

Sustainable Energy in the Caribbean:

Reducing the Carbon Footprint in the Caribbean through the Promotion of Energy Efficiency and the Use of Renewable Energy Technologies

**Identification of mechanisms
for financing of energy
efficiency and renewable
energy initiatives to increase
investment in Dominica**



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**Identification of mechanisms for financing
of energy efficiency and renewable energy
initiatives to increase investment in
the Commonwealth of Dominica**



This document has been prepared under the supervision of Omar Bello, Coordinator of the Sustainable Development and Disaster Unit, Economic Commission for Latin America and the Caribbean (ECLAC) subregional headquarters for the Caribbean with the assistance of Willard Phillips, Economic Affairs Officer, Leda Peralta, Associate Environmental Affairs Officer, Elizabeth Thorne, Research Assistant, Esther Kissoon, On-the-Job Trainee, and with input from Ramon Martin, Consultant.

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Acronyms

5Cs	Caribbean Community Climate Change Centre
AFD	Agence Française de Développement
ALBA-TCP	Bolivarian Alliance for the Americas – People Treaty of Commerce
AOSIS	Alliance of Small Island States
CARICOM	Caribbean Community
CARILEC	Association of Caribbean Electric Utilities
CDB	Caribbean Development Bank
CDM	Clean Development Mechanism
CEIS	Caribbean Energy Information Systems
CFL	Compact fluorescent lamp
CFG Services	French geothermal engineering limited company subsidiary of group BRGM
CIPORE	Caribbean Information Platform on Renewable Energy
CCREEE	Caribbean Centre for Renewable Energy and Energy Efficiency
CREDP	CARICOM Renewable Energy Department Programme
CREF	Caribbean Renewable Energy Facility
CRETAF	Caribbean Technical Assistance Facility
CSEP	Caribbean Sustainable Energy Project (a consortium of OAS, DSD, CARILEC, CARICOM, and REEEP)
C-SERMS	Caribbean Sustainable Energy Roadmap and Strategy
DOE	U.S. Department of Energy
DOMLEC	Dominica Electric Company
DOWASCO	Dominica Water and Sewage Company
DSD	Department of Sustainable Development of the OAS
ECPA	Energy and Climate Partnership of the Americas
EE	Energy Efficiency
EU	European Union
GDP	Gross domestic product
GEF	Global Environmental Facility
GEEREF	Global Energy Efficiency and Renewable Energy Fund
Geo-Caraïbe	Eastern Caribbean Geothermal Development Project (a consortium including OAS/DSD, AFD, UNEP, ADEME)
GHG	Greenhouse Gases
GIZ	Gesellschaft für Internationale Zusammenarbeit
GSEII	Global Sustainable Energy Islands Initiative (a consortium of Climate Institute, OAS/DSD, UNIDO, and other private entities)
GTZ	Gessellschaft fur Technische Zusammenarbeit (German Technical Cooperation Agency)
IDB	Inter-American Development Bank
IPP	Independent power producer
IRC	Independent Regulatory Commission
kW	Kilowatt

kWh	Kilowatt-hours
MW	Megawatt
NDF	Nordic Development Fund
NEP	National Energy Policy
NGO's	Non-governmental organizations
NREL	National Renewable Energy Laboratory - U.S. DOE
OAS	Organization of American States
OECS	Organization of Eastern Caribbean States
OLADE	Latin American Energy Organization
OPEC	Organization of Petroleum Exporting Countries
PEMFUND	Private Energy Market Fund
PETROCARIBE	Energy Agreement between Venezuela and Caribbean States
PROPARCO	French Society for the Promotion and Participation in Economic Cooperation
PV	Photovoltaic
R&D	Research and Development
RE	Renewable Energy
REEEP	Renewable Energy and Energy Efficiency Partnership
RET	Renewable Energy Technologies
SEIO	Sustainable Energy Initiative Organizations
SEP	Sustainable Energy Plan
SIDS	Small Island Developing States
SPREP	Secretariat of the Pacific Regional Environment Programme
UNDP	United Nations Development Programme
UN-ECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNEP	United Nations Environmental Programme
UNIDO	United Nations Industrial Development Organization
USAID	U.S. Agency for International Development
USD	United States Dollar
VAT	Value Added Tax
WB	World Bank

Executive Summary

The 2009-2011 global recession significantly impacted the energy security of Small Island Developing States (SIDS). This impact manifested itself through increased energy costs for the production of many goods and services. This experience, along with the enduring burden of high price variability and current account deficits, have underscored the need for Dominica to adopt sustainable energy strategies that will promote renewable energy (RE) and energy efficiency (EE) wherever feasible across all sectors.

The attainment of increased energy security through the use of RE is however challenging, given that the initial cost of investing in renewable technologies is high. It is therefore necessary to implement strategies to advert and/or reduce these costs to consumers. In the case of Dominica there are good opportunities for the development of RE since the country has substantial indigenous renewable energy resources, with a high potential in geothermal as a steady energy source, and to a lesser degree with hydro, wind and solar power.

