhere.

A. 5. Incremental /Additional cost reasoning:

23. Having conducted a comprehensive baseline assessment during the PPG exercise, several complementary activities have been designed to address the barriers that have been identified. As a consequence, there have been a number of findings that necessitated additional inputs to complement what is written in the PIF. They include:
- a. The derisking mechanism (Energy Performance Contracting) which has some similarity to what was alluded to in the PIF will become the major mechanism through which the bundle of investments in solar PV, energy efficiency retrofits and solar water heating will be effected by means of an ESCO type facility. The basic operating modality includes:
- **A guarantee** that an agreed-upon set of energy-saving measures will perform as stipulated in the performance contract. The ESCO typically guarantees a certain level of energy savings (or locks in historical energy costs) over a fixed period of time, based on a standard set of assumptions about building occupancy and usage. If the performance contractor does not deliver the promised savings, they are responsible to pay the difference. ESCOs earn their profits on the basis of the energy savings that the investments generate over time, as well as the mark-up they charge on component costs.
 - **Shared savings** under which a certain level of performance is stipulated (but not guaranteed) and the customer pays the ESCO based on the projected savings over a fixed period of time. Repayment is typically based upon historical energy costs.
- b. It was initially recommended tha 10-15 hospitals be target for RE and EE interventions. After serious consideration, discussions with relevant stakeholders and an examination of all circumstances it was agreed that a more cost effective and impactful approach with the limited project funds will be to reduce the number of hospital to 5.
24. As discussed in Component 3 Output 3.2, the investment package has been modified in keeping with budgetaryconstraints. The investment package outlined will be pursued using an ESCO model.

Table: 1 Main Barriers and How they will be Addressed by the Project

Description	Barrier Type	Priority	Project Activities
<p><i>Lack of awareness of RE and technical capacity RE and EE at the Individual and institutional level in the public sector of Jamaica.</i></p> <p><u>Project Component: 1: Individual and institutional RE and EE knowledge and capacity strengthening in Jamaica's public sector.</u></p> <p>Outcome 1: Increased knowledge in RE and EE for Individuals in the public sector and strong institutional capacity to support RE and EE development in Jamaica's public sector.</p> <p>This component is designed to address the lack of technical capacity in the public sector to support the renewable energy sector and in particular solar PV and SWH industry.</p> <p>It has been recognised that there is limited technical expertise in public sector institutions (particularly in Jamaica's health sector) tasked to oversee electricity equipment purchases and performance (e.g. quality standards, cost-benefit analysis. Some training and certification in</p>	<p>Awareness</p>	<p>Very High</p>	<p><u>Output 1.1: Technicians within the public sector trained and certified to acceptable industry standards in renewable energy technology and energy efficiency particularly in the solar photo-voltaic subsector:</u></p> <p>Output 1.1 are designed to provide awareness and build capacity to address the limited technical expertise in public sector institutions (particularly in Jamaica's health sector) tasked to oversee electricity equipment purchases and performance (e.g. quality standards, cost-benefit analysis) etc. It also intends to build and strengthen the technical capacity by providing targeted training for selected groups. The activities would include:</p> <ul style="list-style-type: none"> • Assist with the development of training programme modules and related materials to train key stakeholders (including system suppliers and installers) on technical and other quality criteria. • Provide financial support to reputable training institutions in Jamaica such as the HEART Foundation, University of Technology, etc. for their ongoing training programmes in various aspects of RET and EE (in keeping with the objectives of the project); as well as to develop customized programmes to augment the technical skills of building inspectors, local government officers, NEPA representatives who approve development permits. • Assist with developing a manual and template for PV system design and installation), including sizing (including relevant calculations), orientation and other technical requirements to be disseminated in soft copy format in relation to the foregoing bullet. • Sponsor the training of a cadre of technicians to guarantee the participation of public sector maintenance engineers, women, youths, unemployed and other disadvantaged groups in installation, retrofitting of RE and EE systems, service guarantees and maintenance contracts, thereby building capacity within the public sector to respond to the needs of the sector¹².

¹² There have been failure of equipment in the Ministry of Health due to for a variety of reasons including lack of trained technicians, and knowledge about the system to effect on time maintenance intervention.

Description	Barrier Type	Priority	Project Activities
<p>capacity strengthening are on-going at the post-secondary, tertiary and professions levels under different projects. This output will however, provide targeted training in renewable energy technologies and energy efficiency with emphasis on solar photo-voltaic system and solar water heating design and installation, quality control and certification schemes, product performance and maintenance, and retrofitting of solar thermal systems and energy efficiency systems. Such training will build relevant technical capacity in the sector¹¹. To avoid duplication, the project will support ongoing training programmes in the country. In this regard, the HEART – Trust /NTA is recommended to conduct training identified by the project. It has established local and international certification processes, comprehensive and practical syllabuses and is recognised as a GoJ institution. Training from the HEART-Trust/NTA will support the project objectives by utilising the GoJ technical resources from the institution, thereby ensuring that both national and international standards are adhered to and promulgated in satisfying the GEI requirements for the industry and thereby creating opportunities for post-secondary unemployed male and female youths. HEART-Trust/NTA has also indicated that it will utilise a</p>			<ul style="list-style-type: none"> • Develop a gender based disaggregation data base with information on the persons trained, so that they can be identified and deployed within the energy sector to provided related services when needed. • Develop targeted awareness and information packages about renewable energy systems (main focus on solar PV) and RE programmes and their applications and benefits for the hospital sector. • Build capacity for monitoring, reporting and verification (MRV) among technical staff that are tasked with monitoring and reporting greenhouse emission (GHGEs), <p><u>Output 1.2: Selected staff from financial institutions have increased knowledge in matters of RE, EE and Energy Performance Contracting</u> Many Jamaican financial institutions lack a full understanding of the risks, opportunities, and paybacks of RE/EE investments. This leads to the structuring of lending terms that are not optimally structured for such investments. This can lead to high interest rates, collateral requirements or short tenures which lead many consumers to decide that a loan is not worthwhile. This situation proves especially challenging for the lowest income groups who lack access to finance and where savings in electricity costs could be especially beneficial. As a consequence, many potentially good projects have been over looked.</p> <p>While Jamaica has made strides in improving the availability and accessibility of financing for RE/EE, there remains a lack of awareness among lenders on the benefits and financial performance of RE/EE technologies. In particular, lenders are not familiar with the energy performance contracting model. This lack of understanding could restrict access to financing and thereby hinder the development of the ESCO market and the ability for ESCO to purchase the necessary equipment for efficiency upgrades.</p> <p>It is therefore recognised that in order to address this barrier, training is required for selected staff of lending institutions to provide an understanding and appreciation of selected RE technologies and EPC. The activities will:</p> <ul style="list-style-type: none"> • Deepen lender understanding of analysing the risks, opportunities, return on investment and the reality of favourable payback for RE/EE investments

