United Nations Development Programme
Country: Dominica

PROJECT DOCUMENT

Project Title:	Low Carbon Development Path: Promoting energy efficient applications and solar photovoltaic technologies in streets, outdoor areas and public buildings in island communities nationwide (LCDP)
UNDAF/CPAP Outcome(s):	Enhanced capacity of national, sub-regional and regional institutions and stakeholders to: effectively manage natural resources; build resilience to the adverse impacts of climate change and natural and anthropogenic hazards; improved energy efficiency and use of renewable energy; improved policy, legal, regulatory and institutional frameworks for environmental and energy governance
UNDP Strategic Plan 2014-2017 Primary Outcome:	Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded
Expected CPAP Output(s):	Output 6: Improved energy efficiency and the removal of barriers to the introduction and transfer of renewable energy technology facilitated
Executing Entity:	Ministry of Health and Environment (MoHE)
Implementing Entity:	Environmental Coordinating Unit (ECU)

Brief Description

The objective of the project is the removal of the policy, technical and financial barriers to energy-efficient applications and solar photovoltaic technologies in Dominica's streets, outdoor areas and public buildings nationwide, initially targeting up to 5 communities including Dubique, Boetica, Roseau, Portstmouth, for further scale up. This will be achieved through the following outcomes: (i) improved knowledge, awareness and institutional capacity on EE applications and solar PV through demonstrations of their deployment in Dominica; (ii) the uptake of EE applications and solar PV technology promoted through adoption of new institutional arrangements, and policy and enforcement measures; and (iii) scaled-up EE applications and RET investments through implementation of newly proposed financial and institutional mechanisms. RE and EE Projects will lead to cumulative direct and direct post project GHG emission reductions of 100,899 tCO_{2eq}

Programme Period:	2012-2016
Atlas Award ID:	00082947
Project ID:	00091623
PIMS #	4969
Start date:	1 Nov 2016
End Date	31 Oct 2020
Management Arrangements	NIM
PAC Meeting Date	9 Sept 2016

Total resources required	$ 10,666,484
Total allocated resources:	$ 10,666,484
• GEF	$ 1,726,484
• UNDP	$ 1,600,000
• Government of Dominica	$ 6,800,000
• Private Sector	$ 540,000
Total:	$ 10,666,484

Agreed by Ministry of Ministry of Planning, Economic Development & Investment: 01/12/2016
Date/Month/Year

Agreed by Environmental Coordinating Unit:
Date/Month/Year

Agreed by UNDP: 28/11/2016
Date/Month/Year

United Nations Development Programme
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Agreed by Environmental Coordinating Unit: _____ Date/Month/Year 1/12/2016

Agreed by UNDP: _____ Date/Month/Year 24/11/2016

Table of Contents

ACRONYMS

Acronym	Meaning
AA	Administrative Assistant
APR	Annual Progress Report
BAU	Business-as-usual
CARICOM	Caribbean Community
CCCCC	Caribbean Community Climate Change Center
CCTF	Climate Change Trust Fund
CEIS	Caribbean Energy Information System
CHENACT	Caribbean Hotel Energy Efficiency Action Program
CHENACT-AP	CHENACT Action-Advanced Programme
CPAP	Country Programme Action Plan
CREDP	Caribbean Renewable Energy Development Programme
CTA	Chief Technical Advisor
DRR	Disaster Risk Response
DoCCENRM	Department of Climate Change, Environment and Natural Resources Management
DOMLEC	Dominica Electric Company Limited
EC	Eastern Caribbean
ECERA	Eastern Caribbean Energy Regulatory Authority
ECU	Environmental Coordinating Unit
EE	Energy Efficiency
EIAs	Environmental Impact Assessments
EOP	End of Project
ESIA	Environmental and social impact assessment
EU	European Union
FIT	Feed-in tariff
FY	Fiscal year
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gases
GHI	Global horizontal irradiance
GIZ	German Agency for International Cooperation
GoCD	Government of the Commonwealth of Dominica
GJ	Gigajoules
GWh	Gigawatt-hour
IDB	Inter-American Development Bank
IEA	International Energy Agency
INC	Initial National Communication
IPP	Independent power producers
IRC	Independent Regulatory Commission
IRE	Intermittent renewable energy
IRENA	International Renewable Energy Agency
kWh	Kilowatt hours
LAC	Latin American Caribbean Regional Center
M&E	Monitoring and Evaluation
MEPS	minimum energy performance standards
MJ	Megajoules
MoF	Ministry of Finance

Acronym	Meaning
MoHE	Ministry of Health and Environment
MoTEE	Ministry of Trade, Energy and Employment
MW	Megawatt
MWh	Megawatt - hour
MV	Medium voltage
NAMA	Nationally appropriate mitigation actions
NEP	National Energy Policy
NGOs	Non-Government Organizations
NPD	National Project Director
NPM	National Project Manager
NREL	National Renewable Energy Laboratory
NSEP	National Sustainable Energy Plan
OECS	Organization of Eastern Caribbean States
PIR	Project Implementation Report
PMU	Project Management Unit
PPA	Power purchase agreement
ProDoc	UNDP Project Document
PSC	Project Steering Committee
PV	Photovoltaic
RE	Renewable energy
RET	Renewable energy technology
SIDS-DOCK	Small Island Developing States – Island Energy for Island Life
SNC	Second National Communication
TJ	Tera joules
TNC	Third National Communication
TOE	Tons of oil equivalent
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNDAF	United Nations Development Assistance Framework
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

Currency Equivalents[1]

Currency Unit = Eastern Caribbean Dollar (ECD)
1 USD = ECD 2.68

[1] http://www.un.org/depts/treasury/ (exchange rate effective August 2008)

SITUATION ANALYSIS

Context and Global Significance

1. Countries in the Caribbean region are heavily dependent on imported fossil fuels for their energy supplies with petroleum products accounting for more than 90% of commercial energy consumption including conventional methods of electricity production through fossil fuel plants. This consumption serves as a primary source of greenhouse gas (GHG) emissions. Despite substantial renewable energy (RE) resources that are available in the Caribbean Region, RE exploitation lags far below its potential due to various barriers related to policy, financing, capacity and awareness. At the same time, the expansion of electricity generation is a key aspect to economic development in the Caribbean countries.

2. Caribbean countries are also highly vulnerable to global oil price volatility; when oil prices rise, a commensurately larger allocation of national budgets needs to be diverted to pay for these fuel imports. This has a detrimental impact on foreign currency reserves, balance of payments and availability of budgetary resources for social sectors such as health, education and national security. *Energy security as related to affordability and reliability of supplies is therefore a real concern for most Caribbean countries.*

3. Moreover, owing to the geography, small market size, the absence of inter-state inter-connections (as illustrated in Figure 1), and the fact that electricity generation is largely characterized by inefficient diesel combustion, electricity tariffs in many Caribbean countries are among the highest in the world. With the importance of energy as a critical input into virtually all sectors of any economy, the current energy scenario of Dominica as well as most Caribbean countries directly undermines efforts to improve their economic competitiveness and ability to fully integrate in the global economy. Their over-dependence on imported petroleum and petroleum products within the Caribbean Community Secretariat (CARICOM) member states[2] is unsustainable, notwithstanding the current drop in global oil prices and the forecasts of the doubling of energy demand over the next 20 years.

4. In response, several CARICOM member states have sought to catalyze and accelerate the development of indigenous energy resources, and increased the use of renewable energy as well as energy efficiency and conservation. Many Caribbean countries are endowed with various indigenous sources of renewable energy, particularly wind, solar, hydro, and geothermal and bio fuels. A number of CARICOM countries have embarked on the process of elaborating their national energy policies (such as Jamaica, St Lucia, St Vincent and the Grenadines, and Grenada having approved national energy policies) to exploit renewable energy resources and increase the contribution of energy efficiency as priorities. This has resulted in notable RE developments within CARICOM member states including solar thermal for water heating in Barbados and wind and hydropower development in Jamaica. While efforts to increase RE development have intensified over recent years in CARICOM member states, the overall impacts are marginal. This constrained pace of RE development can be attributed to a number of factors including the lack of effective policy and local capacity, legislative and regulatory framework with a low level of awareness, and limited financing for project preparation and development.

[2] http://www.caricom.org/

Figure 1: The Caribbean Region

5. In 2004, GEF supported the **Caribbean Renewable Energy Development Programme (CREDP) Project** that was aimed at dismantling identified barriers (in the areas of policy, capacity, information, awareness and finance) to the increased use of RE in the region. CREDP was implemented by UNDP, and executed by the Energy Programme within the CARICOM Secretariat with co-financing from GIZ. GEF support for CREDP was concluded in 2009 with only GIZ support continuing until 2012.

6. While CREDP did not achieve all of its objectives, it did strengthen capacity and raised awareness of RE issues, laying a useful foundation for further developments in RE and EE in CARICOM countries. In April 2008, the CARICOM Secretariat established an **Energy Programme** with the key objective of finalizing a CARICOM Energy Policy and facilitating its implementation. The Energy Programme provided greater focus on regional energy sectors issues and development by implementing a programmatic approach to regional energy sector developments. In March 2013, CARICOM completed the **Community Energy Policy,** the primary goals of which were to improve regional energy security through diversification of energy supplies and greater utilization of renewable energy and cleaner fossil fuel such as natural gas. The policy also sought to encourage the establishment of more sustainable energy systems.

7. The Commonwealth of Dominica has an area of 754 km² and a population of 72,186. Due to the inaccessibility of most of the country's mountainous interior, Dominica's population centers are located along the coast. Traditionally, agriculture has been the main economic activity with tourism (particularly eco-tourism) emerging as an important contributor to economic development. With the dominance of its mountainous interior covered by lush tropical forests that support the island's rich biodiversity, Dominica is renowned for its many rivers, waterfalls and springs and is known as the "Nature Island of the Caribbean". This topography also forms the basis of its hydropower developments.

8. Energy demand in Dominica that has grown over the past decade has been met through the use of fossil fuels for electricity power generation. The lack of diversity in the current energy scenario of Dominica exposes the country to the volatility of global fossil fuel prices, instability in supply if fuel shipments are delayed and higher GHG emissions. The Government of the Commonwealth of Dominica (GoCD) is aware of the crippling economic and environmental effects of the continued use of fossil fuels as the main energy source. In response, it has outlined in its commitment to pursue renewable sources in its Medium Term Economic Strategy, which states that major investments in electricity generation and distribution are necessary to facilitate the requirements for the further diversification of the economy.

Figure 1: Map of Dominica

Energy Situation in Dominica

9. Despite several efforts in recent years to promote renewable energy technologies (RETs), Dominica like many other Caribbean countries is still largely dependent on fossil fuel as their main source of energy for power generation and other applications. Currently, the country imports in the range of 900 - 1,000 barrels of oil daily for energy generation and other applications. Power generation represents the main use of imported fossil fuels (50%), followed by transport (33%). Dominica's current electricity power generation comes from diesel generators fuelled by imported oil (71%), hydropower (27.4%) and other renewables (i.e. wind at 225 kW Rosalie Bay Resort and 290kW of solar in Roseau). Dominica does not have any domestic sources of fossil fuels. Similar to other CARICOM countries, fluctuations in the import price of oil have posed challenges for Dominica, notably when oil reached a high of USD 145 per barrel in 2008. In 2011, Dominica spent USD 41 million on oil imports, representing 20% of its GDP.

10. The Ministry of Trade, Energy and Employment (MoTEE) provides oversight to the development of energy generation projects in Dominica including the development of geothermal resources, an activity that currently dominates the country's energy sector. As a result, efforts to reduce the carbon footprint of the country's energy sector have also been undertaken by the Prime Minister as well as the Ministry of Health and Environment (MoHE). In 2012, the GoCD has issued a "Low-Carbon Climate-Resilience Strategy" (LCCRS) that charts directions for the country to reduce its dependence on fossil fuels for energy.

11. The Dominica Electric Power Company (DOMLEC) is the main utility in Dominica, serving as the main provider of electricity in the country that generates, transmits and distributes electricity to more than 35,000 domestic customers as well as to commercial, industrial and public sector customers. DOMLEC is primarily and privately owned by the Canadian firm EMERA Caribbean Renewables with a 51% share. Other shareholders include Dominica Social Security at 20% and local corporate and private citizens with the remaining 29%.

12. Up to January 1, 2014, DOMLEC's licenses to generate, transmit and distribute electricity had been exclusive until the enforcement of the 2006 Electricity Supply Act, which opened the way for the Independent Regulatory Commission (IRC) to license other service providers. Since January 1, 2014, DOMLEC have been operating under two licenses granted by the IRC, the first being a non-exclusive generation license, and the second as an exclusive transmission, distribution and supply entity for electricity within Dominica[3]. The most recent information indicates one independent power producer (IPP) with a 225 kW wind turbine at Rosalie Bay.

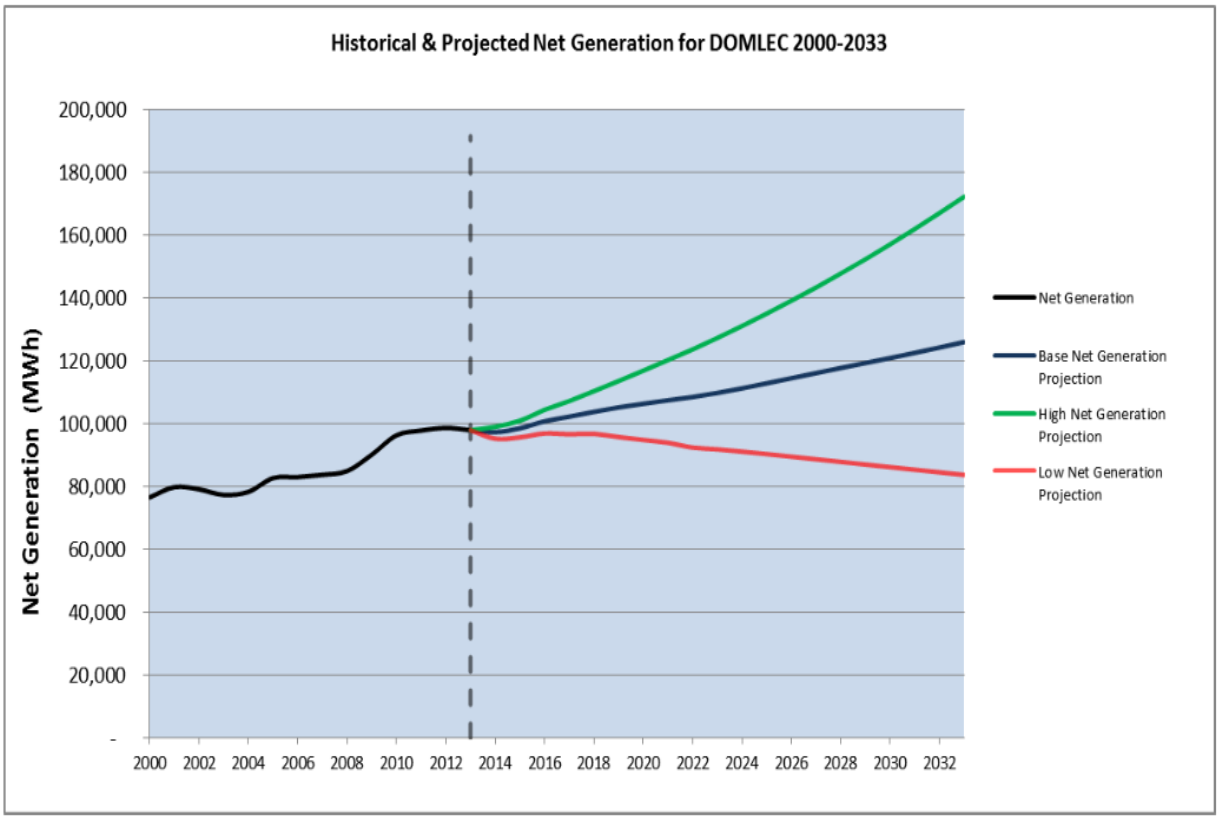
13. DOMLEC has a total installed electricity capacity of 23.8 MW with peak demand of 16.8 MW. There are two operating diesel plants (Fond Cole and Sugar Loaf (Portsmouth)) with a combined capacity of 20.0 MW. The three hydropower facilities (Laudat, Trafalgar and Padu) account for 6.72 MW. Its transmission and distribution (T&D) network services the cities of Roseau and Portsmouth as the main load centers with approximately 403 km of 11kV lines and 922 km of 230/400V overhead lines. All generation sources are linked via 11kV inter-connectors and, in some instances, via 11Kv distribution feeders. Average

[3] http://www.domlec.dm/index.php/our-history

system losses for DOMLEC are in the order of 9.5% of net generation which is added to the electricity cost of the end consumer[4].

14. Diesel energy generation in Dominica has not increased dramatically from 2000, ranging from 55.8 GWh 2005 to 76 GWh in 2010 to 64 GWh in 2013. Assuming a grid emissions factor of 1.0 tonnes CO_{2eq}/MWh for diesel generation and a population of 71,000, the annual CO_2 emissions per capita in Dominica ranges from 0.79 tonnes CO_{2eq} in 2005 to 1.07 tonnes CO_{2eq} in 2010. Slow economic growth has resulted in sluggish growth in electricity demand as shown on Figure 2.

Figure 2: Historical and Projected Energy Generation of DOMLEC[5]



15. The 2015 decrease of global oil prices has only resulted in a marginal reduction in the cost of electricity in many CARICOM countries including Dominica. The customer base for electricity services in Dominica comprises domestic, commercial, hotel, industrial, general lighting and street lighting. Currently, residential customers pay approximately EC$0.74/kWh (USD 0.27) for the first 50kWh and EC$0.81/kWh (USD 0.30 exclusive of fuel surcharge) for additional kWh. A fuel surcharge is calculated monthly and added as a "per cost" to the total consumption which contributes to the high electricity tariffs which

[4] See pg 15 of DOMLEC Integrated Resource Plan and Related 5-Year Investment Plan, March 2015, available on: http://www.ircdominica.org/files/downloads/2015/03/DOMLEC_IRP-Investment_Plan-v2.pdf
[5] From DOMLEC 2015 Integrated Resources Plan available on: http://www.ircdominica.org/files/downloads/2015/03/DOMLEC_IRP-Investment_Plan-v2.pdf

is among the highest in the Eastern Caribbean. As of early 2015, this surcharge was in the order of EC$ 0.27 (USD 0.10/kWh) resulting in a very high total electricity tariff ranging between USD 0.37 and 0.40 per kWh. With the drop in global oil prices in 2015, the reduced fuel surcharge has only reduced these electricity tariffs to the range of USD 0.34 to 0.36 per kWh.

Renewable Energy Development in Dominica

16. Dominica has 3 hydropower stations, Trafalgar, Laudat and Padu with a combined installed capacity of 6.72 MW. These stations provide between 25 to 45% of the grid electricity, depending on climatic conditions and the availability of water:
    - Trafalgar hydropower station, first developed in 1952 with successive upgrades until 1990 bringing the total installed capacity of the station to 4.48 MW;
    - Padu hydropower station, developed in 1967 with an installed capacity of 0.94 MW; and
    - Laudat Hydropower station, developed in 1989 with an installed capacity of 1.3 MW.

    All these facilities were developed, and are currently maintained and operated by DOMLEC. During the period of 1992 to 2001, DOMLEC expanded its diesel power generation capacity in response to growing demand for electricity, and the inability of the country's expansion of its hydropower capacity to keep pace with this demand. Currently, there is interest in developing smaller hydropower facilities (pico, micro and mini hydro) as a means of offsetting high electricity costs. The lack of technical expertise and financing mechanisms in Dominica, however, has been a barrier to further hydropower development.

17. On October 15, 2015, DOMLEC announced that a number of their hydropower stations had been severely affected by tropical storm Erica. Out of the installed capacity of 6.6 MW, only 400 kW were in operation. To maintain uninterrupted power supplies to their customers, DOMLEC is now encouraging self-generation of power supplies[6].

18. Dominica also has some of the best solar resources as provided on Table 1 where solar insolation values range from 4.8 to 6.8 kWh/m^2/day. Solar PV installations in Dominica are confined to the areas around the City of Roseau area where there are over 200kW of installed solar PV at various private business property locations. While there is high interest amongst Dominicans for additional solar PV installations on residential and commercial properties as a means to reduce electricity costs, there are barriers to adoption of these technologies that constrain the markets potential.
19. The wind resource in Dominica ranges from 6.3 to 8.8 m/s as shown on Table 1. To date, there is only one wind turbine installation in Dominica at the Rosalie Bay Resort that comprises a 225 kW wind turbine for self-generation in 2008. Annual energy production is in the order of 596 MWh with surplus generation sold back to DOMLEC's grid. Despite the island's excellent wind potential and a number of potential wind energy sites along the east coast, the barrier to further development of wind energy in Dominica has been difficulties in acquiring land and the small land parcels with unclear ownership. In addition, there are also geographic and transportation challenges related to implementing these wind energy projects along the east coast.

[6] Dominica Vibes News of October 15, 2015

20. Biomass energy has not been developed due to the lack of waste-to-energy technologies that could economically convert the small amounts of wastes available in Dominica. Larger-scale biomass energy projects would not be feasible due to additional costs to transport the biomass waste to a central facility.

Table 1: Solar energy and surface meteorology in Dominica[7]

Variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Insolation, kWh/m²/day	5.13	5.76	6.35	6.76	6.61	6.43	6.51	6.48	5.92	5.55	4.88	4.76
Clearness, 0 - 1	0.63	0.64	0.64	0.64	0.62	0.60	0.61	0.62	0.59	0.60	0.59	0.61
Temperature, °C	25.49	25.07	25.08	25.46	26.20	26.62	26.65	26.77	26.76	26.64	26.48	26.09
Wind speed, m/s	8.78	8.11	7.63	6.85	7.15	8.05	8.22	7.37	6.47	6.26	7.00	8.09
Precipitation, mm	136	87	93	86	137	185	108	246	250	239	252	176
Wet days, d	18.4	14.2	14.6	13.7	17.0	18.6	20.5	20.4	22.7	19.3	19.0	18.6

21. With its volcanic geology, Dominica's potential for geothermal energy is excellent. Over the past 7 years, the GoCD has been pursuing a programme to explore and develop Dominica's geothermal resources, primarily to generate clean and lower cost electricity. This has resulted in an initial proposal of a geothermal project in the order of a 10-15 MW power plant. The ongoing work is to determine whether or not the geothermal resource in Dominica is technically suitable for generating electricity. While the results are encouraging, there is also the potential for the development of 40 to 50 MW of surplus geothermal energy that could lead to underwater electrical transmission and interconnection to supply neighboring islands of Guadeloupe and Martinique. As of March 2015, the time line for developing the geothermal resource, however, is uncertain. In addition, the complexity of the project raises the risk of further delays in implementation, and no certainty for Dominicans on any relief from high electricity prices.

Energy Efficiency in Dominica

22. There have been some piecemeal initiatives to introduce energy efficient appliances and devices to the Dominican market. This includes a 2006 DOMLEC energy efficient lighting project with the distribution of 200 compact fluorescent light bulbs (CFLs) to a local community, and a total of 5,000 CFLs installed in 2007. In 2014, the Government of China donated to the GoCD with 2,500 LED street lights to be powered by solar PV. These LED street lights have been installed at targeted locations throughout the city of Roseau, despite some technical challenges, and other locations. The GoCD has also supported energy efficiency endeavors by providing tax rebates on LED lighting fixtures and small EE equipment.

[7] From NASA Langley Research Center Atmospheric Science Data Center; New et al. 2002, and also available on http://www.gaisma.com/en/location/roseau.html

23. There are energy efficient appliances sold in Dominica such as refrigerators and air conditioners. The labels of these appliances are not standardized leading to difficulties of consumers in interpreting the labels for energy efficiency and household electricity benefits. Furthermore, most sales persons in appliance retail outlets are not knowledgeable in energy consumption. As such, most consumers are looking to purchase the least cost appliances, not necessarily appliances that are energy efficient.