Dominica is highly dependent on imported fossil fuels for energy, which makes the country vulnerable to price increases and supply shortages. Nevertheless, Dominica is in a better position compared with other OECS countries, having already achieved about 30 percent of electricity generation from hydropower, and wind to a lesser extent.

This document identifies mechanisms for financing investments in energy efficiency and renewable energy initiatives in the Commonwealth of Dominica. The overall objective of this study is to examine financing opportunities which will provide greater incentives for the development of energy efficiency measures and implementation of renewable energy technologies.

The methodological approach of this study begins with a literature review of energy policies and plans for Dominica. A national overview of the economy and a review of the energy sector including information on recent energy balances was also prepared. This was followed by an elaboration of a summary of completed and ongoing projects was elaborated. Among such studies were social and commercial projects related to EE and RE, with their respective sources of financing. The study also assessed the process of financing and detailed a list of main institutions and their characteristics as sources for financing new EE and RE projects.

I. Introduction

This report documents the results of a broad assessment of the status of renewable energy development and energy efficiency strategy for Dominica, and is one of the main outputs of the GIZ/ECLAC project titled “*Sustainable Energy in the Caribbean: Reducing the Carbon Footprint in the Caribbean through the Promotion of Energy Efficiently and the use of Renewable Energy Technologies*”. The specific objective of this project is to examine financing opportunities which Caribbean countries could exploit in order to better provide incentives for the development of energy efficiency measures and renewable energy technologies. Addressing this issue is critical for the energy security of Caribbean economies, given their high dependence on, and cost of importing fossil energy, as well as the need to reduce their carbon emissions in order to respond to the challenges of global climate change. While it is anticipated that project results will benefit all Caribbean countries, direct interventions were undertaken in three pilot countries these being Dominica, Saint Lucia and Martinique. The present report assesses the state of energy development in Dominica and reviews options that might be available to the country in financing the future implementation of renewable energy and energy efficiency. The report is organised into four sections. Following the introduction in Section I, a profile of the energy sector is elaborated in Section II. Section III identifies financing opportunities for developing renewable energy and energy efficiency in the country, while conclusions on the assessment are drawn in section IV.

A. Background

In 2009, the world was impacted by a global recession, which affected Small Island Developing States (SIDS). The impact of this development was exacerbated by increased cost of energy and related increase in the costs of many goods and services. Although there has since been a significant reduction in oil prices, this occurrence has underscored the need for Dominica to adopt sustainable energy strategies that will promote renewable energy (RE) and energy efficiency (EE) wherever feasible across all sectors.

Caribbean SIDS face unique challenges associated with generation and use of energy. In Dominica, while oil imports is not as high as in other members of the Organization of Eastern Caribbean States (OECS) the amount is around 1,000 barrels per day, with about 70 per cent used for electricity generation. This level of dependence makes the country vulnerable to the volatility of international oil prices and results in substantial drain of foreign reserve for imports.

Moreover, concerns by Caribbean governments about the serious impacts of climate change have prompted studies on reduction of greenhouse gas emissions and on potential energy savings through improved efficiency in the use of currently available energy. Related research has also been undertaken on the potential of renewable energy in reducing greenhouse gas emissions. Caribbean islands are also particularly vulnerable to further potential impacts associated with fossil fuel consumption and emissions such as sea level rise, acidification, ecosystems degradation, and coastal erosion. In this regard, the deployment of renewable energy and energy efficiency technologies represent an important strategy in mitigation and adaptation to climate change.

Dominica has also made significant progress in strengthening the planning and regulatory framework for the development of renewable energy with the preparation of drafts of a National Energy Policy (NEP) and Sustainable Energy Plan (SEP). When approved by Cabinet, these proposals will form an important part of the development framework for RE and EE in the Commonwealth of Dominica.

Studies on energy efficiency and renewable energy in the Caribbean have been supported by several institutions such as: OAS, ECPA, CREDP-GIZ, UNIDO, WB, IDB, UK-DFID, Geocaraibes, C-SERMS of CARICOM, and CDB. Although many specific studies on Dominica have focused mainly on the potential of geothermal energy, none of this research has so far been converted into active projects. Nevertheless, the country has been able to increase its production of renewable energy almost 30 percent of total electricity consumption through the generation of hydropower.¹

ECLAC subregional headquarters for the Caribbean has undertaken several studies relating to the impacts of climate change, including impacts on the energy sector. ECLAC has also completed a study on EE and RE initiatives, which included financing issues, as well as mechanisms to increase investment in the region. This study identifies the lack of financial resources to develop, implement and monitor EE and RE programmes as a key challenge, for Caribbean SIDS such as Dominica.

B. Objectives, scope and methodology

The overall objective of this study therefore is to examine financing opportunities which will provide greater incentives for the development of energy efficiency measures and use of renewable energy technologies in Dominica.