¹¹ Where there gaps in the programmes, the project will support curriculum enhancement.
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Description	Barrier Type	Priority	Project Activities
<p>compilation of its shorter customised modules for professionals who wish to enhance their competence on the job using a shorter programme delivery. These institutions train young technicians who will eventually gain employment in the private and public sectors. Hence, some of the current deficiencies that exist in the public sector will be addressed through these training programmes. The project will in effect assist in institutionalizing these programmes which will enhance their sustainability. In support of developing a cadre of trained RE and EE technicians, the Development Bank of Jamaica (DBJ) and the Petroleum Corporation of Jamaica (PCJ) have maintained a database of energy auditors. It will be appropriate for the PCJ to increase its database include persons trained under this project.</p>	Legal & Regulatory	High	<ul style="list-style-type: none"> • Make lenders more comfortable with energy performance contracting including the role of the ESCO, the project financing component and the project savings guarantee • Introduce lenders to the UNDP-GEF supported EPC projects and the proposed model <ul style="list-style-type: none"> • Provide a forum for the various institutions involved in the EPC projects to meet including the future ESCOs, public institutions and potential lenders. Design specific training for operatives in the financial sector in the fundamentals of RE technology and EE programmes, project development and implementation, project risk. • Organised field trips where participants can witness firsthand experience on installed PV systems and their applications to income generating activities. <p><u>Output 1.3 Awareness (in RE and EE) of senior management and maintenance staff at selected hospitals, other public institutions and NGOs and CBOs enhanced</u> This will sensitize the relevant staff at selected hospitals and other public institutions on critical aspects of RE an EE programmes. Maintenance staff will also receive training so that they will become familiar with the RE technology and equipment under their supervision and care. In addition, in collaboration with the GEF SGP, this project will include training for NGOs and CBOs who are implementing RE and EE projects in community centres in rural and urban Jamaica. The training programmes under this output will cover:</p> <ul style="list-style-type: none"> • Developing methodologies for creating an energy management plan including identifying, analyzing and prioritizing RE/EE investments and scheduled maintenance of equipment and systems. • Overview of Jamaica’s Green Procurement Guide including the process of and best practices for procuring RE/EE technologies • Post installation methods for monitoring, reporting and verifying the impact of the RE/EE upgrades on building energy use; methods for monitoring the performance of RE/EE technologies; and methods for operating and maintaining technologies <p>Furthermore: The public and CSOs will be invited to participate in the program in two ways. First, the demonstration projects will be conducted at public hospitals in order for them to be publicly displayed and communicated to visitors. Second, the ESCO training program will include a collaboration with GEF SGP to include training for NGOs and CBOs</p>
	Legal and Regulatory	High	

Description	Barrier Type	Priority	Project Activities
<p><i>Lack of appropriate legal and regulatory framework to facilitate the scaleup of RE and EE.</i></p> <p><u>Project Component 2: Regulatory development for the deployment of RE and EE promotion in Jamaica's public sector.</u></p> <p>1. Outcome 2: A supportive legal and regulatory framework to facilitate the deployment of small decentralised RE power generation (notably solar PV) and EE programmes in Jamaica's public sector</p> <p>Despite the plethora of regulatory and policy instruments to catalyze RE and EE in Jamaica, it has not realized the level of penetration of renewable energy that was envisaged. The lack of appropriate legislation and the capacity to enforce policy initiatives is a barrier to advancing the energy agenda forward. The following activities with support from the GEF can assist in addressing this barrier</p>		High	<p>who are implementing RE and EE projects in community centres in rural and urban Jamaica.</p> <p>Senior management at all public sector institutions will be encouraged to pursue voluntary EE and RE goals in advance of stronger Government regulations. Goals and targets, such as LEED, can be a highly beneficial market signal, further strengthening private sector buy-in, confidence, and adoption of country level directives.</p> <p><u>Output 1.4: Relevant institutional capacity within public institutions strengthened to facilitate an increase in the scale-up of RE</u></p> <p>This is designed to build institutional capacity.in several public institutions including the Bureau of Standards of Jamaica (BSJ), the government electrical electorate, etc. that are mandated with responsibility to perform services such as developing standards for testing and accreditation of energy services and products.</p> <ul style="list-style-type: none"> ▪ Provide additional support for the Bureau of Standards (BSJ)¹³ for the installation or upgrade of the quality testing facilities for certification of renewable energy and energy efficiency equipment. ▪ Assist in the development of technical skills with the competence to test and certify RE and EE equipment. <p><u>Output 2.1 The legal and regulatory regime to facilitate scale-up of RE and EE reviewed and strengthened</u></p> <p>This is aimed at strengthening the legal and the regulatory framework to facilitate the promotion of RE and EE in a sustained manner. In some cases, policies may need to be revised in keeping with new and emerging technologies and market conditions. The following actions are necessary to address these matters and can be supported by the GEF resources:</p> <ul style="list-style-type: none"> • Strengthen the Jamaica Productivity Centre's ESCO project to support development of the institutional and regulatory framework, policy, protocol and regulations to govern the ESCO industry as well as standards and norms to achieve energy certification. • Develop a codified system for Net Billing licensing, inspection, and certification of RE and EE equipment, systems and products (e.g. solar water heating and photo voltaic, and energy efficient air conditioning & lighting) in the Jamaican health sector which can be applicable to the rest of the public and the commercial sector.