24. In the face of high electricity costs, a small number of individual private businesses in Dominica have made their own EE investments, most notably the two largest hotels in Roseau, to help in offsetting these costs. One of the primary investments consists of central air conditioning that utilizes waste heat. Despite these EE initiatives, their unit energy costs are still in the order of USD 0.46/kWh, or USD 16.10 per night based on an annual energy consumption rate of 69.1 kWh/m^2. These businesses as well as others are still in search of other opportunities to lower their electricity costs and restore their competitiveness in the tourism sector in the Caribbean.

Gender and Energy in Dominica

25. While the focus on the green economy has led to a number of initiatives to improve capacity and develop relevant infrastructure, less has been done to bridge the gap between renewable energy/energy efficiency and supporting sustainable livelihoods for women and girls. The 2014 Gender Assessment[8] noted that women have been notably absent from the development and planning related to low carbon development. The vulnerability of communities is also undermined when women at the community level are excluded from the planning and decision-making discussions. Moreover, the report concluded that renewable energy in particular would benefit from the introduction of simple technologies for reproductive work (e.g., solar stoves, rain water collection systems) and that the movement toward more substantive infrastructure should be gender-responsive in its approach.

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Root Causes and Threats

26. A root cause for the slow development of renewable energy and energy efficiency as a means to reduce electricity costs in Dominica (similar to other CARICOM nations) is the fact that it is an island country with a small energy market where electricity generation was originally developed through the use of diesel fuels by DOMLEC, the monopoly utility. Though DOMLEC has renewable energy assets in the form of hydropower, its hydropower generation has decreased from 36 GWh in 2002 to around 20.5 to 26.7 GWh between 2008 and 2012. To make up for the shortfall and increased energy demands, it has developed diesel generation that was developed as a least-cost and lowest risk option has grown from 44 GWh in 2002 to 75 GWh in 2012. Since DOMLEC is mainly privately owned (see Para 11), it has little incentive towards full development of low carbon potential of Dominica's energy sector. Moreover, the installation of additional renewable energy (IRE) into the national grid that is owned and operated by DOMLEC will require additional investments into the grid in terms of grid reinforcement and stabilization measures to

[8] "Country Gender Assessment – Dominica (Volume 1), Caribbean Development Bank, May 2014

accommodate a higher rate of IRE penetration. This investment in additional IRE will not occur as it would not fall within the business interests of DOMLEC.

27. The opportunities for developing renewable energy and energy efficiency initiatives in Dominica as a means of lowering electricity costs, however, are drawing increasing interest from a number of Dominican parliamentarians and Dominican-based investors as well as those overseas. Development of additional IRE and EE projects in Dominica, however, is threatened by:

- *Significant efforts by the Government's energy experts on developing geothermal resources as a means of lowering the carbon footprint of Dominica's energy sector*. One of the primary concerning issues includes the uncertainty of when geothermal power will be developed. Given the complexities of the geothermal development related to design and financing, the dates for commissioning of the geothermal power resource range from 3 to 10 years or more. Despite acknowledging the need for medium-term solutions to high electricity costs, the Government has not provided the appropriate efforts. Moreover, the IRC that regulates electricity tariffs in Dominica cannot guarantee that geothermal power will reduce electricity costs to Dominican customers[9], as they do not have the capacity to evaluate such plans;
- *DOMLEC's indications of the limits of intermittent renewable energy (IRE) into the Dominican grid* which have been presented in DOMLEC's 2015 Integrated Resource Plan (IRP) as 10% of peak annual demand[10]. This assumes that the current grid can only take another 2.5 MW of new RE power into the grid without further investments into grid stability measures that would allow for a higher rate of IRE. With DOMLEC's IRP already proposing a 1.5 MW utility-scale solar PV plant in 2017 and 2018, and more than 400 kW of IRE capacity already installed, there is less than 600 kW of IRE available under DOMLEC's proposed IRE ceiling[11]. As of June 2015, approval of DOMLEC's IRP has been delayed pending the submission of the firm date for geothermal development. In addition, there are efforts underway by DOMLEC to initiate a study for IRE grid penetration and grid code development that may result in considerations to increase the IRP ceiling of 10%. Furthermore, DOMLEC announced on October 15, 2015 that it wanted major electricity consumers to self-generate their own power to make up for the lost hydropower generation capacity (estimated at 6.2 MW) from Tropical Storm Erika.

Barrier Analysis

Regulatory, policy and legal barriers:

28. While Dominica has policies, strategies and plans to encourage low carbon development, there are barriers to its realization including:

[9] While a fuel surcharge on tariffs may be reduced, the cost of upgrading transmission lines from geothermal plants to customers to cater to voltage drops and fluctuations, especially the upgrading of an 11 kV line to Portsmouth area to the north to 33 kV, will be costly and be reflected on new tariffs.

[10] Available on http://www.ircdominica.org/files/downloads/2015/03/DOMLEC_IRP-Investment_Plan-v2.pdf. It is surmised that geothermal power is not counted against the IRE ceiling of 10%.

[11] The development of a utility-scale solar PV plant will likely not result in a reduction of electricity costs to electricity consumers due to the need to cover DOMLEC overhead costs

- No detailed action plans for the development of RE sources and EE appliances (notwithstanding the action plans in the National Sustainable Energy Plan (NSEP) and the existing detailed plans for geothermal development);
- Lack of standards for the importation of RE and EE equipment and its installation using best practices;
- Utility-driven cap on RE development (2.5 MW) that does not address potential for higher intermittent renewable energy (IRE) penetration to the national grid;
- No policy on feed-in tariff to safeguard cost recovery of IPPs feeding into the national grid.

29. Under the country's Low Carbon Climate Resilience Strategy (LCCRS) of 2012[12] and its NSEP, there is no detailed sustainable energy action plan that would allow policy makers to define the pace of RE development in terms of annual installed capacity. The lack of such a detailed plan is somewhat attributable to the shifting of significant GoCD resources towards geothermal energy development and associated uncertainties of implementation dates. As a consequence, the GoCD has not provided sufficient attention to development of medium-term low carbon solutions that would include RE and EE installations other than on geothermal developments. The availability of such a plan would assist policymakers and programme implementers in framing supportive government policies to encourage RE and EE development, determine resources and personnel required for implementation, the expected costs of RE and EE-related equipment (i.e. solar-PV equipment, hydropower equipment, LEDs, EE white appliances etc.) required and the potential employment generation for local youth and other local skilled vocational trades.

30. Due to the size of the Dominican market, there has historically been a low volume of sales of electrical equipment. As such, no standards for imported electrical equipment have been developed with the Dominican Bureau of Standards, and as a result, retail sales of imported appliances have not focused on the energy performance of these appliances and RE equipment. While energy efficient white appliances are available in Dominica, most consumers continue to be focused on the purchase of least-cost appliances and equipment, and not minimum life-cycle costs of the appliance or equipment.

31. The GoCD are not aware of the impact of various levels of IRE inputs into the national grid. As such, DOMLEC has set their IRE limits of 10% of installed capacity of 2.5 MW; this limit assumes that no investments are made into the grid to upgrade its capacity to absorb more than 2.5 MW. GoCD's lack of knowledge of the impact of higher levels of IRE penetration on its grid constrains its ability to regulate the IRE ceiling and determine its maximum low carbon potential and strategic planning for a greater share of RE in the Dominican energy market. The lack of a firm date for geothermal energy development only exacerbates this issue.

32. While the 2006 Electricity Act allows DOMLEC to purchase electricity from IPPs, there are no set tariff rates for various forms of RE such as for new solar PV, wind and hydropower installations. Without formulae to set feed-in tariffs for RE, new IPPs have no guarantees for cost recovery of developmental costs and RE equipment that generally make RE investments riskier than most conventional energy projects. Notwithstanding the DOMLEC

[12] Available on: https://unfccc.int/files/cooperation_support/nama/application/pdf/dominica_low_carbon_climate_resilient_strategy__(finale).pdf

10% ceiling for RE, this is a smaller but significant barrier to further interest in developing RE projects in Dominica.

Institutional barrier

33. In Dominica, there are no "energy champions" solely dedicated to the promotion of low carbon development. This has led to weak institutional arrangements to promote low carbon approaches:
    - Ministry of Trade, Energy and Employment (MoTEE) whose energy-related personnel expend significant amounts of time on geothermal development;
    - Ministry of Health and Environment (MoHE) under which its Environmental Coordinating Unit is driving a broad but important climate resilience agenda that includes energy-related climate change actions, which is not considered a core discipline within this ministry;
    - Lack of government capacity to provide focused development of medium-term solutions (as specified in the NSEP) for relief from high energy costs for commercial and residential sectors. To fill in this vacuum, the medium-term solutions for RE development are being led by the privately-owned DOMLEC.

34. The lack of institutional capacity to drive the low carbon agenda is evident given that the country's primary energy advisors in MoTEE are expending significant efforts with the country's geothermal energy developments. Due to the uncertainties of the geothermal development dates, discussions on medium-term solutions towards lower electricity costs were dominated by DOMLEC, a privately-held utility, and the IRC, the regulatory agency responsible for the determination of fair electricity tariffs. While the IRC should lead in the medium-term discussions on lower electricity costs, it does not have the capacity to perform as such. By default, the IRC does take much of its advice from DOMLEC due to DOMLEC's experience in the energy sector, and there is a lack of energy advisors to the GoCD that are external to DOMLEC. Moreover, DOMLEC does not have incentives to maximize low carbon development as it would need to assume much of the development costs for studies to improve the efficiency of its grid system and business plans for other forms of RE. More recently, however, in 2015, there have been discussions at IRC public meetings regarding the IRE ceiling to the national grid. As such, the IRC needs to strengthen its capacity and be exposed to more diverse sources of energy-related technical advice that would improve its status as an ***independent*** regulatory agency.

35. With over 4 years of drilling tests, the MoTEE has expended considerable effort in quantifying the country's geothermal resource and determining the phased development of the project. There is a broad perception that the geothermal project in the medium-term will lead to lower energy costs as well as generate reductions in energy-related GHG emissions. Instead, there has not been much discussion of:

    - The strategies and costs to upgrade the 11 kV transmission line from the geothermal plants (located to the east of Roseau) to electricity customers to the north in Portsmouth. The cost of an upgraded transmission line will not necessarily lead to reduced electricity costs to DOMLEC customers;
    - The necessity of spinning reserve from existing diesel generation sets to ensure reliability of the electricity supply even with a geothermal project. DOMLEC's spinning reserve policy sets the spinning reserve needing to "exceed the dispatched unit with the largest output amounts to a minimum of 3.0 MW". As such, energy-related GHG

reductions may not be as significant. Furthermore, fuel surcharges will still be added to the cost of electricity to the consumer, further adding to the argument that the geothermal project will not necessarily result in lower electricity costs to DOMLEC customers, most notably in the medium-term;

- Development of more diverse indigenous sources of renewable energy that could provide relief from high electricity costs to DOMLEC customers in the short to medium term. While the LCCRS and NSEP state the need and broad plans for low carbon development, there has been little or no public discussion initiated from the public sector on the actions needed for responding to the measures outlined in the LCCRS and the NSEP.

36. The Environmental Coordinating Unit (ECU) is the government agency with oversight of Dominica's LCCRS. In an effort to maximize the country's potential to develop low carbon energy sources, it is proposing a "Department of Climate Change, Environment, and Natural Resources" that will develop a "Low Carbon Climate Resilient Policy and Action Plan" as a follow-up to the LCCRS. At this time, however, the capacity of the ECU is limited in terms of its ability to regulate Dominica's energy sector towards low carbon technologies in collaboration with MoTEE. One of the few energy-related activities that it does oversee is the installation of LED street lights from the Chinese Government through the Electrical Services Division.

Awareness and knowledge barrier

37. There is a general lack of awareness and knowledge of the benefits of EE and RE throughout society in Dominica from parliamentarians to middle class to the private sectors and financial institutions:
    - Most politicians and policymakers have had insufficient exposure to policies and programmes from other countries required to develop EE and RE programmes that will reduce household energy costs;
    - The financial community does not have sufficient knowledge to assess RE and EE loan risks despite the existence of financial products for eco-friendly technologies;
    - Designers and architects in Dominica and the region do not have sufficient knowledge and experience in the design of green buildings including new building designs and retrofits to accommodate RE and EE technologies;
    - There are an insufficient number of technicians with the vocational skills to install RE and retrofitting equipment for EE benefits;
    - The general public is aware of the high cost of electricity but not aware of the means of reducing these costs.

38. There are 30 parliamentarians in Dominica, out of which there has not yet been the emergence of any "environmental" champions. While a number of them are aware of high electricity costs and are keen to formulate policy actions to reduce these costs, they appear more aware of geothermal energy development and its association with low carbon development in the medium-term. They are not fully aware of existing policies, laws and regulations that encourage low carbon development for the energy sector such as the LCCRS and the NSEP.

39. Given the lack of history in the Dominican financial sector in financing RE and EE projects, there is insufficient knowledge of risk profiling of such projects in Dominica. Despite the existence of financial products for eco-friendly equipment, uptake of these products has

been poor. Moreover, all RE and EE projects that do exist in Dominica have been financed by the proponent.

40. The lack of green buildings in Dominica is an indication that local architects and designers have not had any exposure to green building codes or standards. No such codes exist in Dominica, and local stakeholders have pointed out that new building designs do not fully take into consideration measures to reduce lighting and air conditioning costs. This would include the installation of larger windows that take advantage of prevailing winds that could serve as cross ventilation for rooms instead of air conditioning, and maximize the use of sunlight to reduce demand for electric lighting.

41. Service providers for the installation of electric appliances and RE equipment have expressed a certain level of frustration over the lack of sufficient technicians with knowledge for such installations. While there are approximately 3 private entities in Dominica who provide such services with around 2 to 3 technicians (some full time and some part time), they all expressed reservations on expanding their business due to the a very small pool of qualified vocational personnel.

42. The majority of Dominicans are aware of high energy costs but are not aware of the means of reducing these costs. A small sampling of people purchasing a refrigerator or other costly white appliances indicated that they were purchasing the lowest cost appliance, and not the ones that had better energy consumption ratings. Sales personnel at these retail outlets were also not able to converse on energy consumptive issues on the products they were selling. Many Dominicans are aware of the benefits of solar PV on their electricity costs. However, they are not aware of the effort required to design and install solar PV panels, nor have they had access to marketing of solar PV by private solar PV companies that would increase their RE knowledge. This lack of public awareness depresses the demand for RE and EE-related products and services.

Market and financial barrier:

43. There are a series of financial barriers that restrain the public sector from making investments in RE and EE including:
    - Investments in RE or EE not being factored into public sector capital expenditure or operating budgets;
    - The high upfront cost of RE and EE investments that do not have immediate or highly visible benefits notwithstanding their benefits of reducing public sector electricity consumption and reducing electricity bills;
    - Renewable energy and energy efficiency are outside of the core expertise area of most public sector entities. EE and RE investments have long-term impacts that require thoughtful evaluation of the financial trade-offs, risks, and opportunities. Time-strapped public servants are often constrained by limited budgets for considering RE and EE investments, and do not make the necessary time investments for evaluation of RE and EE investments;
    - Alternate public sector financing vehicles for RE and EE, such as Energy Performance Contracting and Third Party Ownership models, have been untested in Dominica.

44. The two financial barriers that hinder uptake of RE and EE in private households and commercial establishments are:
    - the large upfront investment costs; and

- The lack of effective government financial incentives that would catalyze these investments.

45. The upfront investment cost of purchasing RE and making 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 Dominica, 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.

46. Dominica has a well-established financial sector that includes national and indigenous banks, credit unions and international banks which provide debt financing to the residential, commercial and industrial sectors. To date, however, lending for RE and EE investments has been limited leading to the following characterizations of the lending market:
    - The lending window available through Dominica's largest bank, AIDBank, is largely unknown;
    - The lending market for RE and EE investments has been slowly growing but is hindered by the perception that rapid changes in technology will lead to rapid obsolescence of financed technologies;
    - The majority of Dominicans and lending managers are not aware of the benefits and paybacks of such investments;
    - Financing institutions consider the RE and EE industries to be in their nascent stages and are wary of the quality and ability of equipment to provide the returns described by their suppliers[13]; and
    - The lack of a government-backed financial mechanism that would assist in lowering the cost of RE and EE installations and increase financial and economic incentives for low carbon diffusion.

47. The cost of installed solar PV in Dominica is in the range of USD 3.00 per watt to USD 5.50 per watt with a battery storage system. Assuming that a 2.5 kW installation is required for each household, a USD 7,500 investment would be required which may be difficult to finance for a large number of households in Dominica[14].

48. The Government also do not have any functioning financing mechanism that would facilitate implementation of RE or EE projects. Many RE and EE project proponents in Dominica without sufficient knowledge of RE and EE are unable to cover the developmental costs of such projects. This is especially true for RE projects where such projects undergo planning, permitting and the engagement of qualified personnel to design and undertake RE equipment installations. The formation of a facilitation fund to catalyze

[13] Financing institutions are also aware of the lack of policies, and standards and guidelines for RE installations and related equipment. As such, they also have the perception that the risks of using substandard equipment to recover an RE loan are very high.

[14] A 2.5 kWp solar PV installation could generate 18.2 kWh/day (assuming a 20% efficiency), an assumed equivalent of daily household electricity household demand in Dominica (based on household electricity demand in Barbados from 2011 MPRA study on "Price Reform and Household Demand for Electricity", pg 11, available on http://mpra.ub.uni-muenchen.de/40934/1/MPRA_paper_40934.pdf). For example, if 9 kWh/day can be sold back to DOMLEC for USD 0.30 per kWh, a USD 7,500 investment into the solar PV system can be paid back in 3 to 4 years.

low carbon development is undergoing serious consideration by Government as described in Paras 56 and 57.

Stakeholder Analysis

49. **The Environmental Coordinating Unit (ECU)** under the **Ministry of Health and Environment (MoHE)**[15] functions as the body for all environmental and sustainable development management programmes, projects and activities in the country. Its key functions include: (1) advising government on the development of coherent environmental policies; (2) promoting interest and encouraging public participation in environmental matters through public awareness activities; (3) serving as the focal point for regional and international agreements on environmental issues (including Climate Change agreements); (4) serving as the government agency with responsibility for the dissemination of information on the environment; (5) undertaking basic research and coordination of studies on the impacts of development projects on the environment; and (6) liaising with other government and private sector agencies on issues that impact on the environment. The ECU is tasked with implementation of the LCCRS and will serve as the Executing Entity of the LCDP Project. The MoHE will serve as the Implementing Entity of the LCDP Project.

50. **The Ministry of Trade Energy and Employment (MoTEE)** provides oversight to the development of energy generation projects in Dominica, amongst other issues such as trade and employment. The Energy Unit within MoTEE has oversight of the geothermal energy project that dominates the energy-related activities of the GoCD. Since energy development and costs are closely related to Dominica's economic performance, MoTEE also provides oversight to the country's Bureau of Standards (BoS) that has relevance to the standardization of imported equipment related to RE and EE projects in Dominica.

51. **The Independent Regulatory Commission (IRC)** is an independent regulatory body for the generation, transmission, distribution, supply and sales of electricity that reports to the MoTEE minister. The IRC was established under the Electricity Act, Act 10 of 2006, which was passed into Law on October 2006. The IRC was established as an independent regulator with the primary responsibilities and functions contained in the Act. The IRC has the sole and exclusive authority to regulate all electricity entities subject to the Act and has full power to regulate all licensees with regard to all economic and technical aspects of regulation in accordance with the Act, especially with regard to the determination of tariff or electricity charges. The objectives of the IRC are to:

- serve as an independent arbiter in all matters relating to the sale of electricity;
- establish rules and guidelines which will allow for consistency, predictability and transparency in the regulation of electricity supply in the nation;
- serve as a forum for customer appeals in their dealings with the service providers;
- protect the health and safety of all persons affected by the operators in the sector;
- support Government policy on the supply of electricity for national development; and
- engage and work with other agencies to promote, protect and enhance a sustainable environment.

[15] ECU was until mid-2014 under the Ministry of Environment, Natural Resources, Physical Planning and Fisheries

52. **The Dominica Electric Power Company (DOMLEC)** is the main utility for the generation, transmission, distribution and sale of electricity to more than 35,000 customers and is operated as a vertically integrated company. DOMLEC is primarily and privately owned by the Canadian firm EMERA Caribbean Renewables with a 51% share. Other shareholders include Dominica Social Security at 20% and local corporate and private citizens with the remaining 29%. Since January 1, 2014, DOMLEC have been operating under two licenses granted by the IRC, the first being a non-exclusive generation license, and the second as an exclusive transmission, distribution and supply entity for electricity within Dominica[16]. Lack of adequate government oversight and ineffective managerial strategies have resulted in the continuing poor performance of the utility and within recent times, power generation has become an increasingly and relatively expensive activity, resulting in excessive costs to consumers. The T&D losses are close to 10%, the costs of which are passed onto consumers.

53. **EMS Limited** is a Dominican-based energy service company (ESCO) that offers designs, advice and RE and EE installations to property owners, architects/civil engineers and consumers. EMS has been one of the successful RE proponents in Dominica with installation of several solar PV panels that supplement electricity supplies to a number of businesses including one of the largest grocery stores in Roseau, and an automobile dealership in Canefield.

Baseline Analysis

National Strategies, Plans and Regulatory Framework for Renewable Energy

54. The primary and key baseline activity of this GEF Project is the National Low Carbon Climate Resilience Strategy 2012-2020 (LCCRS) which has been adopted with the vision of "*leveraging all of the human, natural and financial resources available to the country, in order to realize the vision for Dominica as a place characterized by economic success, and by the much-enhanced quality of life of its people, through their own empowerment, and through policies of Government geared to facilitating an environment within which private enterprise can flourish".* More importantly, the LCCRS also importantly recognizes that "*current high costs associated with importation of fossil fuel-based energy is unsustainable, a draw on the economy, diverts much needed resources from priority poverty reduction and social development programs, and reduces the availability of funds needed to address impacts from climate change and natural disasters".*

55. The LCCRS provides the rationale and strategies towards the development of a low carbon path. This includes the promotion of energy conservation and RE development to address rising energy costs that affect the cost of living and quality of life, the high costs manufacturing and services, and the challenges of remaining competitive. In addition to its promotion, the LCCRS states that RE will also comprise a greater share of national energy generation in Dominica through the harnessing of geothermal, wind, solar and hydropower resources.

[16] http://www.domlec.dm/index.php/our-history

56. The LCCRS also states that adoption of a National Strategy at the highest levels is necessary to facilitate Dominica's transformation into a low carbon economy that commences with considering climate change mitigation measures (CCM) as a priority. CCM is done with the understanding that CCM will generate energy savings and funds that can be availed through a sustainable financing mechanism for Dominica to invest into urgent climate change adaptation measures.