The scope of this study is informed by a consideration of the following issues:

- All islands need to achieve an energy matrix that represents the highest possible level of energy security.
- Dominica's energy matrix depends on substantial imports of petroleum products supported by several RE sources.
- Taking into account the need to reduce the dependence on oil and gas, an alternative to transforming the matrix is to incorporate electricity generation from renewable sources in order to provide greater energy security to the nation.
- A decrease in the oil import bill in the present and immediate future could be achieved by implementing a set of measures that increase energy efficiency.

¹ Electricity supply capacity in Dominica 20 MW by diesel and 7.6 MW by hydropower, ECONOLER 2014.

- These intentions should be reflected in country energy policies and plans. Any related regulatory framework should be legally binding, and supported by the requisite political will and public awareness so as to achieve sustained improvement in energy production and consumption. Barriers and constraints to the achievement of these goals should also be eliminated for the successful implementation of energy programmes.
- EE and RE projects are the basis for transforming the energy mix of the country and must take into account the projected demand and utilisation of domestic renewable resources.
- Secure financing of projects is achieved through several steps. The first step is to define the domestic capacity (public and private) for savings which may be used to support these investments, since regional savings may not be adequate for this purpose.

The methodological approach of this study involved the following steps:

- Conduct a literature review of energy policies and plans for Dominica and the wider CARICOM and OECS regions.
- Overview of the local economy and energy sector, including information on recent energy balances.
- Elaboration of a summary of energy related projects, including completed and ongoing EE and RE studies, as well as social and commercial projects and their respective sources of financing.
- Evaluation of the process of financing.
- Elaboration of a list of available sources of financing for new EE and RE projects.

II. The energy sector in Dominica

A. National economy and energy sector

1. Update on national economy

The economy of Dominica, as other Eastern Caribbean states, relies mainly on tourism and the production of bananas. As table 1 shows; the Dominican economy declined by 1.1 per cent of GDP in 2012, with only a very slight improvement (0.8 per cent in 2014).

A general overview of the main economic indicators of the last two years and a perspective for 2015 are shown in table 1.

Table 1
Main economic indicators

Economic Indicator	2012	2013	2014	2015
Gross Domestic Product Growth ^a (%)	-1.1	0.8	1.4	1.2
Consumer Price Index ^a (%)	1.4	-0.1	0.6	1.1
Fiscal deficit ^b /GDP (%)	-6.9	-6.9	-	-
Total exports FOB ^c (US\$ MM)	40.6	38.2	-	-
Total imports FOB ^c (US\$ MM)	182.7	203.0	-	-
Balance of trade ^c (US\$ MM)	-142.1	-164.8	-	-
Current account balance ^a /GDP	-18.9	-16.6	-16.6	-15.2
Tourism ^d (Thousands of visitors)	78.0	78.0	-	-
Income from tourism (US\$ MM)	78.0	82.0	-	-

^a - IMF (2014); ^b - ECLAC (2014); ^c - EIU (2014); ^d - OMT (2014).

According to the Eastern Caribbean Central Bank, the economic performance in the first semester of 2014 was mixed with a rebound of tourism which grew by 28.8 per cent. Mixed outcomes were also observed with improvements for agriculture, and manufacturing, while construction declined.²

The improved performance of tourism was influenced by an increase in cruiseship visitor arrivals of 37.6 per cent and an occupancy of 62.2 per cent, which represents a 15 per cent increase relative to 2013.

In agriculture, Black Sigatoka disease affected banana production with a 22.5 per cent reduction in crop yield, and a fall of 12.2 per cent in exports. To some extent, better results were obtained in fruits, vegetables and flowers production.

The manufacturing sector only grew in the case of beverages, with a fall in other major commodities. In addition, a decline of 10 per cent was recorded in the construction sector.

The public budget presented a slight surplus and the public debt rose 0.2 per cent, reaching US\$ 390.8 million.

With only 1.4 per cent growth in 2014, it is unlikely that the official growth target of 3 per cent of GDP will be accomplished. Instead the forecast is for 1.2 per cent in 2015³ with a very high deficit in the current account balance, suggesting that Dominica will likely increase its foreign debt in the short term. In this regard, the current fall in oil prices will be a positive factor for the balance of payments of the country.

2. Profile of the energy sector

As in most Caribbean states, the main energy source for generating electricity in Dominica is diesel fuel. However, the country is increasing its use of renewable energy and currently 20-30 per cent of electricity is generated using hydropower and wind (ECONOLER 2014). Fuel consumption is estimated at 330,000 barrels per day, and the two largest consumers of fossil fuels are electricity generation for residences and businesses, and transportation. Total electricity generation is about 99,181 MWh and the electrical utility has an installed capacity of approximately 27.6 MW, powered by two diesel plants fueled by imported oil, and three hydropower plants.