¹³ The World Bank is already providing some technical assistance to the Bureau of Standards for the upgrade of equipment and systems to perform a wider range of functions including testing of RE and EE equipment.

Description	Barrier Type	Priority	Project Activities
<p><i>Lack of attractive financing to facilitate invest and the scale up of RE and EE in the public and private sector of Jamaica.</i></p> <p>2. Project Component: 3: Economic and fiscal instruments to facilitate the uptake of RE and EE technologies in the Jamaica's public sector</p> <p>3. Outcome 3: An operational Energy Performance Contracting mechanism to facilitate ECSOs in their investments portfolio towards the scale up RE and EE in the public and private sector of Jamaica:</p> <p>For many decades, access to finance for renewable energy and energy efficiency projects has been identified as a major barrier to the public and private sectors as well as households in Jamaica. Multiple lending facilities exist (see Table 6) through the Development Bank of Jamaica and other commercial banks. Investments in the public sector, however, have remained limited due to their inability to access such loans. There are also several fiscal initiatives aimed at catalysing the RE sector (see Table 2). Notwithstanding, these initiatives, RE and EE have not gained momentum in</p>	<p>Financing Mechanism</p>		<ul style="list-style-type: none"> • Analysis of the current building regulations with a view to upgrading them to ensure that building designs are aligned to national standards and practices and thereby promote energy efficiency; and to identify any barriers that may need to be addressed to facilitate implementation of rooftop PV systems and energy efficiency applications in public buildings; • An analysis how these legal and regulatory instrument impact women. <p>An analysis of the current building regulations with a view to upgrading them to ensure that building designs are aligned to national standards and practices and thereby promote energy efficiency; and to identify any barriers that may need to be addressed to facilitate implementation of rooftop PV systems and energy efficiency applications in public buildings;</p> <p>Output 3.1: <u>Uptake of renewable energy strengthened with the Energy Performance Contracting pilot programme.</u></p> <p>To overcome the barriers to public sector investment in RE and EE technologies that can reduce electricity consumption and greenhouse gas emissions, a de-risking mechanism in the form of a pilot programme for the hospital sector is proposed. Through the pilot program the hospitals would enter into agreements with Energy Service Companies (ESCOs) which would take the performance risk and implements the energy project. The hospital derives repayment towards the investment from energy savings. (<i>See Sustainable Energy Services Industry (ESCO) in Jamaica</i> Section below).</p> <ul style="list-style-type: none"> • Review existing financial mechanisms to identify gaps that might constrain the effectiveness of some financial schemes with the possibility of placing developers with small-scale RE projects at a disadvantage¹⁴. • Establish the Energy Performance Contract pilot programme mechanism using an ESCO Model with various institutional and market characteristics. Prepare associated documentation relating to process, contracting and reporting procedures. The EPC pilot programme will initially target public sector investments in building retrofits, lighting, small decentralized solar photovoltaic and solar thermal systems. • Knowledge building between international consultant, local consultant and programme implementation unit so the EPC model can be scaled up or replicated independently in the future. <p>Review of PCJ's outcomes from auditing done at each hospital to identify gaps that need to be funded for effective implementation. Among them are:</p>

¹⁴ Cognisance must be given of the fact that due to the government of Jamaica's current arrangement with the IMF may restrict it from providing additional financial incentives for RE.
GEF5 CEO Endorsement Template-February 2013.doc

Description	Barrier Type	Priority	Project Activities
<p>Jamaica and the cost of electricity and energy services remains one of the highest in the region. The GEF project aims to scale up public sector investment in RE and EE in order to deliver the following outputs (see overleaf):</p> <p>Through the EPC contracting model the PCJ and the GEF will jointly invest in EE and RE interventions in five hospitals (total cost of US\$2.1 million). GEF will contribute \$650,000 in the form of an investment grant and the remainder will be invested by PCJ. The GEF investment grant will reduce the overall amount of investment that PCJ will need to recover through the energy performance contracts with each hospital. Investments in RE and EE interventions will deliver reductions carbon emissions, in electricity consumption and in electricity costs in the health sector.</p> <p>It is being proposed that the Petroleum Corporation of Jamaica (PCJ) will implement this component of the project. As a consequence, the PCJ implementing arm will then use the proposed Energy Performance Contract (EPC) Model and serve as an ESCO for the delivery of the outputs and cost recovery mechanism for the project. It is anticipated the amount budgeted for investment under this component will be assigned accordingly.</p>			<ul style="list-style-type: none"> ▪ Baseline consumption assessment of each hospital ▪ Planned investment for each hospital and associated paybacks <ul style="list-style-type: none"> • Provide initial on-boarding training to participants and key stakeholders. • Provide on-going support, training and contract negotiation support to pilot programme participants and key stakeholders including the Ministry of Health, PCJ and the private sector. • Test and monitor the performance and impact of the pilot financing mechanism with a view to its future application and scale-up. <p><u>Output 3.2 Investments in Solar PV, solar water heaters and energy efficiency retrofits in the health sector encouraged:</u></p> <p>The activities under this project will include the following: Provision of \$650,000 RE and EE interventions in five hospitals and health facilities.</p> <ul style="list-style-type: none"> • Pursue the following investments to address the energy cost and efficiency at the hospitals selected: <ul style="list-style-type: none"> I. 150 KW solar PV installation for 2 hospitals (totaling 300KW) with batteries for two days backup power II. 40 sq ft Solar water heaters - 44,800 gallons for 5 hospitals III. Energy Efficiency Retrofits for 5 hospitals (See list as per Table in Annex III) IV. Installation of 4 KW wind turbines for two primary schools (2 KW each) • Organise field trips where participants can witness first-hand experience on installed PV systems and their applications to income generating activities <p><u>Output 3.3 Other renewable energy sources (wind energy) piloted in the public sector on a small scale.</u></p> <p>Traditional wind mapping exercises can take between one and two years to complete and as a result the levels of investment for small scale producers have been too high. Recently adapted methodologies, utilizing existing programmes and models to produce reliable data for wind mapping over much shorter periods presents an opportunity for Jamaica to review and assess the potential for small scale users. Under the UNDP funded Capacity Development for Energy Efficiency and Security project a total of twenty two sites were identified in the Wind Power for Domestic/Community Feasibility Study & Regulatory Review. The pilot of two wind turbines in two rural schools will be conducted under this project. The pilot will allow for the appropriate assessment and evaluation of the viability of wind energy for small scale domestic applications. The wind turbines are expected to have the following specifications:</p>