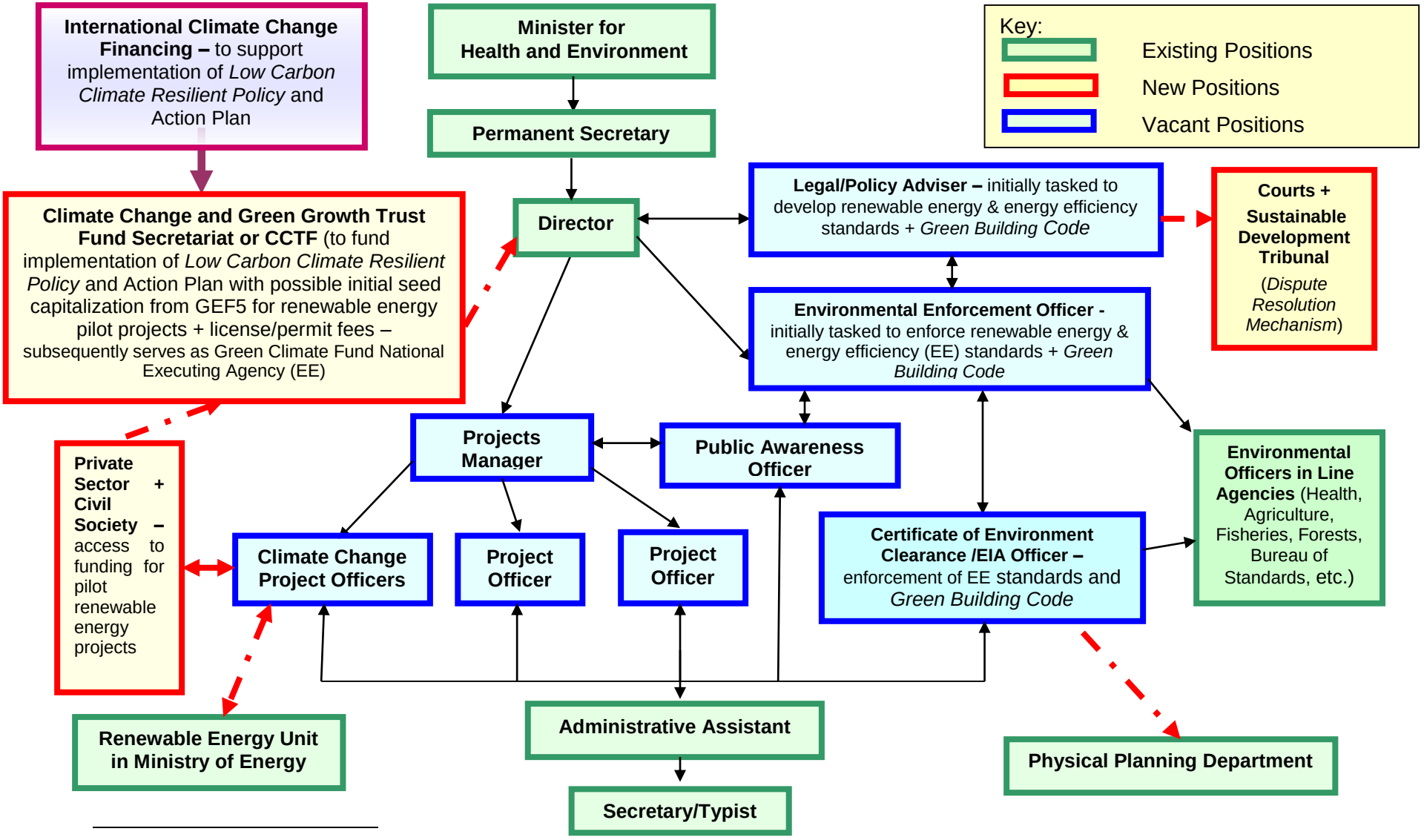
57. The LCCRS identifies the pathway for low carbon development including:
    - Development and commercialization of geothermal resources with the aim of financing the design and construction of a grid-connected 120 MW geothermal plant;
    - Development of solar energy that includes training for solar energy conversions and related technologies, incentives for conversions of solar heating in homes and public buildings, feed-in tariffs for solar producers, design and construction of pilot grid-connected solar power facilities, and soft financing for communities and small-scale private solar power conversions;
    - Development of wind energy and hydropower that includes training on wind and hydropower technologies, development of wind and small and run-of-river hydropower resource inventories for Dominica, feed-in tariffs for wind and hydropower producers, financing of the design and construction of grid-connected wind farms and hydropower projects, and soft financing for community and small-scale private wind and hydropower power conversions;
    - Promotion of green communities including training on energy conservation, GHG auditing and low carbon technologies, financing and commissioning of energy and GHG audits of cities, public buildings and other public energy expenditures, establishment of soft financing of energy conversions and conservation to renewable energy that includes solar powered LED lights, and conversion of public building infrastructure to low carbon technologies in Portsmouth;
    - Sustainable financing for low carbon technologies and energy conservation that will include the provision of training on climate change financing for the private sector; assessment of viable options to finance low carbon technologies using market based instruments (e.g. carbon levies); design of the Climate Change Trust Fund (CCTF) architecture to finance conversions to low carbon technologies; and the legal establishment of the CCTF; and
    - Development of low carbon management services and technologies including training programs on energy and GHG auditing, establishment of standards and certification programs for low energy applications and equipment, energy metering and auditing, and promoting the professional certification of low carbon management services and technology providers.

58. The current institutional arrangements of the GoCD to implement the LCCRS require re-structuring. While the Environmental Coordinating Unit (ECU) is the current government agency tasked with oversight of Dominica's LCCRS, an alternative institutional arrangement is being developed under the country's proposed *Third National Communications (TNC)*, a document that will also contain action plans to implement the LCCRS with the intention of reverting Dominica to becoming a net carbon sink. In an effort to maximize the country's potential to develop low carbon energy sources, a "Department of Climate Change, Environment, and Natural Resources Management" (DoCCENRM) is being proposed to develop a "Low Carbon Climate Resilient Policy and Action Plan". Passage of CCTF through Parliament is expected in 2015. With technical assistance from UNEP, the TNC will be addressing:

- how funds can be used for catalyzing the setup of pilot RE and EE projects;
- the architecture of a Climate Change Trust Fund (CCTF) that is being designed with a few select Parliamentarians with support from the Prime Minister; and
- possible sources of CCTF capitalization including fuel surcharges, license fees, fines and donors.

59. The proposed architecture of the DoCCENRM is provided on Figure 3. Key features to the architecture of the DCCENR include additional positions to the existing organizational structure of the MoHE. Under a Permanent Secretary of MoHE and Director of the DoCCENRM (to replace the ECU), additional positions would include:
    - A Legal Policy Advisor (LPA) reporting to the Director of the DCCENRM to affect policy, lead formulation of a "Green Building Code" and setup a system for permits for energy efficiency and renewable energy;
    - An Environmental Enforcement Officer (EEO) also reporting to the Director of the DCCENRM would provide "low carbon" policy guidance and enforcement instruments to Environmental Officers of other line agencies;
    - A EIA/CEC Officer reporting to the EEO and tasked with issuance of Certificate of Environmental Clearance for low carbon projects;
    - Lead Administrator for the CCTF;

Figure 3: Proposed Organizational Structure: Department of Climate Change, Environment and Natural Resources Management (DoCCENRM)[17]



[17] Courtesy of UNEP and their consultant Mr. G. deRomilly

- A CCTF Projects Manager reporting to both the Lead Administrator and the Director who is tasked with oversight of CC projects approved for funding under the CCTF;
- A Public Awareness Officer;
- Project Officers who screen and provide recommendations to the CCTF Projects Manager for approvals.

MoHE will be funding new positions within the new DoCCENRM including the LPA, the EEO and the EIA/CEC Officer.

60. The creation of new positions within the new DoCCENRM will require training of these personnel on low carbon topics and issues. Since in-country capacity for low carbon training is not sufficient, assistance from persons external to Dominica will be required for training for DoCCENRM personnel.

61. Another key baseline activity for this Project is the *National Energy Policy (NEP) for Dominica, 2014* and the supporting *National Sustainable Energy Plan (NSEP).* The Policy objective is to promote utilization of indigenous sources of energy to produce and supply electricity at the lowest possible cost. The Policy provides:
    - conditions to facilitate the exploitation of Dominica's vast geothermal potential to the extent that Dominica becomes a net exporter of electricity, and to develop cheaper energy through using other RE technologies;
    - encouragement on the installation of solar PV technology where economically viable, on all new public sector buildings, commercial buildings, and residences, particularly for buildings that could benefit from those systems in the event of service outages;
    - measures to promote energy efficiency in all electricity consuming sectors, as well as in production of electricity; and
    - recognition that fossil fuels will be a source of energy for a long time, and as such addresses issues related to bulk storage, fuel quality and supply.

    The NEP will require revisions to account for rapidly maturing RE technologies and their applications, as well as adding disincentives for the use of fossil fuels in circumstances where renewable energy technologies could have been otherwise used. Similarly, the Policy still needs to address and promote incentives for the use of RE in applications such as appliances and small modular systems for domestic use.

62. To support the National Energy Policy, the NSEP lays out a number of actions to be taken with respect to a wide range of renewable energy technologies including solar PV, and implementing pilot projects targeting government buildings[18]. The NSEP also outlines and addresses several extant and critical issues relating to the importation and use of fossil fuels in the country's energy sector. The goal of the NSEP is to promote all the components of sustainable energy in tandem with other policy, legal and regulatory instruments.

63. Dominica does have other policies, acts and regulations that address sustainable energy issues:

[18] http://www.cipore.org/wp-content/uploads/downloads/2014/04/FINAL-SEP-Final-Draft-Commonwealth-of-Dominica-140415.pdf

- *Draft environmental and planning regulations for renewable energy, 2010, April 9, 2010*. These include regulations and standards for the planning and preparation of environmental impact assessments (EIAs) for renewable energy developments;
- *National Geothermal Resource Act (NGRA), 2014***.** The Act sets out the legal conditions for the development, exploration and use of geothermal resources in Dominica. The Act does not include geothermal field rules that are necessary to establish the environmental conditions that govern the exploration of the geothermal resource. The Act does state that "the Minister may make Regulations respecting anything that the Minister considers necessary or expedient for the administration or enforcement of this Act." Secondary laws and regulations in the context of geothermal exploration still need to be formulated under the NGRA. These should be based inter alia on international best practices adapted to the Dominican environment, and account for any relevant preliminary work undertaken. These regulations should also support an enabling investment environment for geothermal development in Dominica that would attract further investment. This would include issues related to licensing and concessions, environment issues, health and safety, power purchase agreements and pricing, and governance; and
- *Electricity Supply Bill, Dominica, 2006***.** Amongst other issues, this Bill was proposing to promote solar PV for street lighting and in public buildings. The Bill, however, does not address the status of the grid to accommodate IRE inputs. As such, the Bill did not provide the necessary information to the issuance of licenses for power generation and supply of electricity to the grid as well as setting limits and targets.

Ongoing Energy Efficiency Initiatives

64. Dominica has had a number of piecemeal efforts to address energy efficiency as a means of achieving low carbon status. This commenced in 2005 with studies conducted by DOMLEC aimed at developing a plan for improving the energy efficiency of its system. It was envisaged that this intervention would realize tremendous savings in energy, reduced importation of fuel for generation purposes and the amount of energy wasted. With the escalation of oil prices from 2006 to 2008, the GoCD embarked on simple solutions notwithstanding their primary focus on geothermal exploration as a major effort. In 2006, it launched an energy efficient lightening project with the distribution of 200 compact fluorescent lights (CFLs) to a local community. By 2007, a total of 5,000 CFLs were installed. This effort was then aimed at retrofitting street lights and public buildings with CFLs and light emitting diode lights (LEDs) to replace conventional and high energy consumptive lights.

65. Dominica has an estimated 5,000 street lights standards. In 2014, the Government of China provided assistance to lower the carbon footprint of GoCD's assets through a donation of 2,500 LED street lamps with solar panels, poles and batteries. By late 2014, an estimated 100 - 50W LED street light standards were installed on a pilot basis at the traffic circle at Pont Casse and along the Edward Olivier Leblanc Highway between Canefield and Roseau. The performance of these LED street lamps, however, has raised concerns over the quality of the LED lamps, the illuminance these LED lamps provide to the road surface, and installation issues related to the location of the lead acid battery at the base of the pole. The batteries were either too exposed to moisture or have been tampered with rendering them dysfunctional. These installations would not be able to withstand a Category 2 hurricane event.

66. Dominica, similar to most other Eastern Caribbean countries, do not have standards or regulations defining the quality of electrical fixtures being imported and the standards of installation. The Public Works Corporation (PWC) under the Ministry of Public Works and Ports (MoPWP) are planning to install the remaining 2,000 LED street lamps in 2015 and 2016 at a cost of USD 1.86 million (ECD 5.0 million) pending the completion of the pilot LED street lamp installations and resolution of the installation issues and the safe and secure storage location of the battery. This will likely involve private contractors. In addition, PWC are also seeking the financial means or donations to convert the remaining 2,500 street light standards to LED lamps.

67. Other than the LED street lighting efforts, there are not many other GoCD-driven energy efficiency initiatives. One of these efforts has been a waiving of VAT on certain electrical appliances such as indoor LED lights and EE electric water heaters. These appliances can be found in a few general stores in Dominica (mainly in Roseau) with the VAT reduction already applied to the displayed price. This has not resulted in increased sales of EE appliances since most consumers only seek the lowest price for appliances, and have poor awareness of the benefits of EE appliances and life cycle costs of an appliance.

68. There are around 5 Dominican retail outlets that do sell larger appliances such as refrigerators and televisions with energy labels. These labels from the EU and US Energy Star systems, however, are not standardized leaving the consumer to translate the meaning of these labels. Exacerbating this situation is that sales staff do not have any understanding of energy consumptive issues of these appliances. This does not promote more widespread procurement of energy efficient appliances by Dominican consumers.

69. Commercial establishments in an effort to be more competitive with their services and goods have undertaken their own initiatives to become more energy efficient and reduce their electricity costs. Examples include local hotels and retail stores that have:
    - installed diesel generation equipment for their own electricity supply that is less costly than DOMLEC-supplied electricity;
    - used waste heat as a means of reducing air conditioning costs;
    - converted lighting systems to LED light fixtures; and
    - installed solar PV systems as a means of offsetting the high cost of DOMLEC supplied electricity.

    These measures have reduced electricity consumption of these applications by as much as 50%. While there is large potential for other business establishments to benefit from these types of EE activities, there are a number of reasons why more EE activities are not undertaken including the lack of awareness and guidance on EE issues, lack of suppliers and shortage of technicians of EE equipment, the initial high cost of EE equipment for many commercial establishments, and the lack of financial mechanisms to facilitate its purchase and installation.

70. Stakeholders have pointed out the number of buildings in Dominica that do not take full advantage of bioclimatic designs. By taking advantage of particular weather conditions of Dominica such as prevailing winds and sunshine, a building can minimize its energy consumption while achieving the comfort level of a conventional building. Examples include strategic placement of windows to allow cross breezes and use the sun to satisfy lighting requirements. This would minimize a building's energy demand for electric lighting, electric fans and air conditioning.

Hydro Power and Wind Energy Development

71. Apart from the development of Dominica's small hydropower system at Trafalgar and Padu between 1949 and 1968, there has been very little development of other small hydropower and wind sites in Dominica. This is in part due to the pre-occupation of the GoCD with geothermal resource development. In 2006, GoCD was the recipient of assistance from GIZ to develop small hydropower and wind energy projects. Several pre-feasibility studies on hydro and a cursory study on wind power development were conducted. None of these sites were developed due to their remote locations and high access costs.

72. DOMLEC also provided efforts towards the collection of wind data at various sites including a wind tower at Tarou (a property owned by DOMLEC) that generated information for meso wind mapping. Currently, DOMLEC have identified 6 suitable sites for the development of a 3 MW wind farm. There has been no movement on these promising wind development sites, however, due to reported issues in secure acquisition of the land.

73. The Rosalie Bay Resort located in the southeast near La Plaine has a 225 KW wind turbine that provides electricity to the resort. The owner of the resort obtained IPP status with DOMLEC and sells excess power back to DOMLEC.

Solar Energy

74. The growth of solar PV installations in Dominica has been modest but the highest amongst all other forms of renewable energy. This has been due to the ease and declining cost of solar PV installations relative to other RE sources. There is, however, a DOMLEC-driven limitation on the use of solar PV and other forms of intermittent renewable energy (IRE) of 10% of annual peak demand in Dominica. To be able to setup a solar PV installation, a property owner would need to obtain the status of an Independent Power Producer (IPP) with DOMLEC.

75. To date, this process has resulted in the installation of 190 kW of solar PV in Roseau with a private entity and another 100 kW at the Rosalie Bay Resort (in addition to the 225 kW of wind energy). While there is strong interest in solar PV installations amongst other commercial establishments and property owners, DOMLEC is not providing any more approvals for IPP status and solar installations.

Geothermal Energy

76. Since 2010, the GoCD has been actively implementing a programme to explore and develop Dominica's geothermal resources for the generation of clean and lower cost electricity. The latest findings of the exploratory programme indicate the feasibility of more than 10 MW of power generation from geothermal resources which can be used domestically. There is also the possibility that an additional 40 to 50 MW of power can be developed for export to the neighboring countries of Martinique and Guadeloupe.

77. According to DOMLEC's IRP of March 2015, they are planning to implement a phased approach to development of the geothermal resource in increments of 3.5 MW plants, spread over a period of 10 years. The viability and approval by IRC of this IRP, however, is contingent on the GoCD providing firm dates for the financing and implementation of

these projects including the first 3.5 MW geothermal plants. As of June 2015, GoCD has not provided any firm dates for these projects.

Grid Issues with Intermittent Renewable Energy

78. To protect its grid from the risks of variable or intermittent renewable energy (IRE) inputs, DOMLEC has a IRE limit of 10% of peak annual demand, equivalent to 2.5 MW out of which 1.5 MW is planned for development of a utility-scale solar PV plant by DOMLEC (for development in 2017 and 2018[19]), and another 515 kW (at Roseau and Rosalie Bay Resort) of RE generation facilities already installed. With less than 500 kW of IRE capacity available under the IRE limit, there were limited opportunities for approvals coming from DOMLEC for grid-connected IPPs using RE into their grid. However, with the recent damage to over 6.2 MW of Dominica's hydropower generation capacity, DOMLEC are going to be encouraging major electricity consumers generate their own electricity to make up for the shortfall. DOMLEC are also seeking assistance for grid studies that can inform them of the level of investment required to accommodate these new sources of energy inputs as well as raising the IRE ceiling above 10%.

79. Given government commitment to geothermal power, Dominican stakeholders have indicated:
    a) The possible need for the grid to undergo transmission and distribution investments and upgrades to accommodate a higher rate of IRE inputs; and
    b) The need for a grid code (currently being drafted by DOMLEC) with an external review to ensure best international practices.

Dominican Public Sector Financing of RE and EE

80. The Ministry of Finance (MoF) is responsible for budgetary provisions for the various departments. Some departments and agencies treat issues related to energy (including energy efficiency) as a project and do not include costs for maintenance as part of the budgetary requirements. Hence, there have been frequent incidences of equipment failure where financing is required to perform maintenance work. This has severely affected the sustainability of energy projects. If project and maintenance costs are not submitted on time, new unbudgeted expenditures may not be approved after a set submission date.

81. While Dominica has made modest progress in improving the availability and accessibility to financing for RE and 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 (EPC) model. This lack of understanding is currently a hindrance to the development of ESCO services in Dominica and the ability for potential ESCOs to access financing required to purchase the necessary equipment for efficiency upgrades.

82. Dominica has a number of service providers that could be classified as "almost ESCOs"; many companies provide some but not all of the types of services offered through a typical ESCO. This is fairly consistent across the Caribbean region. While a few service providers in Dominica and call themselves ESCOs, only one "true" ESCO has been identified to date

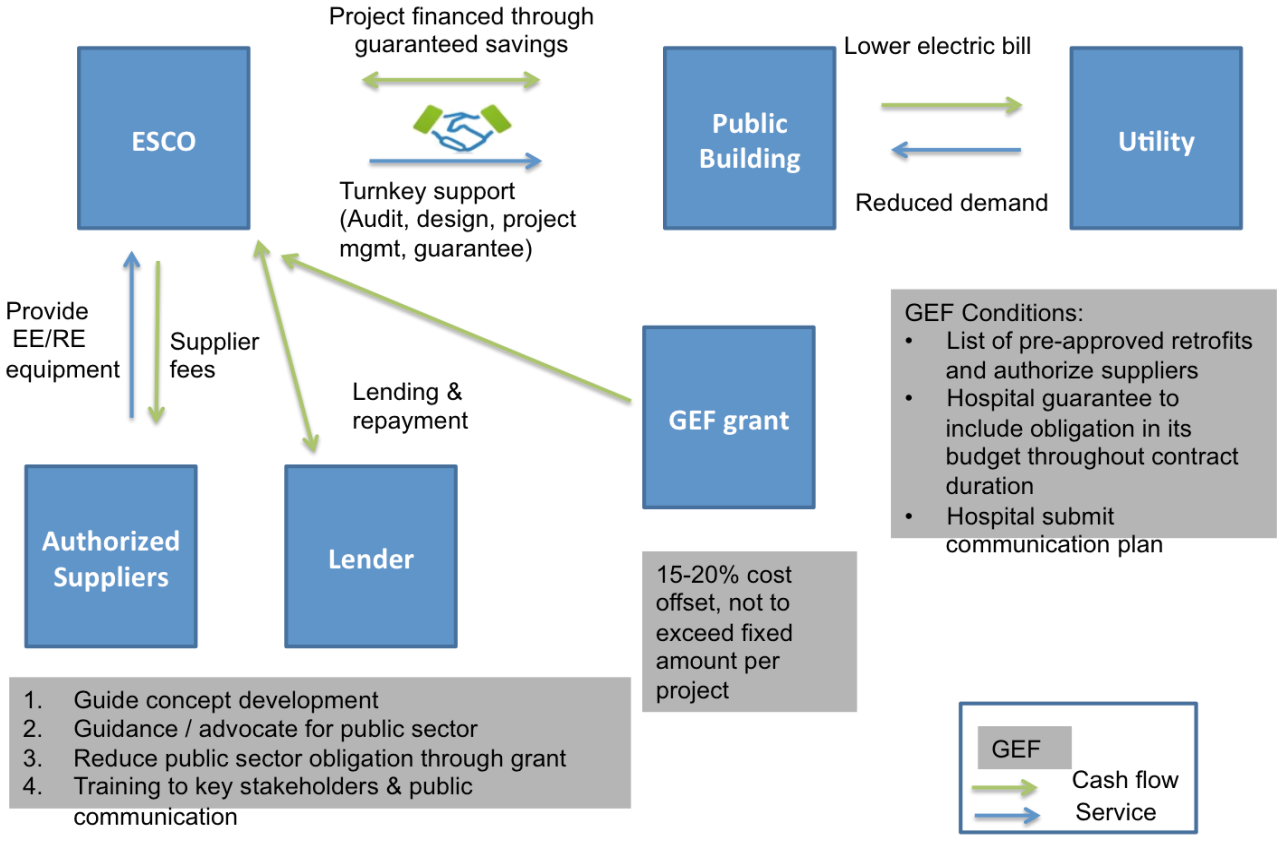
[19] http://www.nbdominica.com/presentations/pmth_devplan.pdf

that relies on EPC as a way of providing turnkey RE and EE services. This Dominican based ESCO will be participating on this UNDP-GEF Project.

Box 1: ESCOs and EPCs in the United States for Financing Public Sector RE and EE Projects

Globally, public sector institutions face similar challenges to investments in RE and EE. Typically, RE and EE investments are not included in the budgeting process and governments do not have a way to access the capital to make upfront investments in energy savings. This has led to the development of the Energy Performance Contracting (EPC) market, which has become the largest provider of EE upgrades in the United States public sector and one of the most common approaches to public sector financing worldwide. Energy Performance Contracting (EPC) is a turnkey service that provides customers with either a selection or a comprehensive suite of energy efficiency and renewable energy measures. At the core of the EPC market are Energy Service Companies (ESCOs) which typically deliver an EPC project, providing services to the public sector including: conducting in-depth energy audits, designing and planning the upgrades, financing, construction and installation, as well as the evaluation and monitoring of energy use over time. As such, ESCOs can help public entities overcome the lack of time and expertise that local governments may face in identifying the right building upgrades, and implementing them. Figure 4 provides an illustration of an EPC arrangement.

Figure 4: Energy Performance Contracting (EPC) Arrangement



Profile of Potential Pilot RE Demonstration Sites

83. The NSEP under Action 20.3 states that "establishing standards for energy efficiency to inform the design, construction, and management of buildings in Dominica" will require "implementing building standards and leading by example by ensuring that Government buildings meet or are striving towards meeting standards". Furthermore, Dominica does not have any formal emergency response programme setup in the event of an extreme storm or seismic event. One of the aspects of a formal emergency preparedness and disaster response is to provide emergency shelters and relief centers. These shelters and centers are typically located in public buildings such as schools, community centers, polyclinics and hospitals to provide food and medicine. These public buildings can also serve as focal points for community activities such as town hall meetings, centers for learning, and other social purposes.