The price of electricity (tariff structure) in Dominica is approximately US\$ 0.38 kWh for residential consumers and between US\$ 0.38 and US\$ 0.41 kWh for businesses, including fuel surcharge, VAT and a service charge per kilowatt of customer-installed capacity. The cost of electricity in Dominica has increased significantly in recent years as it is subject to world oil prices, the country has the highest electricity tariffs within the Organization of Eastern Caribbean States (OECS) (ECONOLER, 2014). In addition, the country experiences important losses of 8.2 per cent (NREL, 2015) due to lack of maintenance and obsolescence of electricity distribution lines, this increases costs between 8 and 14 per cent which are passed on to end consumers. Since electricity prices are not subsidised in Dominica, the widespread use of energy efficiency and renewable energy technologies could have positive social effects through reduced tariffs.

Dominica Electricity Services Ltd (DOMLEC) is the only electricity utility company in the country. It is owned by Light and Power Holdings (subsidiary of Emera Corporation), 52.8 per cent; the Dominica Social Security, 20 per cent; and employees, local corporations and private citizens own the remaining 27 per cent. DOMLEC's license had been exclusive until the enforcement of the new Electricity Supply Act in 2006, which opened the way for the Independent Regulatory Commission

² Eastern Caribbean Central Bank "Economic and Financial Review. Dominica. June 2014" www.eccb.centralbank.org

³ Note that Dominica's Fiscal Year is from July to June.

(IRC) to license other service providers. DOMLEC was granted two licenses from the IRC, “the first is a non-exclusive generation license, and the second as an exclusive license to transmit, distribute and supply electricity within Dominica (IRC, 2013). Both licenses became effective on January 1st 2014 (OLADE, 2014). However, recent information indicates that there are no independent power producers (IPP). In 2009, DOMLEC installed 26,000 smart meters as part of the implementation of Advanced Metering Infrastructure (AMI). The company’s efforts have contributed to a reduction in losses from 17 per cent in 2005 to less than 9 per cent in 2015 (DOMLEC, 2015; NREL, 2015).

With respect to electricity demand, Nexant estimates that peak demand on DOMLEC’s network should increase yearly at a rate of approximately 2.7 per cent over the short term. Moreover, net national generation was forecasted to grow at an annual rate of 2.5 per cent. After 2015, forecasted demand and energy generation is expected to be 18 MW and 101 GWh/year respectively.

Currently, the country’s energy matrix is mainly supported by diesel (71.4 per cent). However, renewable energy contributes approximately 30 per cent, hydropower generates 27.4 per cent, wind 0.95 percent, and solar 0.25 per cent.

Dominica uses STS (S. African Token Based) prepaid meters and is currently installing Elster MAS AMI meters with and without disconnects. The country is well known throughout the Caribbean as a leader in Prepaid/Pay-As-You-Go electricity.

Considering policy, even though Dominica’s National Energy Policy does not include specific targets for energy efficiency or renewable energy, the country is planning to be self-sufficient by 2020. Also, Dominica is already benefiting from three hydropower stations that have an installed capacity of 6.5 MW, with an additional potential of 17 MW (NEP, 2011; NREL, 2015), (table 2). Moreover, DOMLEC has also established goals for generation from renewable energy of 40 per cent by 2017 (NEP, 2011).

Looking towards the future, there are currently significant efforts to develop geothermal energy supply. In this regard, the government has already invested approximately US\$ 20 million and is currently in discussions with a French consortium about financing this programme. The initiative however has so far received strong resistance from environmental civic groups that insist that the project is being pursued in violation of established protocols of the Environmental Impact Assessment (EIA).

It should also be mentioned that Dominica also has high potential for solar energy, as it receives 5.6 kWh per square meter per day (NREL, 2015). Wind and geothermal potential are also high, and projects are currently being explored. In addition, the country has obtained funds to develop two waste-to-energy pilot projects.

Table 2
Renewable energy status and potential

Source	Potential	Installed capacity
Wind	30 MW	0.23
Hydropower	17 MW	6.5
Geothermal	300+ MW	0
Ocean	Unknown	0
Biomass	Unknown	0
Solar	45 MW	6.6

Source: National Renewable Energy Laboratory (NREL) 2015.

B. Energy related projects and studies

These projects have been classified according to their study objectives and focus, and by whether they analysed social or commercial aspects of energy. The first group focuses on *study projects* and refers to research and development issues, legal and policy framework, and energy quality matters at the regional, sub-regional and national levels. The second group, *social projects*, consists of projects that assess direct benefits to the population, inter alia, the substitution of incandescent bulbs by CFL or LED lighting, as well as training programmes and awareness campaigns. The third group of *commercial projects* brought together several productive initiatives, such as deployment of new utilities and renewable energy plants, and actions to improve energy efficiency and energy conservation. Overall, some 24 projects have been undertaken, with 6 of these showing significant potential for renewable energy production and the possibility of introducing energy efficient and energy conservation measures in the country. Table 3 shows a summary of energy efficiency and renewable energy projects implemented in Dominica and their financing agencies. Further details are presented in annex 1.