Description	Barrier Type	Priority	Project Activities
			<ul style="list-style-type: none"> - Optimum height of 60ft (18.3M) with annual wind availability exceeding 95%. - IEC class I and based on proven technology able to withstand up to Category 4 hurricane - Balance of Plant with communication systems and back-up power for the substation switchgear in the event of extended outages

25. The proposed project seeks to reduce the CO₂ emissions in the generation of power. There are other complementary benefits by which the project impact can be measured. They include:

- Kilowatt of grid tie solar PV systems installed during project implementation and after the end of the project
- Number of technicians who have been trained and certified in solar pv design, installation, maintenance, and EE retrofitting of buildings
- % reduction in the electricity drawn from the national grid
- % savings on imported fuel
- Demonstration of the impact of the derisking Energy Performance Contracting Model on the increase uptake of RE
- No of Energy Performance Contracts (EPC) signed
- No of persons in the public and private sector sensitized on RE and EE programmes
- No of women and youths trained and employed in the energy sector
- No of job opportunities created
- No of staff from financial institutions who are sensitized about the fundamentals of RE and EE and related issues

Table 2 is a summary of expected direct and indirect GHG emissions reductions for RE and EE projects

Intervention Description	Details	Lifetime Direct Emissions Reductions (Cumulative)
		3,847 tCO₂
Grid-connected solar PV panels	150 kW systems in x 2 hospitals	
Solar water heaters	44,800 gallons of SWH on 5 hospitals	24,595 tCO ₂
EE retrofits & system and equipment improvement	Various building and system retrofits to enhance efficiency	10,902 tCO ₂
Totals:		39,344 tCO₂¹⁵

Direct Emission Reductions	Indirect Emission Reductions – Bottom-Up	Indirect Emission Reductions – Top Down
39,344	78,688	718,400

¹⁵ Lifetime assumptions: SPV 15 years, SWH 15 years, EE 10 years. NB GEF suggestions vary: BIPV 10 years, no explicit assumption for SWH, EE 5 years

26. For the two 2KW wind turbines installed on two rural schools, an approximate 4.3tCO₂/yr can be avoided if the wind regime is good. Assuming 20 year useful life for these investments, an incremental 86 tCO₂eq can be avoided from this 4KW project.
27. Without these planned interventions and successful demonstrations for renewable energy power generation projects, it is difficult to meet the government's targeted goal as stated in the National Energy Policy. More over the knowledge and level of awareness in Jamaica will not be sufficient to induce RE investments into solar PV electricity generation, SWH and energy efficiency retrofits and enhancements. Without the derisking Model Energy Performance Contract (EPC) the existing incentives will not be adequate to attract the independent power producers (that includes private property owners in Jamaica). Without the removal of the identified barriers, and the support for the Net Billing instrument, the grid-connected renewable electricity market will not develop outside the current modality.
28. The proposed project objectives and outcomes, targeting the strengthening of institutional, regulatory and other capacity mechanisms for RE and EE should also be supported by the various Government entities in Jamaica. This project puts measures in place for private participation in the upgrade of public health facilities and demonstrates the benefits to the Government in reducing its public sector energy bill while concurrently building a sustainable economy with enhanced capabilities across multiple sectors.
29. The Government of Jamaica has recognized as a national priority, and outlined in its Sustainable Roadmap and National Energy Policy, the removal of regulatory and institutional barriers associated with and affecting an energy transition to RE and EE. More specifically, Jamaica has enacted a series of energy and electricity sector policies which are aimed at scaling up the country's RE and EE sector. Component 2 includes an analysis of key measures (i.e. legislation, policies and regulations) within Jamaica's regulatory framework. Specifically, the analysis will:
- a. Review how each measure works and associated strengths/weaknesses.
 - b. Provide recommendations on how to improve the implementation of existing regulatory framework measures (e.g. develop a codified system for Net Billing licensing, create an installer inspection programme and certification system of RE and EE equipment).
 - c. Recommend adoption of new measures to strengthen the regulatory framework and promote government leadership (e.g. adoption of mandatory or voluntary sustainable building targets, adoption of a building code).
 - d. Prepare model legislation, policies and regulations and guidance on its adoption
 - e. Provide suggestions on ways to collaborate with ongoing initiatives to grow the RE/EE sector through partnerships with government agencies, CSOs, development agencies, etc.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