84. As would be expected during a hurricane or a seismic event, grid power is expected to be down necessitating the need for backup power supplies for these public buildings. While most of these shelters and centers in Dominica are equipped with diesel generators to serve as backup power during these extreme events, this is done at a higher cost to the Government in its use of fossil fuels, and at higher risk in the event that the fuel supply is exhausted. As a means of reducing this risk and cost to improve its emergency responses, the GoCD is considering the installation of stand-alone solar-PV systems at emergency shelters and relief centers to provide backup power in the event that the grid is down after a severe storm. This would improve the country's Disaster Relief Response (DRR) and allow Dominica to be better equipped to recover from natural disasters. The need for strengthening the country's emergency preparedness and disaster response was somewhat highlighted during the recent extreme precipitation event associated with Hurricane Erika in August 2015 that damaged five of its hydro generation units.

85. However, similar to other Eastern Caribbean countries, disaster risk management responsibilities in Dominica are dispersed amongst several government agencies, diluting the actions the country could take to strengthen its disaster response to extreme climatic events. In addition, the GoCD face budget constraints in accessing RE technologies that would improve Dominica's DRR. The World Bank-financed project for Dominica entitled "Disaster Vulnerability Reduction Project" is designed to address emergency preparedness and disaster responses of the country to extreme climactic and geological events. This project, however, does not include provisions for setup of stand-alone solar PV systems for these public buildings, located throughout Dominica.

86. Salybia is the main community center of the Carib Territory is located along the eastern shores of Dominica. The Carib Territory has been given autonomy in the management of some community affairs under the Ministry of Kalinago/Carib Affairs as a response to the 2010 Draft Country Poverty Assessment (CPA) report that stated the incidence of poverty in the Carib Territory is high compared to the national level. The Salybia public school is also intended for use as an emergency shelter during hurricanes. With the current use of diesel generation sets for backup power supplies, the school roof can accommodate solar PV installations that would reduce the school's dependence on the diesel generation sets for backup power, and reduce its dependence on costly grid power.

87. Portsmouth is located at the northwestern corner of Dominica with a population of 2,900. Portsmouth has intentions of becoming a "green city"[20] based on its modest economic growth with a Japanese-funded fish processing plant and the growth of the Ross University School of Medicine. One of the emergency shelters in Portsmouth is the Roosevelt Douglas Primary School. Measures could be undertaken to improve its capacity as an emergency shelter from a seismic event, tsunami or hurricane event through the installation of solar PV on the rooftops of the school that would not only provide backup power, but also provide electricity to the school offsetting costly grid electricity costs.

88. Portsmouth also has as sites that can serve as run-of-river hydropower plants along the adjacent Indian River and the North River.

89. The Roosevelt Douglas Primary School is being considered as host to a number of EE measures including:
    - the installation of indoor LED lights in the classrooms;
    - the retrofitting of roof vents in the classrooms to provide natural lighting and encourage cross ventilation;
    - replacement of 4 mercury halide light standards on the basketball court with LED lights; and
    - Installation of LED lights for the football pitch and proposed sports center (located to the west of the basketball court).

90. Portsmouth Municipality also has an ongoing "STEM" (science, technology, engineering and math) exchange programme with McGill University, Montreal, Canada, in the areas of technology, engineering and music, amongst other disciplines. The programme involves the exchange of teachers and other professionals for a period of 6 weeks of training. With Portsmouth's intentions of transforming into a green city, the STEM programme is being expanded to include technical exchanges to include environment. This would expose Portsmouth professionals to best international practices and examples of green city development, including energy efficiency and renewable energy development.

91. Dubic is located on the southern tip of Dominica with a population of 110, and is known as one of the poorest communities in Dominica. In recent times, the economic condition of Dubic has been given national attention. The GoCD's Social Investment Fund (SIF) has provided assistance to the fishermen of Dubic[21]. Dubic is also set in a unique geographical setting with a small stream flowing through the center of the village. This stream is also used by the villagers for washing and bathing as there is no water supply to the homes. Moreover, some of the homes do not have electricity due to the inability of the residents to pay for the services. The GoCD is seeking to setup renewable energy generation in Dubic as a means of mitigating poverty in the village. The setup of rooftop solar PV installations and micro hydropower can facilitate development towards this objective.

92. Boetica is located on the southeastern coast of Dominica with a population of 120. In 2009, the GoCD through an EU-funded component of the SIF provided the Boetica Community Group with technical assistance for income generating activities in animal husbandry (leading to the supply of meat and poultry products to local supermarkets) and agriculture (leading to growth of cassava and production of cassava flour). To increase the competitiveness of local income generation activities, the Government has been interested

[20] http://www.nbdominica.com/presentations/pmth_devplan.pdf

[21] Country Poverty Assessment, Dominica: Reducing Poverty in the Face of Vulnerability, 2010

in the installation of some form of renewable energy generation in Boetica[22]. Solar PV installations appear to be the most feasible technology for the community.

93. Roseau is the largest urban center in Dominica and serves as the capital city for the country with a population of 16,582. There are a number of GoCD buildings where solar PV can be installed as a means of demonstrating low carbon development as well as reducing the Government's operational energy costs. This would include the Government headquarters and the Roseau City Council Building. There are also opportunities to reduce the costs of outdoor lighting in Roseau including street lighting along corridors frequented by tourists, and Windsor Park Stadium for sporting events.

STRATEGY

Project Rationale and Policy Conformity

94. Dominica has some of the world's highest electricity costs due to its dependence on fossil power generation. This jeopardizes the country's potential and image for environmentally sound development that is socially inclusive and economically feasible and is in line with its reputation as the "nature island". Past attempts to strengthen low carbon development have not taken root due to aforementioned threats and root causes (Paras 25-26) and barriers (Paras 27-47). The current development trajectory of Dominica, especially with regards to meeting growing energy demand, is not sustainable with the consequences of increasing poverty in the country.

95. These are the primary rationale for this proposed GEF Project that is designed to initiate and contribute to the lowering of barriers to low carbon development of Dominica. The Project conforms to the recent policies and plans being drafted in Dominica that demonstrate the GoCD's recognition of the serious issue of high energy costs including:

- *The National Low Carbon Climate Resilience Strategy 2012-2020 (LCCRS)* as detailed in Paras 52 to 56*;*
- *Draft National Energy Policy (NEP) for Dominica, 2014* that promotes the development and utilization of indigenous sources of energy to generate and supply electricity at the lowest possible cost as detailed on Para 59;
- *The "Draft" National Sustainable Energy Plan (NSEP) of 2014* are the measures supporting the NEP as detailed on Para 60.

Country Ownership: Country Eligibility

96. Dominica ratified the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol on March 21, 1994.

Country Drivenness

[22] Country Poverty Assessment, Dominica: Reducing Poverty in the Face of Vulnerability, 2010

97. Dominica has promulgated or is drafting legislation to activate initiatives that will contribute to the removal of barriers to low carbon development including:

- *The Climate Change, Environment and Natural Resources Bill 2013 (Draft)* that contains provisions under Clause 48 for the development of renewable energy by the "Ministry responsible for Energy…….in collaboration with the Department of Environment, Climate Change and Development, other Ministries, statutory authorities, civil society organizations and the private sector, as appropriate". This includes review current energy supply mixes to determine how the contribution of renewable energy systems and technologies could be increased in an economically efficient manner;
- *Draft environmental and planning regulations for renewable energy, 2010*. This includes regulations and standards for the planning and preparation of environmental impact assessments (EIAs) for renewable energy developments; and
- *The Electricity Supply Bill, Dominica, 2006* that amongst other issues, promotes solar PV for street lighting and in public buildings.

Alternative GEF Scenario

98. The GEF alternative to the business-as-usual (BAU) scenario for this Project is summarized in Table 4 that demonstrates GEF incrementality of this Project. An important aspect to the GEF contribution to low carbon development in Dominica is the piloting of EPC arrangement which can overcome the lack of public financing for EE and RE initiatives for public assets.

99. An important consideration in the deployment of RETs in Dominica is the obvious benefits from reduced electricity consumption of the users. With current electricity prices in the range of USD 0.32 to 0.36 per kWh (as of August 2015), the generation of electricity from solar PV reduce the electricity costs paid by the user to DOMLEC by as much as 50%[23]

[23] Ibid 13

Table 4: Component comparisons of BAU and GEF scenarios

Component	BAU/Baseline scenario	GEF Alternative
1. Institutional and technical knowledge, awareness and capacity for EE applications and RETs	The GoCD are recipients of grants for various RE technologies including: • The supply and installation of 2,500 solar PV street lighting standards from the Government of China; • Support from SIDS-DOCK on EE lighting for public buildings; Further demonstrations of low carbon technologies in public buildings are limited by lack of knowledge of government personnel to access low carbon technologies, the pre-occupation of their energy-related personnel with the development of geothermal energy, and the lack of encouragement to add RE to the grid (based on the DOMLEC-driven limit to IRE inputs into the national grid at 10% of peak annual demand or equivalent to 2.5 MW of installed RE capacity). GoCD and DOMLEC have requested technical assistance from the World Bank to study the impacts of increasing IRE into the grid, preparing plans for grid upgrades, and the updating of the grid code, leading to the possibility of an increased IRE ceiling.	On the basis that the IRE into the national grid can be increased above 10%, the Project will support: • Detailed studies of RE technologies that can be successfully demonstrated in Dominica; • Demonstration of solar PV and EE technology installations for a number of public buildings and public areas to be selected by the GoCD up to a capacity of 580.8 kW for a number of GoCD building sites, to be implemented under a pilot EPC arrangement; • Use of these pilots as a means of raising awareness and knowledge of RETs and EE equipment for a wide range of stakeholders including parliamentarians to RE technical persons and the general public; • Setup and implementation of an MRV system to monitor energy savings and GHG reductions from RE and EE installations; • Vocational training on best international practices for installations and maintenance of RE equipment.
USD 1,966,000	*USD 1,300,000*	*USD 666,000*
2. Policy measures and enforcement of EE applications and RE technologies	Recent strategies, plans and policies such as the LCCRS, NSEP and the NEP have been adopted. This has not led to a significant rise in the uptake on RE and EE applications. Current enforcement measures are weak with insufficient incentives and government support to implement low carbon development. In addition, there are a lack of regulations and standards for the import, sale and installation of quality RE and EE equipment.	The Project will support: • Capacity building of a new department within MoHE to support climate change and low carbon development in Dominica that responds to the action plans required to implement the LCCRS; • Assistance to implement low carbon action plans including identification resources required for low carbon development; • Setting of minimum energy performance standards (MEPS) for standards and labelling (S&L) of RE and EE equipment import, sale and installation; • Setup and implementing of enforcement regime for MEPS.
USD 690,000	*USD 540,000*	*USD 190,000*
3. Financing options and mechanisms for EE applications and RET diffusion	Government agencies, municipalities and community groups are all interested in RE (particularly in solar PV) as a means of reducing high electricity costs. Only two private sector companies have managed to attain IPP status with 515 kW of RE installations, and DOMLEC has a 10% ceiling (2.5 MW) of IRE inputs into the national grid, thereby stifling any further low carbon development in Dominica. The GoCD have waived VAT on a number of selected EE appliances. This has not resulted in significant uptake in EE appliances in Dominica.	The Project will support: • Plans for scaled-up investments in EE products and RETs for specific communities and using the lessons learned from the pilot installations from Component 1; • Technical assistance to establish a "Climate Change Trust Fund" (CCTF) as specified under the LCCRS to assist proponents in implementing RE and EE installations; • Seed financing for CCTF to catalyze development of RE and EE projects; • Technical assistance to promote and administer CCTF for scale-up of low carbon development.
USD 7,970,484	*USD 7,100,000 (incl. PMC)*	*USD 870,484 (incl. PMC and M&E)*
USD 10,626,484	**USD 8,940,000** *(incl. PMC)*	**USD 1,726,484** *(incl. PMC)*

Project Objective, Outcomes and Output/Activities

100. The objective of the LCDP Project is the removal of the policy, technical and financial barriers to energy-efficient applications and solar photovoltaic technologies in Dominica's streets, outdoor areas and public buildings nationwide, initially targeting up to 5 communities including Dubic, Boetica, Roseau, Portsmouth, for further scale up. This will be achieved through the implementation of 3 components as described in this section.

101. **Component 1: Institutional and technical knowledge, awareness and capacity for EE applications and RETs:** This component is intended to address the barriers associated with the lack of technical knowledge and capacity in Dominica to plan, design, implement, operate and maintain RE/EE projects. The expected outcome from the deliverables of the activities to be conducted under this component is *improved knowledge, awareness and institutional capacity on EE applications and solar PV through demonstrations of their deployment in Dominica*. The outputs from this component will contribute to: (a) awareness of policymakers and government personnel with significant roles in low carbon development; (b) strengthening the capacity of technical and trades personnel from Dominican-based private sector contractors and supply entrepreneurs on low carbon equipment and installations; and (c) raised public awareness of the benefits of EE applications and RE installations. The following outputs will contribute to the achievement of this outcome:

- *Output 1.1: Desk study of selected EE applications and RETs to be piloted through an EPC arrangement.* This output comprises activities related to identification of the most appropriate RETs and EE equipment to be deployed into public buildings and the public realm and installed through an EPC arrangement. To deliver this output, the following activities will be carried out:
  - Conduct a desk study in Year 1 that responds to the following terms of reference:
    - Identify the technologies to be used at selected pilot sites in public buildings or the public realm, and the baseline energy sources that would be replaced. RETs to be considered include solar PV as well as hydropower (from pico and mini-sized projects) if feasible sites can be identified. This should include rationalization of preferred pilot installation sites on the basis of maximizing their demonstrative impacts on the benefits of RETs as well as EE applications;
    - Provide preliminary calculations on the energy saved and projected GHG emissions reductions from proposed pilot installations;
    - Provide recommended implementation arrangements to implement the roll-out of these pilot EE and RE installations that would include a pilot EPC arrangement. An important detail for inclusion of these arrangements is the development of a governance structure of the EPC concept with the GoCD (i.e. roles and responsibilities of various Government agencies to provide oversight and manage the EPC). This can be managed either through the Ministry of Public Works and Ports (who oversee all public assets) or through the Ministry of Finance (who manage a bulk of public procurement for services and equipment);
    - Develop a training program to support EPC pilot participants with the "on-boarding" process. Curricula topics should be included in the training program design;
    - Develop resources such as template agreements and provision of on-call assistance throughout the EPC process;

- Provide plans for the testing, monitoring and managing the performance and impact of the EPC pilot financing mechanism with a view to its potential to scale up investments in the public sector;

- Conduct a workshop in Year 1 with GoCD policy and decision makers to seek their approval of a public sector EPC arrangement to de-risk RE and EE investments. The desk study should provide the necessary rationale to pursue an EPC for implementing EE applications and RE installations without drawing from public operating or capital expenditure budgets, and to find partners willing to share in the risks of RE and EE installations.

GEF support is required for these activities. This activity is consistent with Sub-Action 12.1 of the NSEP for the preparation of such plans.

- *Output 1.2: Pilot EE applications and RE technologies with battery storage*. This output comprises activities to follow-up actions of the desk study of Output 1.1. To deliver this output, the following activities will be carried out*:*
  - Finalize locations of pilot EE applications and RET installations that will be implemented under an EPC arrangement. This will be done in close collaboration with the MoPWP in Year 1 with priority given to public buildings used as hurricane shelters followed by buildings where EE lights are being installed under UNDP's CEELP Project;
  - Identification of solar PV equipment with battery storage and installation requirements with the assistance of a qualified ESCO that will be used for selected public sector buildings. Possible locations include Portsmouth (Primary School), Roseau (Health Clinic and City Chambers), Dubic (community center), Boetica (community center and school), Salybia (primary school and proposed eco-lodge). The choice of pilot project sites will be guided by national priorities and will create equitable opportunities for women, youth and marginalized groups. This activity will be done late in Year 1 with final decisions on the location of these pilot installations to be taken by the Project Board;
  - Identification of opportunities for LED lighting in public areas and public buildings with the assistance of a qualified ESCO that will maximize the demonstrative impact of these installations. This can include public buildings where solar PV installations are being considered, and public areas where outdoor LED lights can be installed. Possible locations include the basketball courts and football pitch near the Roosevelt Public School in Portsmouth, and the street lights along Dame Eugenia Charles Boulevard near the cruise ship terminal along the Roseau waterfront. This activity will also be done late in Year 1 with final decisions on the location of pilot LED installations to be taken by the Project Board;
  - Preparation of an Energy Performance Contract (EPC) with an ESCO using the findings from the desk study in Output 1.1 for these pilot installations. The EPC will need to be clear in terms of:
    - ⇒ Governance of the EPC either through MoPWP or the MoF;
    - ⇒ How RE and EE installations can be observed as examples for learning and providing on-the-job training for equipment technicians;
    - ⇒ How the ESCO will complete detailed audits and assessments of the public buildings where the EPC will be implemented. The Project will provide assistance for energy audits for public buildings and public assets; and
    - ⇒ The system for measuring and monitoring energy saved as this will be used as a basis for remuneration of the ESCO;

- Execution of the EPC starting in late Year 1 and into Year 2. The Project will use its funds to buy-down the cost of the pilot solar PV equipment and LED installations that will reduce ESCO risk on the initial EPCs. The proposed buy downs will consist of:
  - ⇒ Purchase of battery storage systems for proposed 2.6 kWp solar PV installations in public buildings throughout the country. This will be up to a maximum of 23 battery sets at an estimated cost of USD 7800 per 2.6 kWp battery set (total would be around USD 179,400)[24];
  - ⇒ 20% off the price of a 2.6 kWp of USD 7,800 (to USD 5,940) at locations where there are no battery storage systems proposed. This would be up to a maximum of 60 – 2.6 kWp solar PV panel sets (total buy-down would be USD 93,600)[25];
  - ⇒ 20% off the price of LED light installations for various indoor and outdoor applications. This could include indoor and outdoor LED lights for the Roosevelt Douglas Primary School in Portsmouth and the adjacent football pitch and basketball court, and solar-powered LED street lights from a reputable supplier for installation along Dame Eugenia Charles Boulevard near the cruise ship terminal along the Roseau waterfront or other locations deemed feasible by ECU and MoPWP. LED light installations assumed for this Project support includes 18 outdoor LED lights that will replace 18 – 150 watt high pressure sodium lamps, and 700 LED lamps (8 watts) to replace 13 watt CFLs;
- Setup and implementation of a MRV system (measurement, reporting and verifying) under the ECU by Year 2 to monitor energy savings and GHG reductions from EE applications and RE technologies installed by the ESCO and Government technicians. This information will be used to provide tangible proof of the benefits of EE and RE installations, the payback periods and financial gains for commercial establishments and private households;

GEF support is required for these activities to ensure that installations of RE and EE equipment result in tangible reductions in electricity generated from fossil-fuel and energy-sector related GHG emissions.

- *Output 1.3: Knowledge transfer of demonstrated EE applications and RETs*. This output comprises activities to improve the knowledge and development of local expertise in the planning, installation, management and operations of renewable distributed generation systems and EE equipment. This is consistent with Action 7 of the NSEP. To deliver this output, the following activities will be carried out:
  - Completion of two 1-day seminars to House of Assembly of Dominica and Government Cabinet members in Year 1 on EE and RE providing an overview of RE/EE opportunities, real and perceived risks, policy and a facilitated session to identify areas where action is requires for low carbon transition;

[24] These batteries would store more than 650 kWh of energy per 2.6 kWp installation, sufficient power for several days in public buildings, depending on energy consumption of each building. Assumed cost of USD$3 per watt.

[25] For each 2.6 kWp solar PV installation, 7.61 kWh of energy would be save daily. Assuming 220 days of average use of each public building, USD 600 would be saved in electricity cost annually assuming an electricity tariff of USD 0.36.kWh. Assuming USD 3 per watt installation, the payback period would be 5.2 years (without 20% GEF buy down) and 4.2 years (with 20% GEF buy down)

- Delivery of 4 targeted 2-day training workshops during Years 2 and 3 on RE and EE standards and a green building code for future staff[26] on the proposed "Department of Climate Change, Environment and Natural Resources" (DoCCENRM) within MoHE as well as designers and architects. This would include training on:
  - ⇒ RE/EE energy policies;
  - ⇒ A proposed "green building code" for Dominica and enforcement of green permitting (a partial response to Sub-Action 20.2 of the NSEP);
  - ⇒ Effective public messaging that will raise public awareness of the national benefits of RE and EE to sustainability of Dominica's energy sector;
  - ⇒ Permitting and payment of processing fees for RE/EE approvals, and raising awareness of green building code requirements;
  - ⇒ RE and EE installations being funded under the CCTF on RE and EE technologies and administrative issues on RE and EE projects that qualify for funding under the CCTF;
- Delivery of vocational training on best practices for the installation of various EE applications and various EE technologies for electrical technicians and EE/RE equipment installation personnel. Products from Output 2.3 will be used for these vocational training sessions. Each training session will be 10 students trained over a 5-day period. Two of these sessions will be held twice annually during Years 2, 3 and 4;
- Conducting awareness raising messaging during Years 2, 3 and 4 on EE and RE targeting the public and EE appliance sales persons (response to Actions 9 and 16 in the NSEP). This would involve formulation of a communication strategy for the Project, production and screening of 2 Public Service Announcements, and the production of other communication pieces and knowledge products to be published in newspapers and websites by EOP.

GEF incremental assistance is required for this output that to ensure knowledge transfers on RE and EE benefits and issues are covering a wide spectra of Dominican society.

102. **Component 2: Policy measures and enforcement of EE applications and RETs.** This component would address gaps in existing policies and standards that have not provided the necessary confidence for investors and donors into low carbon deployment in the Dominican energy market. The expected outcome from the outputs under this component is *the uptake of EE applications and solar PV technology is promoted through adoption of new institutional arrangements, and policy and enforcement measures*. The following outputs will contribute to the achievement of this outcome:

- *Output 2.1: A strengthened "Department of Climate Change, Environment and Natural Resources Management"*. This output comprises activities to strengthen the planned institutional arrangements of the GoCD to provide more focus towards low carbon development. To deliver this output, the following activities will be carried out:
  - Provide technical assistance during Years 1 and 2 in defining the roles and responsibilities of various positions under the DoCCENRM Director (such as those indicated in Figure 3). This assistance should be provided in the context of

[26] This would include an Energy Advisor within the CCTF Secretariat, a Legal Policy Advisor, a Public Awareness Officer, an Environmental Enforcement Officer, a CEC/EIA Officer, and CCTF Project officers.

strengthening the organizational structure of the DoCCENRM to maximize its effectiveness to implement the LCCRS;

- Provide technical assistance during Years 1 and 2 in the setup of operational rules and regulations within the DoCCENRM. This would include amongst other rules and regulations, the process for submission and approval of green building and low carbon plans that comply with newly formed green building codes, minimum energy performance standards (MEPS), penalties and actions to be taken for non-compliance, and mechanisms for dispute resolution;

GEF support is required to assist in acceleration of the establishment of the DoCCENRM to provide the institutional focus on low carbon development. GoCD is currently preparing legislation for the establishment of the DoCCENRM within the MoHE for the purposes of implementing the LCCRS, and has plans from 2016 to 2019 for its operationalization.

- *Output 2.2: Action plans for implementing low carbon development*: This output comprises activities to develop specific action plans to implement the short to medium (less than 10 years) and long term actions (more than 10 years) in the NSEP that are designed to reduce the predominance of fossil fuels for the generation of electricity and strengthen low carbon development in Dominica. These are mainly related to the integration of IRE into the national grid. With the GoCD expending considerable efforts to develop indigenous geothermal energy generation, there are still no certain dates for the development of geothermal energy in Dominica[27]. To deliver this output, the following activities will be carried out:
  - Provide technical assistance during Year 1 to develop appropriate standards, guidelines, and regulatory system to accommodate higher penetration rates of IRE from RE projects that will help overcome the lack of technical knowledge of the impacts of higher IRE penetration into the national grid. This supports Action 6 of the NSEP;
  - Provide technical assistance during Year 1 to support a grid integration study to analyze how a wide range of renewable energy technologies, including solar photovoltaic, wind, hydropower and geothermal energy can integrate with conventional diesel generators and storage technologies such as batteries. This will include the development of a series of models in the HOMER® software, a tool for designing and analyzing island grids. Building upon ongoing activities at DOMLEC, a baseline model will be developed based on the current installed infrastructure, followed by a refinement of the baseline to determine the techno-economically optimal mixes of renewable generation for DOMLEC and a further refinement of the models based on realistic and achievable goals;
  - Prepare an "*Impacts of Renewables Report"* during Year 1 which will discuss critical considerations (i.e. technical, financial, and economic), recommended data collection tasks, and recommended renewable penetration level based on available data. The recommended level would include discussion around the necessary steps for meeting the targets identified under a likely scenario (likely to meet the objectives of the LCCRS), as well as a summary of expected costs and fuel usage. A shorter, less detailed version of the report would also be prepared for a public audience. If appropriate and in consideration of DOMLEC's business interests, the internal report will include recommended preliminary configurations

[27] There were no certain dates presented for geothermal development as of March 3, 2015 during the IRC stakeholder meeting on DOMLEC's 2015 IRP.

of generation. These will be presented as a system summary sheet including major equipment capacity, initial capital costs, operational costs, and expected generation from each major technology (PV, wind, etc.) for each recommended configuration of generation technologies.