Table 3
Summary of energy efficiency and renewable energy projects implemented in Dominica and agencies of financing

Classification	Topic	Financing	Total
Study	Geothermal (2), EE and RE (2), climate change and energy (2), regulatory framework (1), NEP and SEP developing (1), wind (3), hydropower (2), biogas (1), solar water heating (1), Electricity Act update (1)	WB, GSEII, OAS, USAID, EU, GSPTA, CREDP-GTZ	16
Social	EE and/or RE incentives (4)	CREDP-GTZ	4
Commercial	Wind and solar (1), geothermal (1), EE initiatives (2)	EIB, CFG Services (Subsidiary of BRGM), GSEII	4

Source: author's compilation.

The following section reviews the country's policies and legal framework, as well as barriers to implementation of EE and RE. It also describes the results of projects and studies on energy efficiency, energy conservation and renewable energy in Dominica.

1. Projects on policy, legal issues and barriers

Energy issues in Dominica are managed by the Energy Unit of the Ministry of Public Works and Ports, which sets policy on electricity generation and distribution. The unit also coordinates Dominica's Renewable Energy Programme, and is responsible for coordinating activities related to the development and expansion of electricity generation and distribution, including the development of renewable energy sources such as geothermal, solar, wind and hydro energy. The unit also coordinates matters related to the supply of public lighting.

With respect to policy, final drafts for the National Energy Policy (NEP) and the Sustainable Energy Plan (SEP) were developed with support of the Caribbean Sustainable Energy Project (CSEP). These drafts are however still awaiting Cabinet approval.

The overarching theme of the national energy policy is the pursuit of a sustainable approach to energy development that ensures the availability of energy that is reliable, affordable, clean and efficient. Additionally, the NEP seeks to increase private sector participation through large-scale electricity generation from renewable energy sources, as well as in distribution in order to eliminate monopolies. As mentioned earlier, the Independent Regulatory Commission (IRC) established under the Electricity Supply Act functions to encourage the expansion of the electricity supply where this is

cost effective and in the public interest, and to encourage the operation and development of a safe, efficient and cost effective electricity sector. The IRC is also tasked with facilitating the promotion of sustainable and fair competition in the sector, while protecting the interest of all electricity consumers.

In the performance of its functions and duties, the IRC is independent and not subject to the direction or control of the state.

2. Projects on energy efficiency and renewable energy

Energy efficiency and conservation are short-term measures that could help to reduce use of fossil fuels and mitigate against negative environmental impacts. In Dominica, as in other Caribbean states, one area of significant improvement of energy efficiency is in public buildings where installed technologies installed in public buildings are obsolete and inefficient. Improvements in this area have good potential for achieving high energy savings with a quick payback on investments.

The Institutional Energy Efficiency Programme for OECS members aims to achieve electricity savings of 3.1 GWh/year in Dominica, with 2.2 GWh/year coming from institutional buildings and 0.9 GWh/year from street lighting. In order to achieve these goals, the required investment, without programme development and operating costs, is estimated at over US\$ 3.2 million (ECONOLER 2014).

The country has already implemented a series of initiatives and both residential and commercial customers have been making investments in energy efficient lighting, primarily in CFLs. Between 2006 and 2007, the Government of Dominica installed 5,000 energy-efficient bulbs with the cooperation of the University of Vermont and the UK-based organization Climate Care. Additionally, the Cuban government supported the replacement of 280,000 incandescent light bulbs with energy-efficient compact fluorescent bulbs. Energy awareness activities were also carried out alongside the initial distribution of bulbs.

Box 1 National energy policy at a glance

Increase use of domestic energy sources
Increase energy efficiency
Increase environmental sustainability
Reduce energy costs and tariffs
Extending electricity coverage to all citizens
Development policies for: hydro, geothermal, solar and wind energy

As mentioned before, losses from electricity distribution have been one of the main challenges facing the Dominica electricity utility during the last decade. In order to increase efficiency, the project “Energy Efficiency in DOMLEC Distribution System” was implemented by UNIDO and GSEII, and formed part of the DOMLEC capital investment plan. From this initiative, a reduction of roughly 10 per cent of losses was achieved in less than ten years.

A series of additional projects for the promotion of EE in the Caribbean, and specifically in Dominica, has been supported by CREDP/GIZ. Among these were the following initiatives:

- The conduct of energy audits in hotels as a contribution to the CHENACT project;
- The launch of CREDP-GIZ/OECD Energy Efficiency and Standardisation and Labelling Project (EESLP) in April 2012. This project aimed at removing the barriers for the rapid and widespread use of energy-efficient appliances in low-income households and to develop or adapt EE standards and labelling schemes.

DOMLEC has also implemented some in-house initiatives through the promotion of energy savings and safety tips on its web site, and the provision of a “calculator” to allow households to estimate their electricity consumption by end use.

Regarding renewable energy technologies (RET), in the last few years the country has experienced substantial improvements in cost, performance, and reliability, thus making it more competitive. Given the currently strong momentum for renewable energy worldwide, and the prospects for deployment of these technologies, Dominica is in a good position relative to other OECS countries to exploit renewable energy for its development. In this regard, the country has already achieved about 30 per cent electricity generation from renewable sources through hydropower plants and wind. A conservative estimate of unused hydropower potential in Dominica is in the range of 10 – 20 MW.