30. The following Table summarises some risks that have been identified during the project preparation,

Table 3: Internal Project Risks and Mitigating Actions

Risk	Level of Risk	Impact & Probability	Mitigating Actions
Lack of communication and to some extent coordination amongst various stakeholders implementing similar projects Jamaica	<u>Moderate</u>	P = 2 I = 2	The project will ensure the coordination and integration of activities in support of energy and climate change objectives, in line with Jamaica's National Energy Policy 2009-2030. It will be implemented using the DIM modality with the UNDP as the implementing agency and the PCJ the implementing agency for Component 3 with guidance from MWLECC (climate change policy oversight). These three institutions are tasked to engage other beneficiary ministries and public entities. There will be a strong communication network with similar projects being implemented in Jamaica in order to build synergy and avoid duplication. The project will also engage the Bureau of Women's affairs.
Delays in technical components of the project due to lack of relevant capacity in the sector	<u>High</u>	P = 3 I = 4	The Project is designed to build capacity at the technical level to strengthen the RE sector in Jamaica by providing trained personnel that can design, assemble, install and maintain solar PV, solar water heating and retrofit EE systems. It will build the necessary awareness and provide relevant training for selected personnel from the financial sector and the ESCO industry who will be implementing the EPC.
The uptake of RE project remains low notwithstanding grant funding investments for RE and EE to facilitate up take of RE	<u>Low</u>	P = 3 I = 5	Despite several financial programmes that have been established to support investment in the energy services sector, the results are slow in coming and available energy funds remain largely unused. There is a limited number of private local actors and low capacity. The few EE and RE projects presented to banking institutions are unattractively packaged with long payback periods. The Energy Services Company (ESCO) industry using the proposed Energy Performance Contracting (EPC) has the potential to create new businesses and new jobs, deliver savings in energy consumption and cost, and provide climate change mitigation through reduced carbon emissions.
The inability of the government to broaden existing fiscal and financial incentives or to approve new incentives because of its IMF commitments	<u>Moderate</u>	P = 3 I = 3	This project will support the government's agenda to promote access to cleaner energy sources. As a consequence of the high electricity tariffs, and the costs to Jamaica's public sector (particularly the health sector), intervention in solar pv, solar water heating will redound to tremendous savings for the government.
Project Management risk.	<u>Medium</u>	P = 1 I = 4	Selection of staff without the appropriate skills may comprise the delivery of the project. To avoid associated risk, the selection of key project staff must be based on competitive selection procedures emphasising the skills and qualification requirements stipulated in the ToR.

31. The overall possible risks that could be associated with this project can be considered low. However, all necessary efforts have been made in the design of this project to mitigate perceived project risks, there are inevitably some unavoidable residual risks that will have to be carefully monitored and managed to ensure project success. Project risks can be categorized as external (global and policy-related) and internal (risks inherent to the Project design that could be controlled by Project management). Internal risks and recommended mitigation measures are summarized in Annex 1

32. External risks include:

- An unstable financing environment in which different financial and fiscal incentives, cost recovery mechanisms and other supporting measures are introduced and removed at short notice in an unpredictable manner.
- Short term fiscal incentive would not allow the market to reach critical mass at which point it will begin to experience growth.
- Government of Jamaica's inability to introduce new incentive packages for RE uptake at this time based on its stringent IMF commitments.
- Inability to build the necessary institutional and local capacity during the Project period due to lack of qualified personnel;
- The continued reduction in the price of oil on the world market may likely give a false sense of security to the country's energy solution and therefore the gains made in the promotion of RE may lose some momentum in advancing the energy agenda forward.
- Failure to secure co-financing from potential project partners. This may result from the unforeseen diversion of government budgets and resources towards issues with more pressing priorities such as disaster relief and large infrastructure projects that would generate significant economic benefits.
- High upfront costs of PV systems may still pose a barrier to some targeted clients despite the proposed financial mechanism. Long-term and affordable financing (lending) mechanisms may be critical. High interest rates may undermine the attractiveness for financing RE investments.

A.7. Coordination with other relevant GEF financed initiatives:

33. There are no changes in the proposed coordination from when the PIF was approved.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 How the stakeholders will be engaged in project implementation.

34. The Project Steering Committee (PSC) will have oversight of the Project Management Unit (PMU). The PSC will consist of a Chairperson (from the Petroleum Corporation of Jamaica), with PSC members from Ministry of Health, one representative from the Ministry of Science and Technology Energy and Mining (MSTEM) representative from the Ministry of Water, Land, Environment and Climate Change (MWLECC) and UNDP Jamaica. The primary functions of the PSC will be to provide the necessary direction allowing the Project to function and achieve policy and technical objectives, and to approve annual Project plans and M&E reports. Other stakeholders to be engaged in project implementation are discussed in Paras 29-38 of the UNDP-GEF Project Document. The Project Management Unit (PMU) will consist of a National Project Manager (NPM),

a Project Officer to be based at the Petroleum Corporation of Jamaica, and an Administrative Assistant (AA). The organization structure of the project is outlined in Figure 5

B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):

35. Deployment of Renewable Energy and Improvement of Energy Efficiency in the Public Sector in Jamaica will result in several socioeconomic benefits during and after its completion. Among the socioeconomic benefits are:

- The project will remove a number of barriers explained above to enable the scale up of selected renewable energy technologies and thereby reduce the incidence of GHG emissions. An increase in the use of renewable technologies will result in the reduction in the amount of fossil fuel that are required to generate electricity and would therefore reduce the amount of carbon emission that would emanate. This will result in savings on fuel which could be used for other purposes. It is anticipated that with the removal of the barriers identified earlier, that there would be significant environmental benefits arising from the deployment of a greater proportion of renewable energy technologies and implementation of energy efficiency programmes.
- The success of this project will encourage the development of a strong private sector involvement in Solar PV in Jamaica and thereby stimulate the growth of a sustainable PV market. The project results will also give confidence to the private sector to pursue RE technology and strengthen the resolve for further investments.
- The project will raise awareness not only for hospitals operatives but also in the private sector where power generated from solar PV can be used to power scalable projects for a variety of applications even at the domestic level. This awareness can open possibilities for small business development particularly at the community level using power generated from solar PV at an affordable cost. This of course will assist with poverty eradication and empowerment of marginalised groups like women and youths.
- Investments in RE power generation will create more than 120 full-time jobs, both skilled and unskilled, in the solar-PV energy sector alone. As the market potential for solar PV is fully realised, it is estimated that over 20,000 rooftops will have solar PV installation.
- The public sector of Jamaica will be enriched with an increased number of trained personnel in various aspects of PV technology. These persons will form part of a data base for employment deployment and will therefore enhance the employment possibilities for disadvantaged groups like women (many of whom are bread winners in the home).
- While ESCO models are widespread in the US (currently a market greater than US \$6 billion annually), developing countries and the Caribbean region have limited experience with ESCOs to date. This project is also innovative as it applies a known model in an untested market with a series of support mechanisms that will set it up for successful implementation. The combination of PCJ as the lead ESCO partner, which is will to assume a portion of the investment risk, combined with a UNDP-supported investment cost buy down and rigorous training program makes this a cutting edge program for the region and UNDP.