At the request of the GoCD and DOMLEC, the World Bank supported ECERA Project will support these activities. As such, *no GEF assistance is required for this output*.

- *Output 2.3: Mandatory minimum energy performance standards (MEPS) for EE and RE products*: This output comprises activities that will strengthen GoCD's ability to regulate the import of RE and EE equipment to international quality and energy generation performance standards, and to regulate the installation of RE and EE equipment to ensure adherence to best practices for their installation. To deliver this output, the following activities will be carried out:
  - Provide technical assistance during Years 1 and 2 to develop a national or regional system for standards and labels (S&L) for solar PV products, wind turbines and various EE products. The Project will collaborate closely with a Caribbean-regional S&L project being setup in Trinidad & Tobago. This would accelerate the formulation and adoption of a standardized S&L system, supporting Action 19 in the NSEP;
  - Provision of technical assistance during Years 1 and 2 to develop green building codes that will set certain energy consumptive parameters based on the livable area of the building. This could be patterned after the Caribbean Development Bank's (CDB) Regional Building Code Initiative that would support Action 20 of the NSEP;
  - Provision of technical assistance during Year 1 to establish rules and standards for installation of RE and EE equipment. These rules and standards will need to be disseminated at vocational training sessions to be delivered under Output 1.3;
  - Provision of technical assistance during Years 2 and 3 to prepare auditing and energy certification protocols for various RE and EE systems in support of Sub-Action 18.1 of the NSEP. This will strengthen a proposed DoCCENRM requirement for mandatory energy audits to gauge the performance of RE and EE projects funded by the CCTF;
  - Conduct a workshop in Year 3 to share the findings and recommendations of these activities with policymakers and energy professionals for the S&L system, green building code, installation standards for EE and RE equipment, and auditing and energy certification protocols for EE and RE systems.

  GEF support is required for these activities designed to strengthen GoCD's ability to regulate the import of RE and EE equipment to international quality and energy generation performance standards (that would augment the activities of the Dominican Bureau of Standards) to set these product standards. These activities would standardize RE and EE installations to ensure energy savings and GHG reductions are generated.

103. **Component 3: Financing options and mechanisms for EE applications and RET diffusion**: This component will address the financial barriers and the associated lack of financial incentives for EE applications and RE installations in Dominica. The outcome will be *scaled-up EE applications and RET investments through implementation of newly proposed financial and institutional mechanisms*. The following outputs will contribute to the achievement of this outcome:

- *Output 3.1: Plans for scaled-up investments in EE products and RETs for specific communities.* This output comprises activities to prepare plans for scaled-up RE and EE installations in various villages and towns throughout Dominica including Portsmouth, Roseau, Dubic, Boetica and Salybia, and based on findings from pilot installations from Output 1.2 and grid integration studies for higher IRE from Output 2.2. This would contribute to Sub-Actions 4.5[28] and 5.2[29]. To deliver this output, the following activities will be carried out:
  - Provide technical assistance during Years 2 and 3 for scaled-up plans for additional solar-PV installations on public and private building rooftops. This will assist in determining the size of a programme for scaled-up investments of this type. The plans will be site-specific for the design and the effort required installing solar PV, and estimating the offsets of diesel fuel electricity generation. These plans will also include cost estimates, rates of return, risk analysis and business plans for implementation that can be undertaken with an EPC with an ESCO;
  - Provide technical assistance during Year 3 for the development of pico or mini-hydropower sites if feasible sites can be located. If there are feasible sites, a site-specific plan complete with costs and implementation plan can be prepared for financing. This may include possible run-or-river plant sites near Portsmouth or Dubic using turbine technologies with variable blade pitches that can provide more efficiency for power generation under variable flow conditions. Dubic also needs to establish water availability that will determine the viability of a mini to small hydropower plant in the village. These would support Action 10 of the NSEP;
  - Provide technical assistance during Years 2 and 3 for scaled-up LED lighting applications for public areas such as the Windsor Park Cricket Pitch in Roseau, Melville Airport and various hospitals in the country. Site-specific plans can be prepared for each of these facilities for the purposes of actual implementation by a qualified ESCO in Dominica but in close coordination with the UNDP-supported CEELP Project to avoid overlaps;

  GEF support is required for these activities to prepare scaled-up plans for low carbon development in Dominica.

- *Output 3.2: Established "Climate Change Trust Fund Secretariat"*. This output comprises activities that will accelerate the establishment of the CCTF as described in Para 56 including assistance to define the utility of the funds for the purposes of EE products and RE technology diffusion into commercial and residential sectors. CCTF funds can be used to cover upfront developmental costs, and loan guarantees and partial loan finance. The need for loan guarantees and partial loan finance would be notable for entities who do not wish to adopt the EPC approach to RE and EE installations (where payback periods for RE investments, for example, could be as short as 24 months). Funding sources for the CCTF can include fuel surcharges, fees for processing licenses and fines. To deliver this output, the following activities will be carried out:
  - Provide technical assistance during Years 2 and 3 for the design of the CCTF, charter, rules and implementing regulations. The use of CCTF fund designs from

[28] For preparing a listing of potential RE sites throughout the country that would include building on current efforts for distributed renewable generation to develop a "Standard Offer Contract" for small IPPs using RE technology.

[29] For conducting studies to identify communities without or limited access to grid power, and through cost-benefit analysis, determine the most economic technology to deliver power to them. This should include consideration of grid connection, cooperative generation, or individual generation which could include solar PV.

other countries (such as Trinidad & Tobago and the British Virgin Islands) can be used as templates for Dominica's CCTF;
- Provide technical assistance during Years 2, 3 and 4 for financial planning of the fund based on based projected revenue sources and scaled-up investment plans from Output 3.1. This assistance can also include obtaining commitments for revenue streams coming into the CCTF;
- Provide seed financing of USD 250,000 during Year 2 for the Green Climate Fund under the CCTF. This can kick-start the adoption of low carbon technologies by residential and commercial sectors that should catalyze interest of Government and other donors to provide additional capital to the CCTF that will sustain growth of low carbon technology usage in Dominica.

- *Output 3.3: Scaled-up RE and EE installations*. This output comprises activities designed to assist *CCTF administrators in the promotion and utility of the CCTF (from Output 3.2) for scaling-up low carbon development.* To deliver this output, the following activities will be carried out:
  - Provide technical assistance to CCTF administrators during Years 2, 3 and 4 on the management of fund disbursements for project proponents to design of specific EE or RE measures, sourcing appropriate technical expertise, sourcing loan finance, and advance payments for permitting fees for EE or RE installations. This would include assistance to CCTF administrators on guiding project proponents on detailed development of their RE or EE projects using the lessons learnt from pilot EPCs in Output 1.2. This may include assisting project proponents on implementing RE or EE projects either with an EPC arrangement or self-purchase and installation of RE and EE equipment;
  - Provide technical assistance to CCTF during Years 3 and 4 on the standardization of post-project audits of solar-PV installations and other RE and EE installations and the reporting of the benefits and carbon reductions to the ECU;

  GEF incremental support is required for these activities that will initialize utility of the CCTF and support scaled-up RE and EE installations in Dominica.

104. **Component 4: Monitoring and Evaluation**: This component will contain activities related to monitoring and evaluation of Project activities. Through activities in this component, the ability of the Project to be adaptively managed will lead to an outcome of *sustained low carbon development in Dominica* during the Project period, and the increased likelihood of this outcome after the EOP. The following outputs will contribute to the achievement of this outcome:

- *Output 4.1: Monthly progress reports.* This output comprises activities to prepare monthly progress reports of low carbon development throughout Dominica. These reports prepared by the National Project Manager with assistance from the Chief Technical Advisor will determine the necessary investigations and surveys to be conducted to assess Project progress against the indicators and targets provided in the project results framework. With the completion of these investigations and surveys, the information can then be used to provide monthly recommendations for adaptive management to increase the likelihood of achieving these targets;

- *Output 4.3: Final evaluation.* The final evaluation will be conducted in accordance with UNDP and GEF M&E policies and procedures to provide a comprehensive and

systematic account of the performance of the completed Project. This would include the evaluation of project design, process of implementation, achievements vis-à-vis GEF project objectives and agreed-upon changes during implementation of the Project. The evaluation should synthesize lessons to improve the selection, design and implementation of future GEF activities. This will contribute to reports on the effectiveness of GEF operations achieving global environmental benefits.

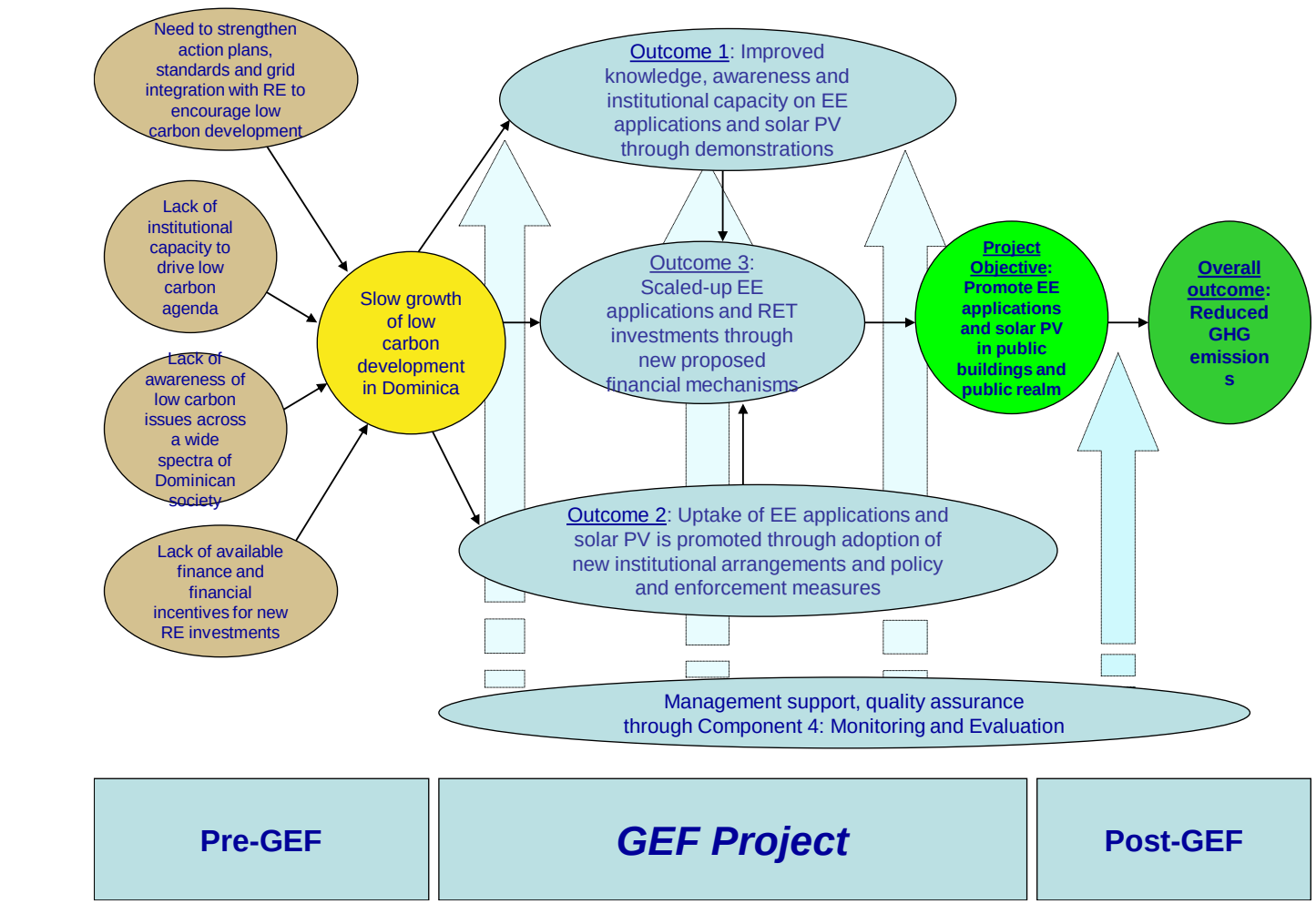
GEF assistance is required for all monitoring and evaluation outputs that will increase the likelihood of this Project achieving its developmental objective.

105. Investments in these Solar PV and LED projects will have an employment impact of approximately 80 jobs mostly related to operations & maintenance and service during and after project implementation[30].

106. Without these planned interventions for catalyzing low carbon development in Dominica, the GoCD will continue along its development of geothermal energy without any certainty of its development dates, and with continued uncertainty over the development of alternative sources of indigenous energy generation that would result in lower electricity prices. Moreover, the absence of support for demonstrating alternative financing and institutional mechanisms would increase the risk of insufficient numbers of interested proponents in RE or EE installations on their premises, and poor progress on mainstreaming low carbon adoption in Dominica. Figure 5 is a flowchart to show the interrelationships between the various outputs and outcomes of the LCDP Project. Figure 6 is an indicative schedule of how this Project will be implemented.

[30] Approximately 30 jobs/MW – EPIA 2004. Figure includes consulting, maintenance, operation, retail and other services. Approximately 20 jobs/MW – EPIA 2004. Assumptions based on manufacturing and installation during project period. Due to the fact that there is no assumed PV manufacturing in Dominica, a reasonable judgment of 10 jobs/MW is applied to capture installation job additions during the life of the project.

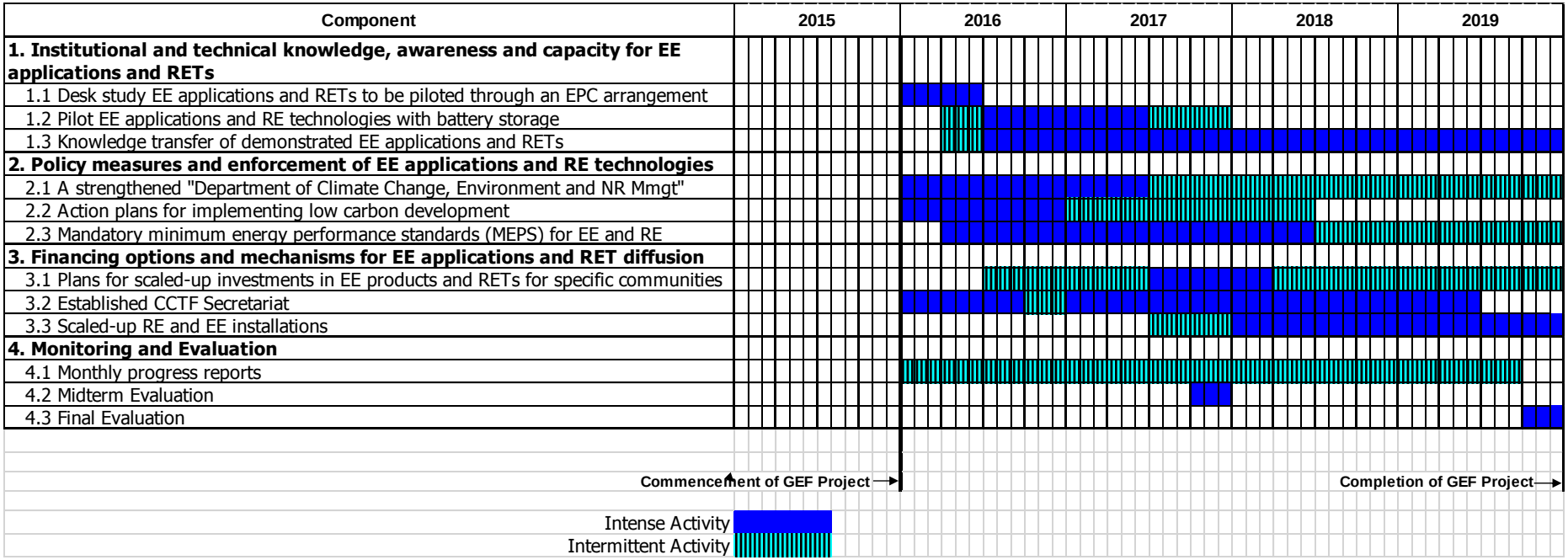
Figure 5: Flowchart of LCDP Project Outcomes



Legend:

- Barriers
- Baseline activities
- GEF activities
- Project objective

Figure 6: Indicative Implementation Schedule for LCDP Project



Key Indicators, Impact and Risks

Indicators

107. The most direct impact of the proposed Project as it relates to core GEF objectives is the reduction in CO_2 emissions from the avoided use of fossil fuel-based electricity generation. Impact indicators to gauge the success of the Project includes:

- Cumulative direct and direct post-project GHG emissions resulting from LCDP Project support for pilot solar PV and EE lighting installations by EOP;
- Percent reduction of energy costs experienced by public buildings where RE and EE installation measures have been undertaken by EOP;
- Number of technicians who are employed in the installation and maintenance of EE and RE equipment by EOP;
- Percentage of persons in Dominica familiar with the benefits of RE and EE by EOP;
- Number of RE and EE technologies with mandatory MEPS by Year 2;
- Number of MoHE officers involved with enforcement of MEPS and green building code by EOP;
- Cumulative number of commercial establishments and households accessing financial assistance from the CCTF by EOP; and
- Annual MWH of EE and RE measures planned or installed by EOP.

Impact

108. The proposed Project activities will result in energy-related GHG emission reductions that will have the impact of demonstrating electricity cost reductions for public buildings and catalyzing interest in further investments in low carbon development, notably through the CCTF which will provide initial funds for proponents for the development of low carbon projects. Table 5 provides a summary of the expected direct and post-project direct GHG emissions from the Project activities.

109. The proposed Project will not generate indirect bottom up emissions due to the fact that the DOMLEC and IRC regulate the solar PV market, placing limits that affect the ability to make a replication factor assumption. A top-down emissions reduction value of 52,108 tonnes indirect CO_2 generated over a lifetime from an, assumed causality factor of 40% can however be estimated[31]. Details of the indirect emission reduction calculation are provided in Annex II, Section C and are attached in a corresponding GHG spreadsheet.

Risks

[31] Modest causality accounts for willingness to add 10 MW of IRE above the current 2.5 MW ceiling but with restrictions to the pace of investment due to the current absence of funding to upgrade the National grid for an increased IRE ceiling.

110. The overall Project risk is moderate. While all possible efforts have been made in the design of this Project to mitigate perceived project risks, there are inevitably some unavoidable residual risks that will need careful monitoring and management to ensure project success. Internal risks and recommended mitigation measures are summarized on Table 6 and provided in detail in the "Offline Risk Log" in Annex I.

Table 5: Summary of Direct GHG Emissions from Project Interventions[32]

Intervention Description	Detail	GHG Reductions (Ton CO_{2eq})[33]	
		Direct ERs from[34]:	Direct post-project ERs from[35]:
Grid-connected solar PV panels and	23 – 2.6 kWp solar installations (with battery storage) with EPC[36]	249.4	830
	Solar PV installations up to 156 kWp for various government buildings (without storage) with EPC[37]	542.1	2166
RE and EE installations using financing from CCTF	Solar PV, hydropower development, EE installations (mostly EE lighting) done with EPC or self-installation (equivalent to 365 kW installed capacity) with GEF seed funds for CCTF	83.4	2757
	RE installations (5.84 MW installed over the 10 yrs after EOP) from additional CCTF funding from GoCD (equivalent to USD 4.5 million out of USD 6.8 million from the GoCD and other donor projects)	-	-
EE applications	Replacement of indoor lights - up to 1,500 CFLs (average 13 watt) with 700 LEDs (average 8 watt) to provide [38]	3.5	44.48
	Replacement of outdoor lights – up to 46 high pressure sodium outdoor lights (150 watts) with 18, 52 watt outdoor LED light complete with solar panel and battery storage[39]	11.5	84.8

[32] RE installations (5.84 MW installed over the 10 yrs after EOP) from additional CCTF funding from GoCD (equivalent to USD 4.5 million out of USD 6.8 million from the GoCD and other donor projects) resulting in approximately 4796.1 tC02eq not included in this analysis.

[33] Grid emission factor for Dominica assumed to be 0.5 tonnes CO_{2e}/MWh.

[34] ERs from 4 year project period

[35] ERs from 10 year post project period including follow on CCTF projects

[36] Project will purchase the battery systems

[37] Project will buy-down by 20%

[38] Ibid 30

[39] Ibid 30

Sub-total from GEF seed financing		***889***	***5883***
Subtotal from GoCD co-financing that is added to CCTF at EOP:			***94,127***[40]
Total direct post-project:		***889***	***100,010***
Total direct+ direct post-project:		***100,899***	

Table 6: Project Risks and Mitigating Actions

Risk	Level of Risk	Mitigating Actions
Lower oil prices reduces government urgency on embracing RE and EE	Low	The Project is assisting GoCD in preparing action plans for the LCCRS and in implementing RE and EE installations in Dominica. This will provide the GoCD with required resources, targets and timelines to implement low carbon development, and thereby reducing the risk that the GoCD reduces its urgency of low carbon or RE and EE development in Dominica.
Delays in RE and EE project approvals due to lack of government capacity	Moderate	The Project will assist GoCD in the setup, establishment and capacity building of the DoCCENRM, a department within MoHE dedicated to approving and ensuring compliance of RE and EE installations. Training of DoCCENRM personnel will be focused on the management and administration of requests for RE and EE project approvals funded by the CCTF. This will work towards reducing the risk of delays in the approval of RE and EE projects through the DoCCENRM
Insufficient capital available to finance the CCTF	Low	The Project will provide seed financing for the CCTF that will be utilized for catalyzing RE and EE project development. The Project will also assist in the setup, administration and effective management of the CCTF. The successful development of RE and EE projects from the CCTF will increase the likelihood of other donors and financers providing additional capital to the CCTF.

[40] **T**his Project will also generate additional post project direct emission reductions resulting from the improved capacity of the **CCTF** with increased seed funds of 4,000,000 from the GoCD post EOP.See attached GHG calculation spreadsheet for detailed calculations and assumptions

Cost Effectiveness

111. The GEF contribution of USD 1,726,484 will contribute to direct and direct post project GHG project emission reductions of 100,899 tonnes CO_{2eq} by the EOP. This includes 889 of direct emissions reductions and 100,010[41] of total direct post project emissions as shown in Table 5. This Project will also generate indirect emission reductions resulting from the improved capacity of the CCTF and GoCD to act as a renewable energy investment facilitation center or clearing house and an enabled RE investment environment that will result in the indirect " "top-down" reduction of 52,108 tonnes CO2eq based on a causality factor of 40%.

112. The design of the LCDP Project will assist Dominica in implementing measures to reduce its energy costs and GHG emissions, and to sustain these reductions well past the proposed EOP date of December 31, 2019. The measures to reduce these energy costs and GHG emissions consists of the promotion of RE and EE, providing more knowledge and awareness of their wide-ranging benefits through pilot RE and EE installations, and providing seed money to a CCTF that will catalyze interest and sustain investment into RE and EE. This will result in proven mechanisms that will be confidently utilized by Dominicans towards low carbon development. This outcome will make GEF resources applied to this Project is cost-effective.

113. Continuation of the status-quo without the Project resources will ultimately result in an unsustainable development path for Dominica that will involve the country's continued ties to fossil fuels for its power generation, the continued burden of high energy costs, and the resulting effects on Dominica's ability to become more competitive in the global economy.