Geothermal sources have also been largely studied in Dominica, and the country's potential ranges between 300 and 1,390 MW (NEP, 2011; NREL, 2015). In 2004, an OAS Geo-Caraibes programme began exploring the feasibility of such a project and by 2005, OAS (in partnership with GEF and UNEP) began resource exploration to confirm the potential for geothermal development. The study was completed in the spring of 2006. Two years later, GSEII helped Dominica secure funding from the Euro Commission's Energy Facility to explore geothermal potential. In 2008, the Ministry of Energy signed an agreement on the commencement of activities for energy exploration projects using Euro Commission's Energy Facility funding. In this initiative, GSEII intent was to support the process by conducting a study of legal issues associated with connecting Dominica's energy grid with those of neighboring islands. In 2009, a three year, US\$ 6 million geothermal resource development programme was started through OAS efforts. Upon completion, this project aims generate 100 megawatts of electricity, 80 per cent of which will be supplied to the French departments of Guadeloupe and Martinique via submarine cables. However, the project has suffered setbacks and is now expected to be completed by 2018 (GSEII 2014).

Yet another activity is a 10 to 15-MW geothermal project which is presently under consideration through private investment. If the project is successful, it is expected to significantly reduce electricity tariffs, thereby increasing electricity demand. Moreover, this project is likely to encourage independent power producers to seek connection to the grid (ECONOLER 2014).

Considering fiscal policy initiatives, the government has waived the import duties on equipment required for renewable energy production and use. Under this provision, items that are produced in a CARICOM member country are imported into Dominica free of import duties.

In terms of social projects, a National Energy Audit Initiative was undertaken in Dominica. The programme worked with selected government staff to train them in energy auditing and purchased equipment to undertake audits on government buildings. OAS is also exploring training teachers on integrating renewable energy and energy efficiency learning activities into schools.

In terms of regional activities, Dominica has participated in a number of regional renewable energy initiatives. For example, the country has been involved in the Eastern Caribbean Geothermal Development Project (Geo-Caraibes) funded by the Organisation of American States (OAS). This project addresses the development of geothermal energy in the islands of Dominica, Saint Lucia, and St. Kitts and Nevis and seeks to reduce the risk and costs linked to geothermal utilisation and create the conditions for its commercial development in the region. The country is also part of the Global Sustainable Energy Island Initiative (GSEII), a consortium of international non-governmental organizations and multilateral institutions that supports small island states and potential donors by bringing RE and EE projects together.

Dominica has also been party to a new feasibility regional study on natural gas, funded with US\$ 1 million by IDB. This study seeks to analyse the overall feasibility of establishing a commercial supply chain for natural gas (NG) in the Caribbean region with Trinidad and Tobago as the gas supplier, and regional small economies as off takers. Given the current precarious status of gas production in Trinidad and Tobago, the feasibility of this initiative now remains in doubt.

III. Financing opportunities for energy projects

A. Lessons learned

In assessing opportunities for the development of energy projects in Dominica, research carried out over the last 30 years shows that geothermal potential is very high in the country. However, even though approximately US\$ 100 million have been invested in research, to date no such projects have been implemented reflecting the high cost and complexity of the technology involved. A similar situation obtains with respect to projects focused on energy efficiency. For instance, measures such as solar water heating, retrofitting of electrical equipment, improving public transport, efficient lighting and cooling of public buildings, or retrofitting of street lighting have not been implemented.

Furthermore, several studies and reports done in last ten years,⁴ at the regional, sub-regional and national levels, persistently show the same deficiencies, barriers and obstacles for successful implementation of energy efficiency and renewable energy projects. Some examples of these are identified by Fichtner (2012), ECONOLER (2014) and OECS (2014) as:

- Low public awareness with regards to energy saving measures.
- Insufficient interest in energy efficiency and renewable energy from both the public and private sectors.
- High cost of more efficient equipment and high initial investments for renewable energy production.
- Lack of cohesive business environment (legislative, regulatory systems, labor unions) and policies to promote trust among private investors.
- Limited availability and transparency of statistical information on energy.

⁴ Fadelle (2009) ECONOLER (2014), NREL-OAS (2012), CARICOM (2013), OECS (2014).

- Reliance on imported capital and other resources, and concerns about safety, productivity, and profitability of imported technologies.
- Shortage of infrastructure services
- Concerns about political risk and foreign exchange convertibility and repatriating returns on investment
- Perceived risks in financing the project
- Complex financing arrangements involving many parties and many instruments

Considering the low investment capacity of most SIDS, financing is an important issue for the development of RE and EE projects. Financial barriers could be overcome through an appropriate use of international funding sources, as will be explained later. These are applicable to commercial projects as well as household investments. CARICOM is also cognisant of the need to explore and establish a feasible institutional framework for supporting financial mechanisms for the development of viable energy resources.