B.3. Cost-effectiveness in project design:

36. The matter of cost effectiveness should be determined after all renewable energy technologies are examined within the context of what technology is most economically applicable and available to be deployed for demonstration purposes in Jamaica. The geophysical make up of Jamaica give rise to hydro, wind and solar endowment. The exploitation of hydropower is a rather expensive undertaking. Traditionally, hydro power has been an important part of the energy mix of Jamaica accounting for about 23%. Moreover, the water resource may be oversubscribed if further exploitation were to be pursued. Notwithstanding the fact that hydropower is a cost effective technology in reducing greenhouse gas emission, the process is rather lengthy and cannot be done in the short term.
37. Solar photovoltaic is the most appropriate technology for small scale decentralised electricity generation options and for demonstration purposes, on the basis that it is less sensitive to site selection, easy to install and has demonstrated tremendous cost reduction over the last couple of years. Solar PV technology is modular and can be scaled for use on a household roof top, in medium-size settings such as resorts and industrial facilities, Solar PV can be deployed quickly with less risk than say wind energy or hydropower which require lengthy data gathering periods to justify the investment or as part of a large network of utility-scale PV farms solar PV has a lifetime of over 20 years with limited annual maintenance
38. In order to further optimize the Solar PV and SWH components of the project, after consideration of the underlying project assumptions, the following revisions were made to the project design:
 - a. Using a more realistic \$/watt assumption of US\$3/watt, the total system wattage was increased to two 150KW systems, adding an additional 100KW in generation to the project and within the estimated budget. Recent regional surveys have found that \$/watt installations as low as US\$2/watt have been reported in the Caribbean market. Although \$3/watt is significantly lower than the original \$6/watt assumed for the project, it is a reasonable assumption.
 - b. Similarly for SWH, using a standard energy production multiplier of 4000kWh/40sq ft collector, the system outputs for the SWH project were recalculated. This multiplier was derived from the Barbados Labor and Regulation Handbook and is suitable for regional use.
39. In total, the cumulative direct emissions reductions from GEF investments made during the project will total 39,344 tCO₂ (Indirect Bottoms up and Top Down: 33,838 tCO₂ and 718400 tCO₂ respectively). The GEF contribution allocated towards investment of solar panels on rooftops of 2 public hospitals with a combined generation capacity of 300 kW, will translate in a cumulative direct reduction in emissions of 3,847 CO₂ eq tonnes over the lifetime of the project.
40. Revisions to project assumptions have resulted in an increase in project benefits. Based on these revisions, the cumulative GEF\$/ton is US\$32/ton = \$1,254,987/39,344 (i.e. GEF contribution/ lifetime direct CO₂ emissions)
41. It is evident that the inefficient or non-functioning equipment and energy systems in the hospitals will have to be replaced in the short term. Given the economic constraints that the government currently faces, it is highly likely that hospitals and other public sector institutions will delay invest in new systems or revert to a business as usual scenario and replace these equipment and appliances with traditional outdated high energy consumption units. With GEF investment, the hospitals will install solar water heaters and several energy efficiency measures and retrofits including capacitor banks for power factor correction.
42. Similarly, wind energy development could also be cost effective but requires suitable land, and funding for such a venture may not be easily forthcoming. Wind energy also has some element of unpredictability particularly

when the wind is low or there is no wind. In light of the foregoing. Solar photovoltaic which is also cost effective can be implemented in the short term with smaller investment cost. The unit cost of PV is being reduced gradually. For the project in question, greenhouse gas reduction can be realized within a short time frame. On the other hand, investment in solar PV supplemented by EE intervention will offer more economical options towards greenhouse gas reductions.

C. DESCRIBE THE BUDGETED M & E PLAN:

43. Project monitoring and evaluation will be conducted in accordance with the established standard UNDP and GEF procedures. For further details, please see Para 99-100 and Table 8 of the UNDP-GEF project document.
44. Framework provides performance and impact indicators for project implementation along with their corresponding means of verification. The GEF CC Tracking Tool will also be used to monitor progress in reducing GHG emissions. The M&E plan includes: inception workshop and report, project implementation reviews, quarterly and annual review reports and independent final evaluation. The following sections outline the principle components of the Monitoring and Evaluation Plan and indicative cost estimates related to M&E activities. The M&E budget is provided on Table 15.

Table 4: M&E Work Plan and Budget

Type of M&E activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time Frame
Inception Workshop and Report	<ul style="list-style-type: none"> ▪ Project Manager ▪ UNDP CO, UNDP GEF 	Indicative cost: 5,000	Within first four months of project start up
Measurement of Means of Verification of project results.	<ul style="list-style-type: none"> ▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. 	<i>To be finalized in Inception Phase and Workshop.</i>	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on <i>output and implementation</i>	<ul style="list-style-type: none"> ▪ Oversight by CTA with support from the Project Manager ▪ Project team 	<i>To be determined as part of the Annual Work Plan's preparation.</i>	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> ▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG 	<i>None</i>	Annually by September
Project Board Meetings	Project Manager	<i>To be determined as part of the Annual Work Plan's preparation. Indicative cost:</i>	Following IW and annually thereafter.
Mid-term Review	<ul style="list-style-type: none"> ▪ Project manager and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team) 	None	.
Periodic status/ progress reports	1. Project manager and team	None	Quarterly
Terminal Evaluation	<ol style="list-style-type: none"> 1. Project manager and team, 2. UNDP CO 3. UNDP RCU 4. External Consultants (i.e. evaluation team) 	Indicative cost : 5,000	At least three months before the end of project implementation
Audit	<ol style="list-style-type: none"> 1. UNDP CO 2. Project manager and team 	Indicative cost: 14,000(7000 x 2 years)	Yearly