114. This Project will also seek to produce knowledge of global value on how to implement climate change mitigation measures in Small Island states that can be applied in other countries in the region that are not participating in the Project and even for islands in other regions of the world. The value of these early lessons will make the GEF resources applied, more cost-effective in the medium term.

Sustainability and Replicability

Sustainability

115. This Project is designed to ensure that investment conditions into by the EOP are favorable to the extent that RE and EE development in Dominica can be sustained well after Project completion. Sustainability of this GEF project will be ensured through:

[41] Included the impact of the addition of GoCD financing that is added to CCTF at EOP

a) Improving the technical knowledge and awareness of the benefits of low carbon development across a wide spectrum of Dominican society from parliamentarians and government technical persons to vocational technical persons and the general public. This will be done with credible pilot RE and EE installations that will create more interest and demand for RE and EE related products and services as a means to reduce electricity costs in Dominica;
b) Strengthening institutional arrangements that provide more focus and support from higher levels of GoCD for low carbon development. This will ensure that higher levels of low carbon development will be permitted in Dominica and that financing mechanisms to incentivize stakeholders on RE and EE installations are available;
c) Providing technical assistance to potential RE proponents to instill market confidence in the feasibility and relative ease of developing RE and EE installations for reducing electricity costs in Dominica.

Replicability

The energy savings generated from pilot RE and EE installations of Output 1.2 will be disseminated to all Dominican stakeholders, informing them of the feasibility and mechanisms available for their development. This information can then be used by stakeholders to replicate the positive experiences and lessons learned from the pilot RE and EE installations. This information would include the means of installing solar PV, small hydropower (if feasible pilot sites are found) and other forms of RE, LED lights in commercial and public buildings throughout Dominica, and the financial and technical assistance available for their development, and EPC as a means of RE and EE development. This will serve as the replication mechanism for the LCDP Project.

PROJECT RESULTS FRAMEWORK

Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy OR 2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. Expanding access to environmental and energy services for the poor.					
Applicable GEF Strategic Objective and Program: GEF-5 CC4 Strategic Program SP3: Increased production of renewable energy in electricity grids					
Applicable GEF Expected Outcomes: Total avoided GHG emissions from on-grid RE electricity generation					
Applicable GEF Outcome Indicators: Market penetration of on-grid renewable energy (% from renewables); GHG emissions from electricity generation (tons CO_{2eq}/kWh); and $/ tons CO_{2eq}					
	Indicator	**Baseline**	**Targets End of Project**	**Source of verification**	**Assumptions**
Project Objective: [42] The removal of the policy, technical and financial barriers to energy-efficient applications and solar photovoltaic	▪ Cumulative direct and total post project direct CO_2 emission reductions resulting from the Project support for outdoor EE lighting and solar PV pilot installations and investments in tonnes CO_2.	▪ 0	▪ 889 100,010[43]	▪ Project final report ▪ Annual surveys of energy consumption & reductions for each project where RE and EE measures have been undertaken	▪ Government capacity is available to support more diversified EE and RE development and utilization beyond geothermal development

[42] *Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR*
[43] Include the impact of GoCD co-financing that is added to CCTF at EOP (5.84 MW is expected to be installed in additional capacity in the 10 years following the EOP through the Climate Change Trust Fund). See attached GEF spreadsheet for detailed calculations

technologies in Dominica's streets, outdoor areas and public buildings nationwide, initially targeting up to 5 communities including Dubuc, Boetica, Roseau, Portsmouth, for further scale up	▪ Total MWh of renewable energy generated by EOP ▪ Total MWh of energy saved from installation of LED lights ▪ % reduction in electricity costs in public buildings from RE and EE measures by EOP ▪ % of households and commercial establishments experiencing lower electricity costs from EE and RE installations by EOP	▪ 0 ▪ 0 ▪ 0 ▪ 0	▪ RE- 683 MWh ▪ EE – 14.3 MWh ▪ 10 ▪ 1	▪ Government electricity bills for specific buildings where RE and EE measures undertaken	
Outcome 1:[44] Improved knowledge, awareness and institutional capacity on EE applications and solar PV through demonstrations of their deployment in Dominica	• Number of studies for selected EE applications and RETs to be piloted through an EPC arrangement. • Number of pilot installation of EE applications and RE technologies with and without battery storage carried out. • Combined installed capacity of "scaled up investment" through CCTF in RE and EE applications targeting vulnerable groups e.g. low-income female-headed households. • Number of electrical technicians and EE/RE equipment installation personnel trained in best practices for the installation of various EE applications and various EE technologies.	• 0 • 0 • 0	• 1 • 23 solar PV installations with battery and 60 grid-tied solar PV installations with 50% of installations directly benefitting vulnerable communities e.g. low-income female-headed households in Dubic 18 units of outdoor LED street lights 700 units of public lighting in buildings • 365 kW of RE installations (PV and hydropower) and EE installations (mostly EE lighting)[45] • 60 persons trained, with at least 50% of	• Desk study on cost effectiveness of EE measures and RE technologies for Dominica. • Training evaluation feedback from parliamentarians, policymakers, architects, technicians • Reports on pilot EE and RE installations and their energy consumption and GHG emissions in comparison with baseline technologies • Draft of green building codes • Awareness raising survey	• Government budgets for technical training for RE are replenished on an annual basis

[44] *All outcomes monitored annually in the APR/PIR.*

[45] Break down of sub elements and individual projects/installations between RET not provided however, these projects are additive to above RET installations

			those receiving training being female		
Outcome 2: Uptake of EE applications and solar PV technology is promoted through adoption of new institutional arrangements, and policy and enforcement measures	• Number of draft strategic plans and institutional arrangements developed that are gender responsive and are informed by relevant gender-based research, analysis and advocacy • Number of RE and EE technologies with mandatory MEPS by Year 2 • Number of MoHE officers involved with the enforcement of MEPS and green building codes by EOP	• 0 • 0	• 1 • 3 [46] • 6, with 50% female	• Drafts of institutional arrangements and strategic plan for EE and RE growth • MEPS documentation • Training evaluations by participants on MEPS and quality standards workshops	• Continued government support for legislative and regulatory reform to promote and accelerate RE development • Capacity of government does not substantially delay approval of RE policies and RE projects
Outcome 3: Scaled-up EE applications and RET investments through implementation of newly proposed financial and institutional mechanisms	• Cumulative number of commercial establishments and households accessing financial assistance from the CCTF by EOP. There will be emphasis on promoting economic opportunities for women and vulnerable groups e.g. low-income female-headed households • Annual MWh of EE and RE measures planned or installed by EOP (based on combined total of 591 kW installed capacity during project period) • Number of technicians who are employed in the installation and maintenance of EE and RE equipment by EOP	• 0 • 0 • 0 • 0	• 10 • 1778[47] • 20 – Installation jobs, with 50% female • 60 – O&M jobs, with 50% female	• CCTF fund charter and fund design documentation • Bankable documents with business plans for RE scaled-up projects along with applications for CCTF financing assistance • EPC documents for local ESCO for the installation of EE and/or RE equipment • Work inspection reports • Plans for rooftop solar PV and/or mini hydropower installations • Surveys of electricity consumption after completion of RE and EE installations	• Sufficient annual replenishment of RE development funds • Capacity of government does not substantially delay approval of RE policies and RE projects

[46] Solar PV, hydropower installations and LED lighting

[47] Based on MWh generated of RE and EE (1748 MWh) and LED lighting (30 MWh) by 2019

Outcome 4: Low carbon development is sustained through effective monitoring and evaluation	• Number of monthly reports submitted by EOP • Number of completed final evaluations completed by EOP	• 0 • 0 • 0	• 45 • 1 • 1	• Submission of monthly and quarterly reports as well as PIRs • Completed final evaluation report	• Continued government support for low carbon development throughout the duration of the Project.

TOTAL BUDGET AND WORK PLAN

Award ID:	00082947	Project ID(s):	00091623
Award Title:	Low Carbon Development Path: Promoting energy efficient applications and solar photovoltaic technologies in streets, outdoor areas and public buildings in island communities nationwide (LCDP)		
Business Unit:	BRB10		
Project Title:	Low Carbon Development Path: Promoting energy efficient applications and solar photovoltaic technologies in streets, outdoor areas and public buildings in island communities nationwide (LCDP)		
PIMS no.	5186		
Implementing Partner (Executing Agency)	Environmental Coordinating Unit (under the MoHE)		

GEF Outcome/Atlas Activity	Imp. Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount (USD) Year 1 2016	Amount (USD) Year 2 2017	Amount (USD) Year 3 2018	Amount (USD) Year 4 2019	Total (USD)	Notes
Outcome 1: Raised awareness and increased capacity of government personnel, local entrepreneurs and tradesmen to support the scaled-up development of RE installations in Dominica	UNDP	**62000**	GEF	71200	International Consultants	8,000	12,000	12,000	0	32,000	See Note 1
				71300	Local Consultants	88,000	44,000	28,000	0	160,000	See Note 2
				72100	Contractual Services	60,000	5,000	7,000	10,000	82,000	See Note 3
				71600	Travel	1,000	1,000	1,000	1,000	4,000	See Note 4
				72300	Materials and Goods	6,000	6,000	6,000	7,000	25,000	See Note 5
				72200	Equipment	180,000	95,000	0	0	275,000	See Note 6
				75700	Training Workshops	16,000	32,000	24,000	16,000	88,000	See Note 7
					Total GEF Outcome 1	359,000	195,000	78,000	34,000	666,000	
					Total Outcome 1	**359,000**	**195,000**	**78,000**	**34,000**	**666,000**	
Outcome 2: Uptake of EE applications and RE technology through promotion and adoption of new institutional arrangements, and policy and enforcement measures	UNDP	**62000**	GEF	71200	International Consultants	8,000	12,000	8,000	0	28,000	See Note 8
				71300	Local Consultants	60,000	28,000	18,000	0	106,000	See Note 9
				72100	Contractual Services	20,000	20,000	0	0	40,000	See Note 10
				75700	Training Workshops	0	0	10,000	0	10,000	See Note 11
					Total GEF Outcome 2	88,000	60,000	36,000	0	184,000	
					Total Outcome 2	**88,000**	**60,000**	**36,000**	**0**	**184,000**	
Outcome 3: Scaled-up EE applications and solar PV technology investments through implementation of financial and institutional mechanisms	UNDP	**62000**	GEF	71200	International Consultants	0	24,000	8,000	12,000	44,000	See Note 12
				71300	Local Consultants	0	90,000	117,000	164,000	371,000	See Note 13
				72100	Contractual Services	0	0	55,712	0	55,712	See Note 14
				72200	Equipment	0	250,000	0	0	250,000	See Note 15
					Total GEF Outcome 3	0	364,000	180,712	176,000	720,712	
					Total Outcome 3	**0**	**364,000**	**180,712**	**176,000**	**720,712**	
	UNDP	**62000**	GEF	71200	International Consultants	8,000	20,000	8,000	16,000	52,000	See Note 16

GEF Outcome/Atlas Activity	Imp. Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount (USD) Year 1 2016	Amount (USD) Year 2 2017	Amount (USD) Year 3 2018	Amount (USD) Year 4 2019	Total (USD)	Notes
Outcome 4: Low carbon development is sustained through effective monitoring and evaluation				71300	Local Consultants	4,000	4,000	4,000	4,000	16,000	See Note 17
					Total GEF Outcome 4	12,000	24,000	12,000	20,000	68,000	
					Total Outcome 4	**12,000**	**24,000**	**12,000**	**20,000**	**68,000**	
PROJECT MANAGEMENT		**62000**	GEF	71300	Local Consultants and Local Staff	5,000	5,000	5,000	5,000	20,000	See Note 18
				72400	Communications	500	500	500	500	2,000	See Note 19
				72300	Materials and Goods	1,000	1,200	1,200	1,000	4,400	See Note 20
				72500	Office Supplies	1,000	1,000	500	872	3,372	See Note 21
				74598	UNDP Cost Recovery Charges	10,000	10,000	10,000	10,000	40,000	See Note 22
				74100	Audit	3,000	3,000	3,000	3,000	12,000	See Note 23
				75700	Training Workshops	1,500	1,500	1,500	1,500	6,000	See Note 24
					Total GEF Project Management	22,000	22,200	21,700	21,872	87,772	
					Total Project Management	**22,000**	**22,200**	**21,700**	**21,872**	**87,772**	
GEF Total						**481,000**	**662,200**	**328,412**	**251,872**	**1,726,484**	
Grand Total						**481,000**	**662,200**	**328,412**	**251,872**	**1,726,484**	

Summary of Funds:

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Total
GEF	**481,000**	**662,200**	**328,412**	**251,872**	**1,726,484**
Co-Financing	**1,200,000**	**1,300,000**	**1,300,000**	**5,100,000**	**8,900,000**
UNDP	400,000	400,000	400,000	400,000	1,600,000
MoHE (in-kind)	300,000	400,000	400,000	200,000	1,300,000
MoHE (investment)	0	500,000	500,000	4,500,000	5,500,000
EMS Ltd. (ESCO Enterprise)	540,000	0	0	0	540,000
TOTAL	**1,722,000**	**1,966,200**	**1,624,556**	**5,353,728**	**10,666,484**

Notes:

1. This includes professional time for the Chief Technical Advisor (CTA) (@USD 4,000/week) being in Dominica for 2 weeks during Year 1, and 3 weeks during Years 2 and 3 on this component;
2. This includes professional time for the National Project Manager (NPM) @USD 2,000/week for a total of 28, 12, and 6 weeks for Years 1, 2 and 3 respectively, and the Low Carbon Officer (LCO) @USD 1,000/week for a total of 32, 20, and 16 weeks for Years 1, 2 and 3 respectively;
3. Includes USD 60,000 for a desk study on RE technologies and their deployment in Dominica (Output 1.1), and USD 22,000 for outsourcing awareness raising messaging on RE and EE, and communications strategy, and the development of other knowledge products;
4. For workshop facilitators and capacity building
5. For energy savings promotional material and other energy-related knowledge products;

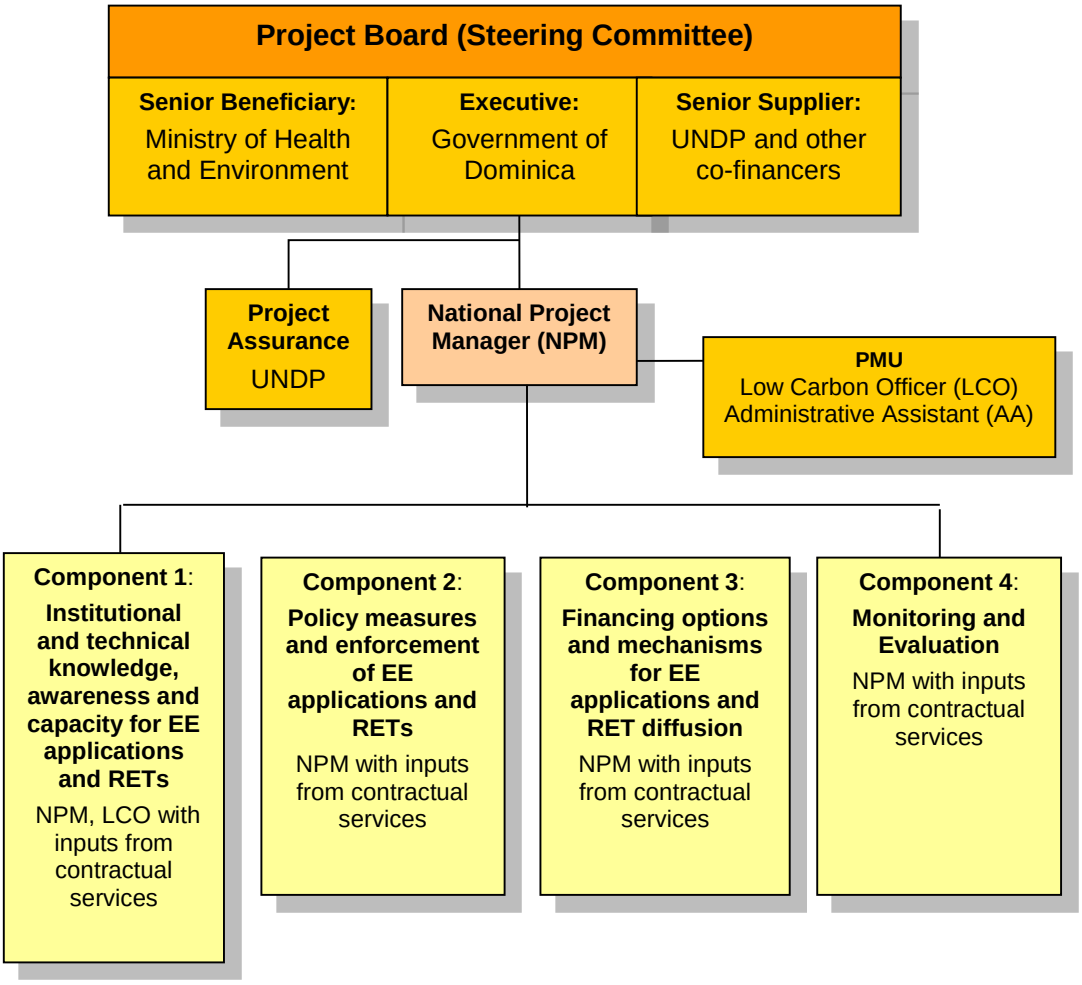
6. For purchase of battery systems for solar PV storage systems (up to a maximum of 23 battery sets at an estimated cost of USD 6,500 per 2.6 kWp battery set for a total would be around USD 149,500) and 20% buy-downs for solar PV and LED installations (assumes 60 – 2.6 kWp solar PV panel sets where total buy-down would be USD 90,000);
7. Assumes 11 workshops @ USD 8,000 per workshop: a) two 1-day sessions for parliamentarians; b) four 2-day workshops for MoHE and DoCCENRM personnel as well as designers and architects; c) to 5-day vocational training for Output 1.3;
8. This includes professional time for the CTA (@USD 4,000/week) being in Dominica for 2, 3,and 2 weeks for Years 1, 2 and 3 respectively;
9. This includes professional time for the National Project Manager (NPM) @USD 2,000/week for a total of 21, 8, and 4 weeks for Years 1, 2 and 3 respectively, and the Low Carbon Officer (LCO) @USD 1,000/week for a total of 18, 12, and 10 weeks for Years 1, 2 and 3 respectively;
10. USD 40,000 for a consulting firm to develop MEPS study (S&L, GBCs, installation standards for RE and EE equipment, and auditing/energy certification protocols;
11. Workshop to present findings of MEPS study;
12. This includes professional time for the CTA (@USD 4,000/week) being in Dominica for 6, 2 and 3 weeks for Years 2, 3 and 4;
13. This includes professional time for the National Project Manager (NPM) @USD 2,000/week for a total of 29, 39, and 49 weeks for Years 2, 3 and 4 respectively, the Low Carbon Officer (LCO) @USD 1,000/week for a total of 18, 24, and 50 weeks for Years 2, 3 and 4 respectively, and the Administrative Assistant (AA) (@USD 500/week) for a total of 28, 30, and 32 weeks for Years 2, 3 and 4 respectively. The cost of the AA will be shared directly with the Supporting Sustainable Ecosystems by Strengthening the Effectiveness of Dominica's Protected Areas System (91618).
14. For scaled-up plans for RE and EE installations
15. Seed funds for CCTF;
16. This includes professional time for the CTA (@USD 4,000/week) being in Dominica for 2 weeks for Years 1, 2 and 3, and the Evaluation Specialist (ES)(@USD 4,000/week) for 3 weeks in Years 2 and 4
17. This includes professional time for the National Project Manager (NPM) @USD 2,000/week for a total of 2 week each for Years 1 to 4;
18. Project Management Unit (PMU) time is allocated as follows: NPM @USD 2,000/week for a total of 4 weeks (1 week per year), the LCO @USD 1,000/week for a total of 4 weeks (1 week per year), and the AA @USD 500/week for a total of 16 weeks (4 weeks per year)
19. Project team coordination; dissemination of project information
20. Start-up supplies and equipment to support Project Management team in coordination of activities and monitoring and evaluation
21. Office stationery and supplies
22. Direct Project Costs for UNDP
23. Audit consultant fees
24. Project Steering Commitee meetings

MANAGEMENT ARRANGEMENTS

Project Organization Structure

116. The project will be executed according to UNDP's National Implementation Modality (NIM), as per the NIM project management implementation guidelines agreed by UNDP and the GoCD. The Project is co-financed with funding from the GEF and UNDP acts as the *GEF Executing Agency*. Components 1, 2 and 3 of the Project will be implemented by the ECU, who will assume the overall responsibility for the achievement of Project results as the *Implementing Partner (GEF Local Executing Agency).* The ECU will designate a senior official as the *National Project Director (NPD)* for the Project. The Project Management Unit (PMU) will consist of a full-time National Project Manager (NPM). The organization structure of the Project is depicted on Figure 7. The Terms of Reference (ToRs) of PMU personnel are provided in Annex VI.

Figure 7: Project Organization Structure



117. The Project Steering Committee (PSC) will have oversight of the Project Management Unit (PMU). The PSC will consist of a Chairperson (from the Ministry of Health and Environment), with PSC members from MoHE, MoTEE, MoF, a person representing ESCO services in Dominica and UNDP Barbados and the OECS. The primary functions of the PSC will be to provide the necessary direction that allows the Project to function and achieve its policy and technical objectives, and to approve the annual Project plans and M&E reports.

118. The NPD will be responsible for overall guidance to project management (for all components), including adherence to the Annual Work Plan (AWP) and achievement of planned results as outlined in the ProDoc, and for the use of UNDP funds through effective management and well established project review and oversight mechanisms. The NPD also will ensure coordination with various ministries and agencies provide guidance to the Project team to coordinate with UNDP, review reports and manage administrative arrangements as required by the GoCD and UNDP. This would include the contribution of office space within the premises of the ECU to personnel in the Project Management Unit (PMU).

119. This Project has been designed as complimentary project that will initially provide valuable assistance for policy and strategic planning gaps and provide funds and technical assistance for Dominican efforts to promote and development renewable energy in Dominica. As such, the NPD in close collaboration with the Project's NPC will chart and implement the activities of this Project towards its objectives of catalyzing RE development in Dominica. This will include outsourcing of technical assistance such as the grid stability assessments and mitigation measures, strategic planning for RE expansion, and quality control for solar PV and other RE installations.

120. UNDP will provide overall management and guidance from its Country Office (CO) in Barbados and the Latin America Caribbean Regional Centre (LAC) in Panama City, and will be responsible for monitoring and evaluation of the project as per normal GEF and UNDP requirements. The PMU under the CO will manage the day-to-day activities of the Project under the guidance of the NPD. The PMU will have one full-time staff, the National Project Coordinator. Terms of reference (ToRs) for the NPC are contained in Annex VI.

121. As per Determination and Decision of the UNDP's Executive Board on the *Policy on Cost Recovery from* Regular *and Other Resources*, UNDP shall recover costs for the provision of project related general management services (GMS) and direct project services (DPS). As an Implementing Agency of the GEF, UNDP earns a fee upon approval of each project which is to be used to cover specific project assurance and oversight costs incurred by UNDP. For the Country Office, these services are related to the provision of project cycle management services; thus, the GEF fee is provided to cover the specialized project cycle management service indirect costs. At the Country Office level, project cycle management services performed by UNDP Country Offices are broadly analogous to General Management Support (GMS) and cover support to project development and oversight of implementation stages. The UNDP-GEF Unit will support the Country Office by providing a suite of specialized technical services as required by the GEF.

122. If the Implementing Partner requests UNDP to provide direct services specific to project inputs, then UNDP's costs must be recovered in full accordance with GEF-specific Bureau of Management Services (BMS) policy on Direct Project Costs (DPCs). In

summary, to comply with BMS policy, UNDP will need to ensure for each project that: (a) a Letter of Agreement (LOA) between UNDP and the Implementing Partner has been entered into clearly documenting the services requested and the associated costs (Annex VI); and (b) the DPCs are within the Project Management Cost (PMC) component of the project budget. If direct project services are requested after the date of GEF CEO Endorsement, prior approval of any DPCs will be needed from the GEF Secretariat. An appropriate separation between project oversight and direct project support is required in accordance with the UNDP Internal Control Framework.