Notwithstanding all of the above, the lack of well-structured projects⁵ is an important constraint to securing financing for the implementation of EE and RE measures in Dominica. For this reason, the following section is dedicated to guiding the process of financing.

B. Process of financing

Currently, financing energy programmes that pursue a reduction in energy bills is one of the most direct ways to increase national economic efficiency in Caribbean countries, since this can reduce the impact of volatile oil prices on production costs.

There are two main ways of increasing energy efficiency and achieving sustainable energy development. One is to reduce the input costs of electricity through more efficient use of equipment, and by extension reducing fossil fuel consumption. The other way is to generate electricity by substituting traditional sources of fuel with renewable energy.

However, financing these types of projects is complex due to high upfront investments and capital costs of these technologies. In this scenario, all stakeholders involved in this financing process are concerned with the risks and results. One of the foremost challenging issues in financing energy projects is to obtain a better understanding of the process itself. The following section analyses the main actors and factors from the financial side of the process. These may be listed as follows:⁶

- Energy balance forecast and goals of the financing
- Definition of donors, funders and sponsors
- Presence of intermediary entities
- Work on financing lines of entities that offer financing
- Document formalities

⁵ CREF, Barbados October 2011: "Financing is not a problem: funds are available. Well-structured projects are missing."

⁶ The necessary steps for the financing process for each type of project (studies, social or commercial projects) are sketched in annex 2.

An energy balance forecast will determine the amount of energy that the country will need in, at least, the next 20-30 years. The purpose or objective of the financing (study, social or commercial project) should be clear in all cases. Studies rarely need a financial evaluation, while social projects are often presented along with a cost-benefit analysis. Commercial projects, on the other hand, typically require rigorous technical, economic and financial evaluations.

The identification of financing sources (donors, funders and sponsors) must also be detailed. Project managers should take into consideration the various types of funding institutions. These may be:

- Government donors or sponsors: Funds are offered for specific projects, and come in the form of donations or subsidies. These funds are generally used for the conduct of studies.
- Philanthropic institutions act very similarly to governments in this respect.
- National or international financial institutions offer loans directly or indirectly (through national or local institutions).
- Other institutions act as intermediary entities, channeling funds from global or international institutions.

Financing for energy projects can have one or multiple sources, and the end users can be locals within a country, or even the country or region itself. The latter is generally specific to multilateral programmes.

Intermediary entities. Many projects are conceived from national initiatives, while others come as part of multilateral regional programmes. In any case, there are many institutions, which have been grouped under the name of Sustainable Energy Initiative Organisations (SEIOs). Among the international SEIOs are:

- The International Renewable Energy Agency (IRENA): This is an intergovernmental organization that supports countries in their transition to a sustainable energy future, and serves as the main platform for international cooperation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy, in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity.⁷
- The Renewable Energy and Energy Efficiency Partnership (REEEP): An international non-profit organization that advances markets for clean energy in developing countries, where they build scale and replication by connecting funding to projects, practice to knowledge and knowledge to policy. REEEP uses donor funding to support a portfolio of potential ventures that create energy access and combat climate change, often attracting private finance. The organization monitors and evaluates projects within their policy, financial and commercial environments to gain insight into opportunities and barriers; subsequently this knowledge is fed back into the project, the portfolio and the policy framework to continuously advance markets for clean energy.⁸
- The Global Sustainable Energy Islands Initiative Consortium (GSEII): This was formed in 2000 to accelerate the transition of the Alliance of Small Island States (AOSIS) member nations toward cleaner, more sustainable energy use. The Global Sustainable

⁷ www.irena.org

⁸ <http://www.reeep.org>

Energy Islands Initiative is a consortium comprised of NGOs and multilateral institutions. Formally, the consortium is coordinated by the Climate Institute (CI) and is partnered with the United Nations Industrial Development Organization (UNIDO). GSEII strength is in the foundation of the consortium, as major partners can proceed with projects while others may struggle – ensuring a constant presence on the islands.⁹

With respect to SEIOs in the Caribbean region, the following examples are identified:

- SIDS DOCK-5Cs-SPREP: Developed jointly by the Caribbean Community Climate Change Centre (5Cs) and the Secretariat of the Pacific Regional Environment Programme (SPREP). This initiative, among member countries of the Alliance of Small Island States (AOSIS), offers Small Island Developing States a collective institutional assistance mechanism to help them proceed on a sustainable economic development path and help generate financial resources for addressing climate change adaptation. Under SIDS DOCK, public–private partnerships are promoted as a means for investments in sustainable energy projects and technology transfers.¹⁰
- The Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS): This is conceptualised as an updateable sustainable energy planning, management and implementation framework, as well as a communication tool to be developed under the CARICOM Energy Programme in collaboration with CARICOM member states and other partners. C-SERMS establishes regional sustainable energy targets and strategies for the short, medium and long term. The approach to developing the C-SERMS is to establish a baseline for energy efficiency opportunities and renewable energy potential. The development of C-SERMS is guided by a broad-based stakeholder platform that will utilise appropriate tools to scan, monitor, analyse, track, plan and make adjustments to the targets and strategies.