Type of M&E activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time Frame
Visits to field sites	<ul style="list-style-type: none"> UNDP CO UNDP RCU (as appropriate) Government representatives 	For GEF supported projects, paid from IA fees and operational budget	Yearly
Dissemination of lessons learnt	<ul style="list-style-type: none"> Project Manager and team Local consultant 	None	At least three months before the end of the project
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		Total: 24,000 approx. (GEF funded, not including co-financing resources)	

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

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

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
LEONIE BARNABY	GEF OPERATIONAL FOCAL POINT	MINISTRY OF WATER, LAND, ENVIRONMENT AND CLIMATE CHANGE	04/25/2014
GILLIAN GUTHRIE	GEF OPERATIONAL FOCAL POINT (APPOINTED JULY 2014)	MINISTRY OF WATER, LAND, ENVIRONMENT AND CLIMATE CHANGE	05/22/2015

B. GEF AGENCY CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Adriana Dinu, UNDP-GEF Executive Coordinator		March 17, 2016	Marcel Alers PTA, EITT	(1) 212-906-6199	Marcel.alers@undp.org

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

	Strategic Development Indicator	Baseline	Targets End of Project	Source of verification	Assumptions
<p>Project Objective: ¹⁶ To advance a low carbon development path and reduce Jamaica’s public sector energy bill through the introduction of renewable energy (RE) and improvement in energy efficiency (EE) in the health sector.</p>	<ul style="list-style-type: none"> Cumulative amount of reduced/avoided CO₂ emissions as a direct and indirect result of the investments, financed by the project 	<ul style="list-style-type: none"> 20.7 tonnes of CO₂ reduced/avoided annually 	<p>Lifetime Direct: 39,344 cumulative tonnes of CO₂eq reduced/avoided (Indirect Bottoms up and Top Down: 33,838 tCO₂ and 718,400 tCO₂ respectively).¹⁷</p> <p>Approximate Total energy produced annually : 3,583 (MWh)</p>	<ul style="list-style-type: none"> Project final report as well as annual report on energy consumption & reductions for each RE project. Annual report on hospital energy consumption and expenditure on electricity 	<ul style="list-style-type: none"> The country continues to experience economic growth Government is committed to supporting RE development in Jamaica. RE systems are in place and are functioning effectively.
<p>Outcome 1 Increased knowledge in RE and EE for Individuals in the public sector and strong institutional capacity to support RE and EE development in Jamaica’s public sector.</p>	<ul style="list-style-type: none"> Number of technicians from the health sector and the private sector with improved capacity to assemble, install, maintain and retrofit RE and EE systems and programmes in Jamaica by the end of project. Number of persons employed in the RE and EE sector. 	No formally trained technicians in the health sector to support solar PV	At least 5 trained technicians (35% women)75 persons employed (35% women)	<ul style="list-style-type: none"> Gender disaggregated database on trained and certified technicians eligible to provide a range of RE and EE related services. 	<ul style="list-style-type: none"> Certified training programmes for technicians are recognized, well-funded and supported. Capacity of government does not substantially delay approval of RE policies and RE projects.
	<ul style="list-style-type: none"> Number of operatives from the health sector trained on RE and EE to enable them to function effectively 	No health sector operatives with formal knowledge in RE and EE.	At least 40	<ul style="list-style-type: none"> Database on trained and certified operatives 	<ul style="list-style-type: none"> Funding for training of operatives within the health sector are provided by the government, private

¹⁶ Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR

¹⁷ GEF STP methodology suggests that The difference between the direct emissions during the projects implementation and the baseline emissions equals the direct emission reductions of the project. Therefore approximately a further 310.5 tCO₂ eq could be deducted from this value. See: P 9, 16B, http://www.thegef.org/gef/sites/thegef.org/files/documents/C.33.Inf_.18%20Climate%20Manual.pdf

					sector and regional and international partners.
	<ul style="list-style-type: none"> Number of persons (almost 40% of women) from financial institutions trained on the fundamentals (by evidence of those who have completed training and received certificates) of RE technology, EE programs, risk assessment, project development, implementation and evaluation 	No persons from financial institutions trained	40 persons	<ul style="list-style-type: none"> Annual report from financial institutions Report on training activity Database on trained financial personnel (as above) 	<ul style="list-style-type: none"> Financial institutions have demonstrated commitment to building the relevant capacity in supporting RE and EE.
<p>Outcome 2:</p> <p>A supportive legal and regulatory framework to facilitate the deployment of small decentralised RE power generation (notably solar PV) and EE programmes in Jamaica’s public sector</p>	<ul style="list-style-type: none"> Amount of electricity drawn from the national grid for hospital with on-grid rooftop solar-PV panels financed by the GEF funds 	30 GWh/yr of electricity drawn from the national grid annually to service hospitals	0.0018 GWh of electricity drawn annually from grid tie PV system by the end of project	<ul style="list-style-type: none"> Annual report on hospital energy consumption and expenditure on electricity 	The proposed legal and regulatory improvements passing through the Government approval process without delays.
<p>Outcome 3:</p> <p>An operational Energy Performance Contracting mechanism to facilitates ECSOs in their investments portfolio towards the scale up RE and EE in the public and private sector of Jamaica</p>	<ul style="list-style-type: none"> Pilot Energy Performance Contract established No of contracts signed 	<p>Limited EPC/ESCO resources available to date aside for Model EPC contract prepared by JPC and ESCO gap analysis</p> <p>No active Energy Performance Contracts in place in Jamaica</p> <p>Zero companies operating as “true” ESCOs (see paragraph 48 for ESCO definition)</p>	<p>Establishment of resources to enable Energy Performance Contracting (e.g. contracting guidance documents)</p> <p>5 Energy Performance Contracts signed during project implementation.</p> <p>PCJ, a major player in the energy sector, to develop “true” ESCO capabilities</p>	<ul style="list-style-type: none"> Executed EPC contracts PCJ Annual Reports RE/EE market reports & communications (e.g. from the Jamaican Renewable Energy Association) 	<ul style="list-style-type: none"> Successful EPC contract execution