123. UNDP, through the SRO in Barbados and the OECS, will support the Ministry of Health and Environment with implementation support services according to the Agreement between the Government of Dominica and UNDP for the provision of support services, including identification and recruitment of local and international consultants, identification of training activities and assistance in their execution, procurement of goods and services, financial monitoring and reporting, processing of direct payments, supervision of implementation, monitoring and assistance in MSP assessment.

124. The costs associated with these activities will be determined as follows:

Support services (insert description)	**Schedule for the provision of the support services**	**Cost to UNDP of providing such support services (where appropriate)**	**Amount and method of reimbursement of UNDP (where appropriate)**
1. Recruitment of project staff	As per AWPs	As per UPL	ATLAS Billing
2. Recruitment of consultants	As per AWPs	As per UPL	ATLAS Billing
3. Purchase of IT equipment	As per AWPs	As per UPL	ATLAS Billing
4. Purchase of travel tickets as and when necessary	As per AWPs	As per UPL	ATLAS Billing
5. Procurement of goods and services	As per AWPs	As per UPL	ATLAS Billing
6. Processing of direct payments	As per AWPs	As per UPL	ATLAS Billing

General

Collaborative Arrangements with Related Projects

125. The proposed Project will have collaborative arrangements with a number of other donor initiatives that support renewable energy and energy efficiency as follows:

- The Caribbean Energy Efficient Lighting Project (CEELP) that is a part of the SIDS-DOCK Support Program that seeks to catalyze the transition to low carbon economies and sustainable energy sectors through the provision of energy efficient lighting systems to communities located in SID-DOCK member countries that include Dominica. CEELP seeks to remove policy, capacity and financial barriers to EE lighting systems through facilitating EE lighting systems installations in public buildings. CEELP is providing LED lighting in the Government Headquarter Building in Roseau during 2015 and possibly into 2016. UNDP is implementing this 21-month project with a budget of over USD 1.0 million;
- The Disaster Vulnerability Reduction (DVR) Project for the GoCD is financed by the World Bank and seeks to reduce vulnerability to natural hazards and climate change impacts in Dominica through: (i) investment in resilient infrastructure, and (ii) improved hazard data collection and monitoring systems. Synergies between the DVR Project and this GEF Project will consist of solar PV installations on the roofs of public buildings being used as emergency shelters such as public schools and community centers. The DVR Project will benefit from the installation of more climate resilient and climate friendly technologies and reduce their fossil-fuel consumption through the use of solar energy for normal operations and back-up power during extreme climatic events. The deployment of solar PV at these public buildings will also raise the profile of RE usage in Dominica as well as raise public awareness of RE and its value in mitigating disaster vulnerability;
- ECERA is a Caribbean Regional Project of the World Bank that provides amongst other energy-related assistance, technical assistance in grid stability issues related to intermittent renewable energy (IRE) inputs. DOMLEC and MoTEE are currently in discussion with ECERA to receive technical assistance on the formulation of a grid code and the necessary grid upgrades to accommodate higher rates of IRE.
- The Supporting Sustainable Ecosystems project is a UNDP-GEF project aimed at preserving biodiversity through the establishment and strengthening of the protected area system. Given the similarities in the administrative support roles of the two projects, it is proposed that the two projects cost-share to cover the salary of the Administrative Assistant.

126. This proposed Project will establish the necessary communication and coordination mechanisms through its PMU and PSC with the Project Steering Committee to ensure proper coordination between the various projects. UNDP Barbados and OECS will also take the lead in ensuring adequate coordination and exchange of experiences. The Project will seek to coordinate its actions with other UNDP energy and climate change activities in the region; similar strategies of the proposed Project may extend an opportunity to share lessons and exploit synergies, in particular in areas of harmonization and mutual recognition. The proposed Project will also seek to coordinate actions with other existing government commitments and non-government initiatives.

127. The ECU will ensure co-finance and cooperation from its other programs, some of which are funded by other donor agencies. Co-financing details are provided on Table 7.

Prior Obligations and Prerequisites

128. There are no prior obligations and prerequisites.

Audit Arrangements

129. The Government will provide the UNDP Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the programming and finance manuals. The project will be audited according to UNDP Financial Regulations and Rules and applicable audit policies on NIM implemented projects.

Agreement on Intellectual Property Rights and Use of Logo on Project Deliverables

130. To accord proper acknowledgement to GEF for providing funding, a GEF logo should appear on all relevant GEF-supported project publications, including among others, project hardware, if any, purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgement to GEF. Alongside GEF and UNDP logo, a GoCD logo may also be featured as the Implementing Partner of the Project.

Table 7: Co-Financing Details

Co-Financer	Amount (USD)	General Description of Co-Financed Activities
UNDP	1.6 million	• Technical assistance and implementation in the scale up of solar PV and EE investments, including the installation of backup power supplies for improved disaster risk resilience.
GoCD	6.8 million	• USD 4.5 million as additional financing for CCTF; • USD 180,000 for 23 – 2.6 kWp solar PV installations on public buildings used for emergency shelters and relief centers. These installations will also have battery storage that will be purchased by the Project, and will be installed under an EPC arrangement; • USD 360,000 for 156 kW of solar PV to be installed (without battery storage) on selected Government buildings throughout the country including Government Headquarters in Roseau. These solar PV panels will be installed under an EPC arrangement; • USD 960,000 for other RE installations (365 kwp) on public buildings to be considered as investments near EOP; • USD 1.3 million of in-kind contribution of professional time and office space for the PMU
Private Sector Investors	0.5 million	• Initial ESCO investment on solar PV installations and EE lighting on public buildings and outdoor public areas; • Private property owners will be identified during the course of Project
Total:	**8.9 million**	

MONITORING FRAMEWORK AND EVALUATION

131. The project team and the UNDP Office in Bridgetown supported by the UNDP-GEF Regional Coordination Unit in Panama City will be responsible for LCDP Project monitoring and evaluation conducted in accordance with established UNDP and GEF procedures. The Project Results 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, independent mid-term evaluation, 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 8.

132. Project start: A Project Inception Workshop will be held within the first 4 months of the project starting with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and program advisors as well as other stakeholders will be invited. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan. The Inception Workshop would address a number of key issues including:

Table 8: M&E Work Plan and Budget

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time Frame
Inception Workshop and Report	▪ 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.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by CTA with support from the Project Manager ▪ Project team	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	Included with periodic status and progress reports	Annually by July
Project Board meetings	Project Manager	To be determined as part of the Annual Work Plan's preparation. Indicative cost: 6,000 (1,500 x 4 years)	Following Inception Workshop and annually thereafter.
Mid-term Review	▪ Project manager and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)		At the mid-point of project implementation.
Periodic status/ progress reports	1. Project manager and team	Monthly progress reports to be undertaken by National Project Manager with support from CTA Indicative cost: 44,000	Monthly
Final Evaluation	1. Project manager and team, 2. UNDP CO	Indicative cost: 50,000	At least three months before the

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time Frame
	3. UNDP RCU 4. External Consultants (i.e. evaluation team)		end of project implementation
Project Terminal Report	• Project manager and team • UNDP CO	Indicative cost: 10,000	At least three months before the end of the project
Audit	1. UNDP CO 2. Project manager and team	Indicative cost: 12,000 (3,000 x 4 years)	Yearly
Visits to field sites	• UNDP CO • UNDP RCU (as appropriate) • Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
Dissemination of lessons learnt	• Project Manager and team • Local consultant	Indicative cost: 5,000	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: 132,000 approx. (mostly GEF funded, not including co-financing resources)**	

a) Assisting all partners to fully understand and take ownership of the project;
b) Detailing the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team;
c) Discussing the roles, functions, and responsibilities within the Project's decision-making structure including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference of project staff will be discussed again as required; Finalization of the first annual work plan based on the project results framework and the relevant GEF Tracking Tool if appropriate. A review and agreement on the indicators, targets and their means of verification will be required as well as a re-check of assumptions and risks;
d) Providing a detailed overview and reach consensus on reporting, monitoring and evaluation (M&E) requirements, the M&E work plan and budget;
e) Discussion of financial reporting procedures and obligations, and arrangements for annual audit;
f) Planning and scheduling Project Steering Committee meetings;
g) Clarification of roles and responsibilities of all project organization structures as well as planned dates of meetings where the first PSC meeting should be held within the first 12 months following the inception workshop.

133. An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

134. Quarterly Progress Report: Contents of the QPR include:
- Progress made as reported in the Standard Progress Report and monitored in the UNDP Enhanced Results Based Management Platform;
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS (if applicable otherwise outside ATLAS). Risks become critical when the impact and probability are high;

- Project Progress Reports as generated in the Executive Snapshot and based on the information recorded in Atlas;
- Other ATLAS logs that are used to monitor issues and lessons learned. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

135. *Annual Project Review /Project Implementation Reports (APR/PIR)*: APRs/PIRs are key reports prepared to monitor progress since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements, and includes, but is not limited to, reporting on the following:
    - Progress made toward project objective and project outcomes, each with indicators, baseline data and end-of-project targets (cumulative);
    - Project outputs delivered per project outcome (annual);
    - Lesson learned/good practice;
    - AWP and other expenditure reports;
    - Risk and adaptive management;
    - ATLAS QPR;
    - Portfolio level indicators (i.e. GEF focal area tracking tools) that are used by most focal areas on an annual basis.

136. Periodic Monitoring through site visits: UNDP CO and the UNDP RCU staff will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

137. End of Project: An independent Final/Terminal Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

138. The Final Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center. The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainable and replicable project's results.

139. Learning and knowledge sharing: Results from the project will be disseminated within and beyond the Project intervention zone through a number of existing information sharing networks and forums. In addition:

a) The Project will participate, as relevant and appropriate, in UNDP/GEF sponsored networks, organized for senior personnel working on projects that share common characteristics;
b) The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned.

140. The Project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Identifying and analyzing lessons learned is an on-going process and the need to communicate such lessons as one of the project's central contributions is a requirement to be delivered not less frequently than once every 12 months. UNDP/GEF shall provide a format and assist the project team in categorizing, documenting and reporting the lessons learned. To this end a percentage of project resources will also need to be allocated for these activities.

LEGAL CONTEXT

141. This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement (SBAA), the Government of the Commonwealth of Dominica and the United Nations Development Program, signed by the parties on 17 November 1993. The host country-implementing agency shall, for the purpose of the SBAA, refer to the government co-operating agency described in that Agreement.

142. Consistent with the Article III of the SBAA, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner. The implementing partner shall:
a) Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
b) Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

143. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

144. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via: http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This

provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

ANNEXURES

Annex I: Risk Analysis

OFFLINE RISK LOG

Project Title: **Dominica:** Low Carbon Development Path: Promoting energy efficient applications and solar photovoltaic technologies in streets, outdoor areas and public buildings in island communities nationwide	**Project ID:**	**Date:**

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Management Response	Owner	Submitted, updated by	Last Update	Status (compared with previous evaluation)
1	Lower oil prices reduces government urgency on embracing RE and EE	October 2014	Political	P = 1 I = 5	The Project is assisting GoCD in preparing action plans for the LCCRS and in implementing RE and EE installations in Dominica. This will provide the GoCD with required resources, targets and timelines to implement low carbon development, and thereby reducing the risk that the GoCD reduces its urgency of low carbon or RE and EE development in Dominica.	Project manager	Submitted by Project Proponent, updated by Project Manager		
2	Delays in RE and EE project approvals due to lack of government capacity	October 2014	Regulatory	P = 3 I = 4	The Project will assist GoCD in the setup, establishment and capacity building of the DoCCENRM, a department within MoHE dedicated to approving and ensuring compliance of RE and EE installations. Training of DoCCENRM personnel will be focused on the management and administration of requests for RE and EE project approvals funded by the CCTF. This will work towards reducing the risk of delays in the approval of RE and EE projects through the DoCCENRM	Project manager	Submitted by Project Proponent, updated by Project Manager		
3	Insufficient capital available to finance the CCTF	October 2014	Financial	P = 2 I = 4	The Project will provide seed financing for the CCTF that will be utilized for catalyzing RE and EE project development. The Project	Project manager	Submitted by Project Proponent, updated by		

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Management Response	Owner	Submitted, updated by	Last Update	Status (compared with previous evaluation)
					will also assist in the setup, administration and effective management of the CCTF. The successful development of RE and EE projects from the CCTF will increase the likelihood of other donors and financers providing additional capital to the CCTF.		Project Manager		

Submitted by Project Manager _____ Approved by UNDP Programme Analyst _____

Annex II: Detailed CO_2 Calculations and Assumptions

A. Direct Emission Reductions

The direct emission reductions calculated in this section are generated during the proposed 4-year duration of the Project includes the below activities. The calculations and assumptions are shown and shared in a separate spreadsheet.

⇒ *Direct Project investments:*

- 23 – 2.6 kWp solar PV installations to be installed by an ESCO during Year 2 on public buildings that will have battery storage systems to serve as backup power supplies for public buildings to improve the country's disaster relief response. The Project investment (Output 1.2) consists of the purchase of the battery systems for buildings while the remainder of the system cost will be borne by the ESCO under an EPC arrangement;
- 60 – 2.6 kWp solar PV installations to be installed by an ESCO during Years 2 and 3 on public buildings that will not have a battery storage system. The Project investment (Output 1.2) will consist of a buy-down of 20% of the purchase price of the system that will reduce the debt burden of the ESCO for a pilot EPC arrangement (designed to reduce the payback period by 2 years);
- An assumed equivalent of 30 kW of installed solar PV or EE measures that are installed with Project resources providing seed funding for CCTF (Output 3.2) and technical assistance from the Project to build capacity of CCTF administrators to assist project proponents (Output 3.3). Installation could either be through an ESCO or by the building owner. The above installations are listed on Table II-1;
- 18 outdoor LED street lights that are to be installed by an ESCO during Years 2, 3, and 4 as solar powered lights in public areas along street or public areas (such as along Dame Eugenia Charles Boulevard near the cruise ship terminal along the Roseau waterfront, basketball courts or football pitches in Portsmouth). Baseline assumed to be 150 watt high pressure sodium lights (actual baseline lights should be recorded as inventory prior to installation). This is listed in Table II-1 and II-2;
- 700 indoor LED lights that are to be installed by an ESCO during Years 2, 3 and 4 in public buildings to be selected during the Inception Phase of the Project. Baseline assumed to be 13 watt CFLs that are converted to 8 watt LED lights. This could include indoor LED lights for the Roosevelt Douglas Primary School in Portsmouth, various government buildings and schools and community centers used for disaster relief response (actual baseline light power should be recorded prior to LED installation). This is listed in Table II-1 and II-2;

⇒ *Co-financed investments:*

- No direct GHG ERs assumed since the GoCD's contribution to the CCTF is expected until Year 4 at which time, the CCTF installations would not be completed prior to EOP.

B. Direct Post-Project Emission Reductions

Direct post-project emission reductions will also generate emission reductions after completion of the Project from:

- RE and EE installations that receive assistance from CCTF from the Project of the amount of USD 250,000 used for seed financing. The direct post-project GHG reductions from

this amount are calculated assuming installations of 40 to 60 kW annually for the 10 years after the EOP. The assumed installations are provided on Table II-1, and are determined according to funds disbursed, an average of 3 years for loan payback, and a leakage rate of 10%. The direct project and direct post-project GHG reductions from the USD 250,000 were calculated assuming solar PV installations as indicated on Table II-1 on page 67;

- RE and EE installations that receive assistance from a co-financing commitment to the CCTF of USD 4.5 million from GoCD that is assumed to be provided at EOP (after CCTF can demonstrate its operations in Years 3 and 4 to GoCD). Direct post-project GHG reductions from these two financing streams is attributed based on a percentage contribution of GoCD co-finance and GEF seed funds combined
- Total direct post-project emission reductions including GEF and GoCD contributions to the CCTF are

The calculations and assumptions for post-project direct emission reductions are estimated using the GEF Manual for guidance and assumptions are shown and shared in a separate spreadsheet with a summary shown on Table II-1 and Table II-2

C. Indirect Emission Reductions

These are estimated using the GEF Manual for guidance on top-down and bottom-up factors. The calculations and assumptions are shown and shared in a separate spreadsheet and are also shown on Table II-3.

The **bottom up indirect emission reductions** have not been estimated for this project due to the fact that solar PV installations are regulated by DOMLEC and IRC and a replication factor, necessary for this analysis, cannot be determined given these regulatory constraints.

The **top down indirect emission reductions** have been estimated with the formula $CO2_{INDIRECTTD}$ = P10 * CF, with P10 being the technical and economic potential of this application in the 10 years following the end of the project (130,270 tonnes) and a Causality Factor (CF) of 40% [48].

$CO2_{INDIRECTTD}$ = 130,270 * 0.4 = 52,108 tonnes

.Assumptions into the calculation are as follows:

- the GoCD want to raise the IRE into their grid from 2.5 MW to 12.5 MW. The decision to allow 12.5 MW of RE through IPPs will come from IRC and the GoCD, and would be done as a measure to allow commercial enterprises to reduce their energy bills through permission to become IPPs for RE;
- Potential for 10 MW of solar PV panels to generate 26,538 MWh/yr resulting in 13,270 tonnes CO2 reduced per year (130,270 tonnes CO2 over a 10-yr period), and
- An assumed causality factor of 40% translating into the PV Project being responsible for indirect emissions of 52,108 tonnes CO_2.

[48] A causality factor of 40% indicates “modest” influence of the Project

Table II-1: Total Generation (MWh) and Emission Reductions (tC02 eq) from Pilot Solar PV Installations

Description of Solar PV System (installed using GEF resources)	Installed Capacity (kWp)	MWh (direct)					MWh (Post-project)										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
23 - 2.6 kWp solar PV installations (with storage)	59.8			166	166	166	166	166	166	166	166	166	166	166	166	166	2,159
Solar PV installations various Govt Bldgs	156			217	433	433	433	433	433	433	433	433	433	433	433	433	5,416
Solar PV or other RE/EE from CCTF (2018)	30				83	83	83	83	83	83	83	83	83	83	83	83	1,000
Solar PV or other RE/EE from CCTF (2020)	40						111	111	111	111	111	111	111	111	111	111	1,111
Solar PV or other RE/EE from CCTF (2021)	40							111	111	111	111	111	111	111	111	111	1,000
Solar PV or other RE/EE from CCTF (2024)	30										83	83	83	83	83	83	500
Solar PV or other RE/EE from CCTF (2025)	60											167	167	167	167	167	833
Solar PV or other RE/EE from CCTF (2026)	50												139	139	139	139	556
Solar PV or other RE/EE from CCTF (2027)	45													125	125	125	375
Solar PV or other RE/EE from CCTF (2028)	40														111	111	222
Solar PV or other RE/EE from CCTF (2029)	30															83	83
Total Solar Energy Generated (MWh)		0	0	383	683	683	794	905	905	905	988	1,155	1,294	1,419	1,530	1,613	13,255
Annual Emission Reduction ($tCO_{2\,eq}$)		0	0	191	341	341	397	452	452	452	494	577	647	709	765	807	6,628
Cumulative ERs		0	0	191	533	874	1,271	1,723	2,176	2,628	3,122	3,700	4,347	5,056	5,821	6,628	
Total Installed Capacity (kW)	580.8																
Total Installed Capacity under CCTF (kW)	365.0																
		Start GEF Project →					← End of GEF Project										

Description of Solar PV System (installed using GEF resources)	Capacity (kWp)	Emissions Reductions (direct)					Emissions Reductions										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
23 - 2.6 kWp solar PV installations (with storage)	59.8			83	83	83	83	83	83	83	83	83	83	83	83	83	1,080
Solar PV installations various Govt Bldgs	156			108	217	217	217	217	217	217	217	217	217	217	217	217	2,708
Solar PV or other RE/EE from CCTF (2018)	30				42	42	42	42	42	42	42	42	42	42	42	42	500
Solar PV or other RE/EE from CCTF (2020)	40						56	56	56	56	56	56	56	56	56	56	556
Solar PV or other RE/EE from CCTF (2021)	40							56	56	56	56	56	56	56	56	56	500
Solar PV or other RE/EE from CCTF (2024)	30										42	42	42	42	42	42	250
Solar PV or other RE/EE from CCTF (2025)	60											83	83	83	83	83	417
Solar PV or other RE/EE from CCTF (2026)	50												69	69	69	69	278
Solar PV or other RE/EE from CCTF (2027)	45													62	62	62	187
Solar PV or other RE/EE from CCTF (2028)	40														56	56	111
Solar PV or other RE/EE from CCTF (2029)	30															42	42
Annual Emission Reduction ($tCO_{2\,eq}$)		0	0	191	341	341	397	452	452	452	494	577	647	709	765	807	6,628
Cumulative ERs		0	0	191	533	874	1,271	1,723	2,176	2,628	3,122	3,700	4,347	5,056	5,821	6,628	

Notes and Assumptions:																		
1. The 23-2.6 kWp solar PV installations are with battery storage for public buildings that also serve as emergency shelters and relief centers such as schools, community centers and health clinics																		
2. GHI Index for Dominica is	5.8	kWh/m2/day																
3. A 1.04 kW installation is	6.56	m2 of solar flat panel (information from EMS Inc., Dominica)																
4. Assumed efficiency of solar panel is	20%																	
5. For every 1.04 kW of solar PV installed	7.61	kWh per day or	2.78	MWh/yr														
6. Average electricity consumption assumed to be 546 kWh/month or 18.2 kWh/day (based on electricity demand for Barbados from 2011 MPRA study on																		
"Price Reform and Household Demand for Electricity", pg 11, available on http://mpra.ub.uni-muenchen.de/40934/1/MPRA_paper_40934.pdf)																		
7.Dominica grid emissions factor	0.500	tonnes CO_2/MWh																
8. ERs/yr for each 1.0 kW solar PV installed	1.4	tonnes CO_2/year																
8. Direct ERs during Project	874	tonnes CO_2																
9. Cumulative ERs 10 yrs after EOP	5,754	tonnes CO_2																
10. Assumed service life of solar PV	15	years																
11. Lifetime energy production for solar PV installation assisted by Project			10,241	MWh														
12. If GoCD co-finance includes a contribution of	$4000,000	to the CCTF, then total installed capacity of RE installations will be													5.84	MW		
12. Direct ERs from:																		
23 - 2.6 kWp solar PV installations (with storage)	249	tonnes CO_2																
Solar PV installations various Govt Bldgs	542	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2018)	83	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2020)	0	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2021)	0	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2024)	0	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2025)	0	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2026)	0	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2027)	0	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2028)	0	tonnes CO_2																
Totals:	**874**	**tonnes CO_2**	**incl. LED**	**889**														
13. Direct post-project ERs from:																		
23 - 2.6 kWp solar PV installations (with storage)	830	tonnes CO_2																
Solar PV installations various Govt Bldgs	2,166	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2018)	417	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2020)	556	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2021)	500	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2024)	250	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2025)	417	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2026)	278	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2027)	187	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2028)	111	tonnes CO_2																
Solar PV or other RE/EE from CCTF (2029)	42	tonnes CO_2																
Subtotal from GEF seed financing:	**5,754**	**tonnes CO_2**	**incl. LED**	**5,883**														
Subtotal from GoCD co-financing that is added to CCTF at EOP:	**92,058**	**tonnes CO_2**		**94,127**														
Total direct post-project:	**97,811**	**tonnes CO_2**		**100,010**														
Total Direct + Direct Post Project				**100,899**														
14. Lifetime direct ERs from:																		
Total Solar Energy Generated (MWh)	10,241																	
Lifetime Direct Emission reductions (t CO_{2eq})	5,120																	
Lifetime Post-Project Direct ERs (t CO_{2eq})	6,978																	
14. Direct post-project MWh saved and ERs from:																		
	MWh	tCO_2																
23 - 2.6 kWp solar PV installations (with storage)	1,661	830																
Solar PV installations various Govt Bldgs	4,333	2,166																
Solar PV or other RE/EE from CCTF (2018)	833	417																
Solar PV or other RE/EE from CCTF (2020)	1,111	556																
Solar PV or other RE/EE from CCTF (2021)	1,000	500																
Solar PV or other RE/EE from CCTF (2024)	500	250																
Solar PV or other RE/EE from CCTF (2025)	833	417																
Solar PV or other RE/EE from CCTF (2026)	556	278																
Solar PV or other RE/EE from CCTF (2027)	375	187																
Solar PV or other RE/EE from CCTF (2028)	222	111																
Solar PV or other RE/EE from CCTF (2029)	83	42																
Totals:	11,507	5753.6																
15. Assumed CCTF seed funds:																		
From GEF	$250,000																	
From GoCD	$4000,000																	