	<ul style="list-style-type: none"> • Annual investment in RE and EE programmes 	<p>Approximately US\$240,000 investments annually in solar pv technology (and EE systems) to date in Jamaica</p>	<p>10%-15 % increase in solar PV systems and EE programmes¹⁸</p> <p>Greater public and private sector participation in the DBJ energy audit grant program</p> <p>DBJ disbursement of more than \$6 million annually due to increased demand for RE/EE investments</p>	<ul style="list-style-type: none"> • Result of market survey on RE and EE in Jamaica • Record of performance Contracts processed • Financial institutions' annual Financial Report. • DBJ reporting of energy audit grant disbursement 	<p>Adequate market size to support the supply-side of the RE and EE market.</p> <p>DBJ committed to sustained financing for RE and EE projects</p>

18 Quality control criteria are built into contracts.

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

At the time of PIF approval the GEF Secretariat asked for the following to be addressed at CEO endorsement stage:

- a) Please update/confirm the GHG emissions estimates, using GEF/STAP methodologies wherever applicable.
- b) Please increase/confirm UNDP co- financing and submit all co-financing letters including private sector partners
- c) Please submit CCM tracking tool with the CEO approval.

ANNEX C: PROJECT CO-FINANCING

The Co-financing partners for the project are listed below along with the detailed parameters and definitions of their contribution as outlined in their co financing letters (see pro doc, page 122 Annex VIII – co-financing letters). An adjustment was made to the DBJ Co-financing. We believe that the DBJ in parallel contribution of for this project of USD\$18,120,000 as stated in the co-financing letter dated April 29 2015 represented total DBJ support for all private sector sustainable energy projects and was therefore overstated for this project. This adjustment more conservatively reflects allocations to this project at an approximate value of USD\$8,368,143.

Projects Co-financing	Year 1	Year 2	Year 3	Year 4	Total
PCJ (cash)- Letter expected		\$ 680,620	\$ 680,620		\$ 1361,240
GEF SGP (associated)		\$ 104,433	\$ 104,433	\$ 104,434	\$ 313,300
Jamaica Productivity Centre (in-kind)		\$ 120,000			\$ 120,000
UNDP(cash)		\$ 30,000			\$ 30,000
Ministry of Health (in kind)		\$ 21,600	\$ 21,600	\$ 21,800	\$ 65,000
Development Bank of Jamaica (cash)		\$ 163,690	\$ 163,690	\$ 163,690	\$ 491,071
Development Bank of Jamaica (in parallel)*		\$ 2789,381	\$ 2789,381	\$ 2789,381	\$ 8368,143
TOTAL	\$ -	\$ 3909,724	\$ 3759,724	\$ 3079,305	\$ 10748,754

* Assumes an additional USD\$2,789,381 per annum from the DBJ based on a conservative allocation of DBJ financing to private sector investors implementing sustainable Energy Projects countrywide

FINANCING LETTERS SUMMARY

FINANCING LETTERS SUMMARY			
Date	Development Bank of Jamaica	\$ Jamaica	\$ USD
July 2 2015	i Establish line of credit for ESCO's to access	\$ 50000,000.00	\$ 446,428.57
	ii Energy Audit Grants (Separate from Energy Audit Program)	\$ 3000,000.00	\$ 26,785.71
	iii Capacity Building Support	\$ 2000,000.00	\$ 17,857.14
Total		\$ 55000,000.00	\$ 491,071.43
Date	US DOE	\$ Jamaica	\$ USD
April 1 2015	i project delivery support	\$ -	\$ -
Date	GEF SGP (associated)	\$ Jamaica	\$ USD
April 16 2015	i 5 RE and EE projects in schools and Community Centres (parallele investment NOT co financing)	\$ 35089,600.0	\$ 313,300.0
Date	UNDP(cash)	\$ Jamaica	\$ USD
20-May-15	i second year cash contribution for RE and EE Public Sector Improvements	\$ 3360,000.0	\$ 30,000.0
Date	Ministry of Health (in kind)	\$ Jamaica	\$ USD
27-Apr-15	i Planning and implementation, technical and operational support	\$ 7280,000.0	\$ 65,000.0
Date	Development Bank of Jamaica (parallel)	\$ Jamaica	\$ USD
29-Apr-15	i To private investors implementing SE projects	\$ 2016000,000.0	\$ 18000,000.0
	ii non reimbursable energy audit program (>25 energy audits annually)	\$ 13440,000.00	\$ 120,000.00
Total		\$ 2029440,000.0	\$ 18120,000.0
Date	PCJ (Cash)	\$ Jamaica	\$ USD
May 15 2015	i RE and EE installations and retrofits over 3 years	\$ 152458,880	\$ 1361,240
Date	Jamaica Productivity Centre (in-kind)	\$ Jamaica	\$ USD
24-Mar-15	i cofinancing commitment in the form of parallel activities	\$ 13440,000.00	\$ 120,000.00
GRAND TOTAL		\$ 20500,611.43	

Please note that the DBJ commitment of USD \$18,120,000 is assumed to be an overstatement and therefore has been adjusted to more suitably reflect the commitments for this project.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS¹⁹

A. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES FINANCING STATUS IN THE TABLE BELOW:

PPG Grant Approved at PIF: USD100,000.00			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF/NPIF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Project design and project document preparation including institutional arrangements, monitoring and evaluation	85,000	85,000	
Stakeholders consultation and validation workshops	5,000	5,000	
Travel	10,000	10,000	
Total	100,000	100,000	

The PPG phase of the project achieved its main outcome of developing a Medium-Size Project Proposal for submission to GEF.

¹⁹ There have been failure of equipment in the Ministry of Health due to for a variety of reasons including lack of trained technicians, and knowledge about the system to effect on time maintenance intervention.

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used):

NA