Table II-2: Phasing of Emission Reductions from LED Installations

Baseline: Outdoor Lights

Energy Consumption of Street Lamps	Watts	150	Assumed as high pressure sodium lamps
Daily operation for street lights	hours	10	
Daily operation for basketball court	hours	1	
Annual operation for street lights	hours	3,650	
Estimated CO_2 emission per mercury lamp	kg CO2/lamp/yr	273.75	
Estimated CO2 emission per solar LED street light	kg CO2/lamp/yr	273.75	
Eastern Caribbean Dollar per USD	EC$/USD	$2.68	

Baseline: Indoor Lights

Energy consumption of CFL Lamps	Watts	13	
Daily operation of CFL lamps - public building	Hours	8	
Number of school days per year	Days	160	
Equivalent LED Lamp conversion	Watts	8	Equivalent to 800 lumens
Estimated CO2 reduction per LED conversion	kg CO2/LED/yr	3.200	

	Unit	Value	Year -1 2015	Year 0 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 6 2020	Year 7 2021	Year 8 2022	Year 9 2023	Year 10 2024	Year 11 2025	Year 12 2026	Year 13 2027	Year 14 2028	Year 15 2029	Total
Number of Outdoor Lights Replaced by LEDs																		
Number of outdoor lights replaced in 2016				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of outdoor lights replaced in 2017					10	10	10	10	10	10	10	10	10	10				100
Number of outdoor lights replaced in 2018						4	4	4	4	4	4	4						28
Number of outdoor lights replaced in 2019							4	4	4	4	4	4	4					28
Number of outdoor lights replaced in 2020								8	8	8	8	8	8	8				56
Number of outdoor lights replaced in 2021									20	20	20	20	20	20	20			140
Cumulative Outdoor Lights installed up to 2021				0	10	14	18	26	46	46	46	46	42	38	20	0	0	

	Unit	Value	Year -1 2015	Year 1 2016	Year 2 2017	Year 3 2018	Year 4 2019	Year 5 2020	Year 6 2021	Year 7 2022	Year 8 2023	Year 9 2024	Year 10 2025	Year 11 2026	Year 12 2027	Year 13 2028	Year 14 2029	Total
Number of Indoor CFL Lights Replaced by LEDs																		
Number of CFLs replaced in 2016			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of CFLs replaced in 2017				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of CFLs replaced in 2018					100	100	100	100	100	100	100	100	100	100				1,000
Number of CFLs replaced in 2019						200	200	200	200	200	200	200	200	200				2,000
Number of CFLs replaced in 2020							400	400	400	400	400	400	400	400	400			4,000
Number of CFLs replaced in 2021								800	800	800	800	800	800	800	800	800	800	8,000
Cumulative SLs installed up to 2028				0	100	300	700	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,400	1,200	800	

Energy Savings and ER Generation																		
Energy saved on Outdoor Light Replacements	MWh			0	5.5	7.7	9.9	14	25	25	25	25	23	21	11	0	0	193
Energy saved on CFL Replacements	MWh			0	0.6	1.9	4.5	10	10	10	10	10	10	10	9	8	5	96
Total Energy saved on Light Replacements	MWh			0	6.1	9.6	14.3	24	35	35	35	35	33	30	20	8	5	289
Total ER for light replacements each year	tonnes CO_{2eq}			0	3.1	4.8	7.2	12	17	17	17	17	16	15	10	4	3	144
Cumulative ERs	tonnes CO_{2eq}			0	3.1	7.9	15.0	27	44	62	79	97	113	128	138	142	144	

Start of GEF Project → ***End of GEF Project*** →

Notes and Assumptions:

1. Assumed service life of LED fixture 10 years
2. Two 10 kWp solar PV panels can provide up to 233 MWh/yr of energy to charge vehicles
3. Lifetime of energy saved from LEDs installed during Project 143 MWh
4. Direct ERs: 15 tonnes CO_2
5. Lifetime direct ERs 72 tonnes CO_2
6. Lifetime energy saved 10393,920 MJ

Table II-2: Indirect Emission Reductions from Rooftop Solar PV Installations

No bottom-up replication factor since solar PV installations are regulated by DOMLEC and IRC.

					Activities Contributing to Indirect Emissions Reductions	
				1)	Awareness raising and knowledge dissemination of EE products and solar PV technology for the general public	
				2)	Training and capacity building for EE products and solar PV technologies for parliamentarians, policymakers, designers and architects, technicians and operational personnel	
				3)	Review and adoption of MEPS for EE products and solar PV technologies	
				4)		0
				5)		0
					Indirect Bottom-up	
Step 15	Enter Replication Factor. Please refer to section 2 (e) in the Manual for further guidance. Also see table below for standardized suggestions. Not all projects will fit these suggestions, if using a different replication factor explain rationale in the assessment			**15)**	**Replication Factor**	**0**
Notes:	No bottom-up replication factor since solar PV installations are regulated by DOMLEC and IRC.					
Assumptions:					Direct Emissions Reductions	889

Table II-3: Indirect Emission Reductions from Rooftop Solar PV Installations (cont'd)

					Indirect Top Down		
Step 17	Enter 10 year market potential			**17)**	**Enter P10 (Tons CO2 e)**	**130,270**	
Notes:	No published estimates of solar potential in Dominica. Thus P10 is computed using the number of commercial rooftops that could be used for solar-PV installations that does not exceed the peak installed capacity						
Assumptions:	A 2.6 kWp solar PV panel installation will generate 19 kWh daily or 6.9 MWh/yr. Assuming that the Government of Dominica want to raise the solar-PV penetration into their grid from 1.0 MW to 10 MW, there is potential for 10 MW of solar PV panels to generate 26,538 MWh/yr resulting in 13,270 tonnes CO_2 reduced per year (130,270 tonnes CO_2 over a 10-yr period). The decision to move to develop 10 MW of RE through IPPs will come from IRC and the GoCD as a measure to allow commercial enterprises to become more competitive through reducing their energy bills through RE by 20 to 80% (assume an average of 50%). This will also occur with the decision to re-structure DOMLEC, reduce their fossil fuel power generation through the retirement of some of their diesel units, and public pressure to allow commercial establishments to reduce their energy costs to improve competitiveness						
Step 18	Enter GEF Causality Factor. Please refer to section 2 (e) in the Manual for further guidance. Also see table below for standardized			**18)**	**Enter Causality Factor (%)**	**40**	
Notes:	Government is assumed to strongly supports solar PV installations to replace ageing fossil fuel generator sets, and follow the lead of Barbados on increasing RE generation (centralized or decentralized)						
Assumptions:	A modest liklihood of adoption of program as a means to reduce overall electricity costs due to absence of funds to support grid upgrades for an additional 10 MW of IRE into the DOMLEC						
	Standardized Suggestions						
	Pick Causality Factor	**%**					
	Level 5 - "Critical"	100					
	Level 4 - "dominating"	80					
	Level 3 - "substantial but modest"	60					
	Level 2 - "modest"	40					
	Level 1 - "weak"	20					
Step 19	Sense check automatic results			**19)**	**Results: Indirect top-down emissions**	**52,108**	**Tons CO2 e**
						52.11	KT CO2 e
						0.05	MT CO2 e

Annex III: Co-Financing Letters

(attached separately)

Annex IV: Terms of Reference for Project Staff and Consultants

1. **National Project Manager (NPM):**

Duties and Responsibilities: The incumbent will be responsible for implementation of the project, including mobilization of all project inputs, supervision of project staff, consultants and oversight of sub-contractors. The NPM will be the leader of the Project Team and shall liaise with the government, UNDP, and all stakeholders involved in the LCDP Project. S/he will be specifically responsible for (a) overall management of the Project; (b) work closely with Project stakeholders and ensure the Project deliveries as per Project document and work plan, (c) ensure technical coordination of the Project and the work related to legal and institutional aspects; (d) mobilize all Project inputs in accordance with UNDP procedures and GEF principles; (e) finalize the ToR for the consultants and subcontractors and coordinate with UNDP Procurement for recruitment, procurement and contracting; (f) supervise and coordinate the work of all Project staff, consultants and sub-contractors; (g) ensure proper management of funds consistent with UNDP requirements, and budget planning and control; (h) prepare and ensure timely submission of monthly reports, quarterly consolidated financial reports, quarterly consolidated progress reports, annual, mid-term and terminal reports, and other reports as may be required by UNDP; (i) perform routine monitoring and evaluation functions; (j) submit the progress reports and key issue report to the National Project Steering Committee; (k) prepare quarterly and annual work plan; (l) provide regular input to UNDP corporate system ATLAS for financial and program management on Project progress, financial status and various logs; (m) arrange for audit of all Project accounts for each fiscal year; (n) undertake field visit to ensure quality of work; and (o) undertake any activities that may be assigned by UNDP and National Project Steering Committee.

Qualifications and Experience: The incumbent should have a minimum Bachelor degree in Engineering with MBA/Master degree or Masters in energy/environment or other relevant academic discipline and profession qualifications with at least ten (10) years professional experience at senior level. S/he should have extensive experience and technical ability to manage a large Project and a good technical knowledge in the fields related to climate change, renewable energy, energy efficiency, institutional and regulatory development and/or private sector development,. S/he must have effective interpersonal and negotiation skills proven through successful interactions with all levels of project stakeholder groups, including senior government officials, financial sectors, private entrepreneurs, technical groups and communities. S/he should have ability to effectively coordinate a complex, multi-stakeholder project and to lead, manage and motivate teams of international and local consultants to achieve results. Good capacities for strategic thinking, planning and management and excellent communication skills in English are essential. Knowledge of UNDP project implementation procedures, including procurement, disbursements, and reporting and monitoring will be an added advantage.

Additional roles and responsibilities may also include:

- Provide a baseline for skills and absorptive capacity within the ECU, the Energy Unit and MoHE to promote and regulate low carbon development;
- Consult with relevant institutions, government officers, and the local consulting industry on RE knowledge gaps within Dominica;
- Design and deliver appropriate training materials and workshops on RE and EE planning, design, implementation, operation and maintenance as well as financing of RE and EE projects.

2. **Low Carbon Officer (LCO):**

Duties and Responsibilities: Under the direct supervision of UNDP and the NPM, the incumbent will be assigned to assist the NPM and the ECU in a number of low carbon development activities that includes planning, development, monitoring and evaluation of pilot RE and EE installations to the coordination and monitoring of scale-up of low carbon development under the supervision of the NPM. S/he will be responsible specifically for (a) coordination of pilot low carbon site activities including the EPC arrangements with ESCOs; (b) coordination of information dissemination, workshops and seminars for low carbon pilots; (c) assistance to NPM on the strengthening of the DoCCENRM; (d) coordination of activities for action plans for low carbon development and MEPS; (e) coordination of activities and technical assistance contributions to scale-up phase of low carbon development; (f) developing and setting up the overall framework for Project monitoring and evaluation (M&E), (g) prepare the monthly, quarterly and annual monitoring plan for project activities, (h) monitor and evaluate the compliance of actual progress and performance against the planned work plan and expected quality, (i) regular analysis of the effect of current actual performance to the project timetable and budgets in close collaboration with the NPM, (j) prepare reports for NPM including identification of problems, causes of potential bottlenecks (if any) in project implementations, (k) recommendations on how to reduce the impact of deviations vs. work plans, (l) prepare the ToRs for mid-term and final evaluation in accordance to UNDP and GEF guidelines, (m) assist the PM in preparation of various progress report, (n) coordinate with the international and national consultants and other stakeholders, (o) facilitate exchange of experiences by supporting and coordinating participation in any existing network of UNDP/GEF projects sharing common characteristics, (p) identify and participate in additional networks, for example scientific or policy-based networks that may also yield lessons that can benefit Project implementation, and (q) any other related activities as assigned by Project Manager.

Additional roles and responsibilities include:

- Assist in preparing and delivering appropriate training materials and workshops on RE planning, design, implementation, operation and maintenance as well as financing of RE projects. This would include close collaboration with a local ESCO who has knowledge on RE and EE project development and the sourcing of quality equipment for reducing electricity consumption;
- Provide oversight in the full-cycle of RE development and RET quality including serving as a key resource in the planning and design of RE projects and evaluator of RETs brought into the Project diffusion programs with an emphasis on rooftop solar PV installations;
- Serve as the key inspector of new RET equipment upon arrival, and to be the key officer to ensure supplier obligations vis-à-vis equipment repairs and replacements are enforced with an emphasis on solar PV equipment, notably for installations that do not involve an ESCO;
- Provide construction and installation oversight for civil, mechanical and electrical equipment for pilot on-grid RE plants;
- Work closely with personnel from the ECU and other relevant GoCD agencies as well as RE and EE project proponents to ensure lessons learned on-the-job are imparted to them.

Qualifications and Experience: The incumbent should have a minimum Master's degree in Energy/Environment or other relevant academic disciplines from a recognized university. S/he should have at least five (5) years hands-on experience in energy and environment field where past experience in monitoring and evaluation of projects would be considered an asset. S/he should have the ability to plan, design and implement an effective M&E system, the logical

framework approach and other strategic planning approaches, training in M&E development and implementation and/or facilitating learning-oriented analysis sessions of M&E data with multiple stakeholders, data and information analysis and analytical report writing. S/he should have the willingness to undertake regular field visits and interact with different stakeholders, especially primary stakeholders. S/he must have willingness to undertake regular field visits and interact with different stakeholders, especially primary stakeholders. Computer proficiency in MS Office (Word, Excel and PowerPoint) and other common software is a prerequisite. Computer literacy in graphic design software will be appreciated. Fluency both in written and spoken English is essential.

3. **Admin Assistant (AA):**

Duties and Responsibilities: The incumbent will be responsible to provide overall administration and financial services of the project such as processing payments, raising requisition, purchase order, projects logs etc. using UNDP corporate software ATLAS. S/he will be responsible to provide information to UNDP Project web, RRMC reporting and administrative trouble shooting. S/he will also perform (a) word processing, drafting routine letters/messages/reports, mailing (b) arrange travel, itinerary preparation for project related travels, (c) assist to arrange workshops/seminar/training programs and mailing, (d) work at reception desk and make appointments and schedule meeting, (e) assist in work-plan and budgeting, (f) photocopying, binding and filing, (g) maintenance of all office equipment and keeping inventory/records of supplies and their usage and any other duties assigned by Project Manager or concerned officials.

Qualifications and Experience: The incumbent should have at least a Bachelor degree in any discipline from a recognized university. S/he should have at least 3 years relevant working experience with foreign aided projects or international development or organizations. Computer proficiency in MS Office (Word, Excel and PowerPoint) and other common software is a prerequisite. Diploma in computer/secretarial science is desirable but not essential. Basic knowledge in procurement, petty cash handling, logistics supports, and filling systems is a basic requirement. Knowledge of UNDP project implementation procedures, including procurement, disbursements, and reporting and monitoring is preferable. Fluent both in written and spoken English is required.

Key Short-term Consultants

Detailed TORs of the national and international consultants will be developed during the Project Inception period, in the first 3 months after Project start-up, by the NPM in consultation with UNDP and the implementing partners.

4. International Consultant: Chief Technical Advisor (CTA) for Components 1, 2 and 3

- Provide management oversight for project as required and recommend actions that focus work plans on achieving key milestones in a timely manner;
- Recommend special expertise to be deployed on the Project to assist in its achievement of key milestones;
- Provide the interface between Project team and key specialist consultants and consulting firms;

- Assess the baseline conditions for capital financing of RE projects and RET diffusion programs;
- Closely assess EPC arrangement for financing public capital works for RE and EE projects;
- Determine details for feasible financial mechanisms for scaling-up RE investments in Dominica in concert with the fund disbursement conditions of the CCTF;
- In close collaboration with the National Project Director, NPM and the LCO:
  - ⇒ Provide a baseline for skills and absorptive capacity within ECU, the Energy Unit and other relevant GoCD agencies to promote and regulate RE development, and with prospective personnel within the DoCCENRM and CCTF Secretariat to manage the CCTF and disbursement of funds for RE and EE scale-up; and
  - ⇒ Design and deliver appropriate training materials and workshops on green building codes (based on the CDB regional green building codes), RE and EE planning, design, implementation, operation and maintenance as well as financing of RE/EE projects;
- Provide work plan and oversight for local procurement, assembly and commissioning teams to facilitate operation of RE investments.

Annex V: Social and Environmental Screening Template

The completed template, which constitutes the Social and Environmental Screening Report, must be included as an annex to the Project Document. Please refer to the Social and Environmental Screening Procedure and Toolkit for guidance on how to answer the 6 questions.

Project Information

Project Information	
1. Project Title	Low Carbon Development Path: Promoting energy efficient applications and solar photovoltaic technologies in streets, outdoor areas and public buildings in island communities nationwide (LCDP)
2. Project Number	5186
3. Location (Global/Region/Country)	Dominica

Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?
Briefly describe in the space below how the Project mainstreams the human-rights based approach
The Project will demonstrate the feasibility and the means to increase access to renewable energy and energy efficiency. This will have the impact of catalyzing interest in reducing energy costs, development of a more affordable electricity source, reducing the burden of high energy costs on marginal income household budgets, and eventual increased access to electricity that is a right for all Dominican citizens. In addition, the development of renewable energy will be conducted in a manner respectful of local community rights including those of indigenous peoples, whose communities will be targeted for renewable energy installations on their public school or other public buildings
Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment
Not applicable.
Briefly describe in the space below how the Project mainstreams environmental sustainability
This Project will mainstream low carbon development by promoting the use of renewable energy and energy efficiency that will avoid the use of fossil fuel for power generation for electricity, reduce GHG emissions and mitigate climate change.

Part B. Identifying and Managing Social and Environmental Risks

QUESTION 2: What are the Potential Social and Environmental Risks? *Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any "Yes" responses). If no risks have been identified in Attachment 1 then note "No Risks Identified" and skip to Question 4 and Select "Low Risk". Questions 5 and 6 not required for Low Risk Projects.*	**QUESTION 3: What is the level of significance of the potential social and environmental risks?** *Note: Respond to Questions 4 and 5 below before proceeding to Question 6*			**QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?**
Risk Description	***Impact and Probability (1-5)***	***Significance (Low, Moderate, High)***	***Comments***	***Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.***
Risk 1: Technicians installing renewable energy or energy efficient are exposed to higher occupational risks from not practicing safe measures for installation	I = 2 P = 2	Low		Technical personnel involved with installation of renewable energy and energy efficient equipment installations are to undergo vocational training that is supported by the Project (Output 1.3) on best international practices for installation and commissioning. Quality of installations will be undertaken by ESCOs who have a business interest in quality installations to maximize energy savings on which the ESCO will be remunerated. The quality of installations also includes ensuring all occupational hazards of installations are addressed by the ESCO which will reduce this risk to a "low" rating.
Risk 2: Some of the renewable energy installations will be located in indigenous peoples communities.	I = 1 P = 5	Low		The Carib peoples approached the Project through the Ministry of Kalinago/Carib Affairs on its participation through the installation of solar PV panels on various public buildings. As such, their willingness to participate indicates there will be no risk for the Project to locate its activities within indigenous territory in Dominica
	QUESTION 4: What is the overall Project risk categorization?			
	Select one (see SESP for guidance)			**Comments**
	Low Risk	X		

	Moderate Risk	☐	
	High Risk	☐	
	QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant?		
	Check all that apply		**Comments**
	Principle 1: Human Rights	☐	
	Principle 2: Gender Equality and Women's Empowerment	☐	
	1. Biodiversity Conservation and Natural Resource Management	☐	
	2. Climate Change Mitigation and Adaptation	☐	
	3. Community Health, Safety and Working Conditions	☐	
	4. Cultural Heritage	☐	
	5. Displacement and Resettlement	☐	
	6. Indigenous Peoples	☐	
	7. Pollution Prevention and Resource Efficiency	☐	

Final Sign Off

Signature	***Date***	***Description***
QA Assessor		UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have "checked" to ensure that the SESP is adequately conducted.
QA Approver		UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have "cleared" the SESP prior to submittal to the PAC.
PAC Chair		UNDP chair of the PAC. In some cases PAC Chair may also be the QA Approver. Final signature confirms that the SESP was considered as part of the project appraisal and considered in recommendations of the PAC.

SESP Attachment 1. Social and Environmental Risk Screening Checklist

Checklist Potential Social and Environmental Risks		
Principles 1: Human Rights		**Answer (Yes/No)**
1.	Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	No
2.	Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? [49]	No
3.	Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	No
4.	Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them?	No
5.	Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project?	No
6.	Is there a risk that rights-holders do not have the capacity to claim their rights?	No
7.	Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process?	No
8.	Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to project-affected communities and individuals?	No
Principle 2: Gender Equality and Women's Empowerment		
1.	Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	No
2.	Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	No
3.	Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	No
4.	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? *For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being*	No
Principle 3: Environmental Sustainability: Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below		
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management		

[49] Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to "women and men" or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

1.1	Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services? *For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes*	No
1.2	Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?	No
1.3	Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5)	No
1.4	Would Project activities pose risks to endangered species?	No
1.5	Would the Project pose a risk of introducing invasive alien species?	No
1.6	Does the Project involve harvesting of natural forests, plantation development, or reforestation?	No
1.7	Does the Project involve the production and/or harvesting of fish populations or other aquatic species?	No
1.8	Does the Project involve significant extraction, diversion or containment of surface or ground water? *For example, construction of dams, reservoirs, river basin developments, groundwater extraction*	No
1.9	Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	No
1.10	Would the Project generate potential adverse transboundary or global environmental concerns?	No
1.11	Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? *For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.*	No
Standard 2: Climate Change Mitigation and Adaptation		
2.1	Will the proposed Project result in significant[50] greenhouse gas emissions or may exacerbate climate change?	No
2.2	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	No
2.3	Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? *For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding*	No
Standard 3: Community Health, Safety and Working Conditions		
3.1	Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	No

[50] In regards to CO_2, 'significant emissions' corresponds generally to more than 25,000 tons per year (from both direct and indirect sources). [The Guidance Note on Climate Change Mitigation and Adaptation provides additional information on GHG emissions.]

3.2	Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	No
3.3	Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	No
3.4	Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	No
3.5	Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	No
3.6	Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	No
3.7	Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	No
3.8	Does the Project involve support for employment or livelihoods that may fail to comply with national and international labor standards (i.e. principles and standards of ILO fundamental conventions)?	No
3.9	Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)?	No
Standard 4: Cultural Heritage		
4.1	Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	No
4.2	Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes?	No
Standard 5: Displacement and Resettlement		
5.1	Would the Project potentially involve temporary or permanent and full or partial physical displacement?	No
5.2	Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	No
5.3	Is there a risk that the Project would lead to forced evictions?[51]	No
5.4	Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	No
Standard 6: Indigenous Peoples		
6.1	Are indigenous peoples present in the Project area (including Project area of influence)?	Yes
6.2	Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	Yes

[51] Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.

6.3	Would the proposed Project potentially affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples (regardless of whether indigenous peoples possess the legal titles to such areas, whether the Project is located within or outside of the lands and territories inhabited by the affected peoples, or whether the indigenous peoples are recognized as indigenous peoples by the country in question)? *If the answer to the screening question 6.3 is "yes" the potential risk impacts are considered potentially severe and/or critical and the Project would be categorized as either Moderate or High Risk.*	No
6.4	Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	No
6.5	Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	No
6.6	Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	No
6.7	Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	No
6.8	Would the Project potentially affect the physical and cultural survival of indigenous peoples?	No
6.9	Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	No
Standard 7: Pollution Prevention and Resource Efficiency		
7.1	Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	No
7.2	Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	No
7.3	Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? *For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol*	No
7.4	Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health?	No
7.5	Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	No