These organizations offer financing for energy projects or help in channeling resources, and often work together with one or several of the institutions of the United Nations System (UNDP, UNIDO, UNEP, FAO, ECLAC). SEIOs and United Nations institutions play the role of coordination, technical assistance and management in project funding.

Priorities of financing institutions. It is important to be aware of the main lines of work and/or funding priorities, as well as the geographic social or economic priorities of each institution, so that the right project can be directed to the right funder.

For example, for the period 2013-2014 REEEP prioritised the following lines of work:

- Water-energy-food nexus
- Sustainable urban transport
- Energy efficient buildings.

Calls for projects: The bidder lenders (funding institutions) often call for projects with a clear objective and identified priorities in the funding assignment. These calls for projects include a particular procedure to be followed by every proposal in order to win the bid. Some examples are IDEAS, organised by the Department for International Development (DFID) of the United Kingdom for innovative ideas that promote renewable energy. There is also the Abu Dhabi Fund for Development (ADFD) contest that is conducted jointly with IRENA to promote energy access or address energy security.

⁹ <http://gseii.org/who-we-are/about-us>

¹⁰ <http://aosis.info/sids-dock/>

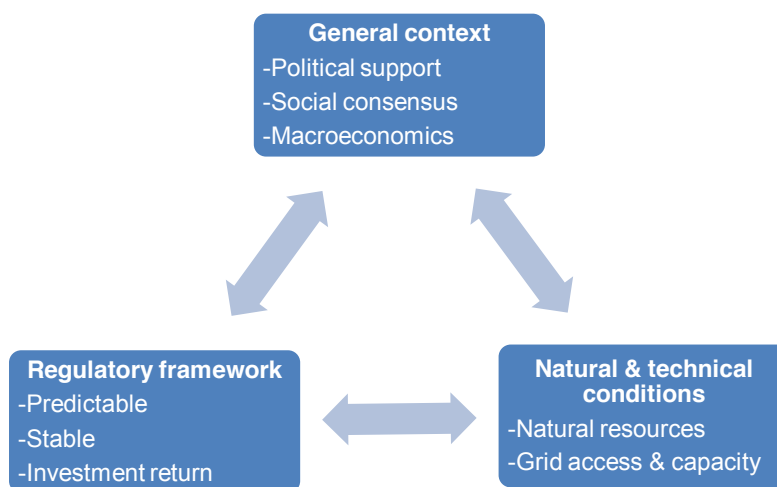
Prerequisites: Project planners must be aware that funding institutions have set preconditions for the release of funds to any particular project. For example, to access funds coming from private institutions and occasionally from multilateral programmes, national government participation is often required. In this regard the following should be considered:

- The need of a financial entity at the national level that could coordinate government and private sector interests and support the indispensable guaranties to be submitted to the creditors.
- The issuance of guaranties by government or private sector bonds to assure the reimbursement of loans.
- The co-financing arrangement between government and private sector.

Note that a study project is generally financed through government funds, while SEIOs and United Nations institutions can act as intermediaries or even as direct funders. Main financial sources for social projects are also governments and their development agencies, although philanthropic institutions often participate in these types of projects.

Regarding commercial projects, these could be financed by loans provided to private, public or mixed companies. Financing is usually available at lower interest rates and spread over longer time periods. One possible strategy in financing of energy projects such as power plants is the formation of a project company. This approach recognizes the complex nature of these types of projects, and provides opportunity for the involvement of myriad stakeholders in analyses such as showed in figure 1.

Figure 1
Investment drivers



Source: Carlie Renewable Energy Forum 2012. Financing RE in the Caribbean, EIB's model and experience. [on line], <http://www.eib.org> [date of reference: 12 October 2014]

The financing process could also include direct lending, indirect lending or on-lending (using commercial national banks) and insurance as guarantee. Ultimately, an effective financing strategy could be one in which several related projects (exploration studies, explanatory studies, pilot tests, expansions or replications) are designed as a bundle and presented for funding. However, given the complexity involved in the preparation of projects, it is often necessary to assemble working groups in institutions to support the process.

C. Main sources for project financing

As has been shown above, the process of obtaining funding for RE and EE projects depends heavily on the type of project. The relationships between project types and possible financing sources are shown in table 4. Institutional characteristics and financing requirements also vary for different funding sources. These issues are discussed further below.

Table 4
Summary of relationships in RE-EE projects funding

Purpose	Donors/funders/sponsors	Intermediary	End-user
Studies	Mainly UN System, government development agencies and philanthropic institutions	UN System and/or SEIO	Government
Social	Mainly UN System, government development agencies and philanthropic institutions	UN SYSTEM and/or SEIO	Government and population
Commercial	Multilateral and commercial Banks	SEIO (occasionally)	Private sector

1. Multilateral funds¹¹

The Global Environment Fund (GEF) of the World Bank (WB): GEF is the largest source of public sector financing to support renewable technologies and practices and new and emerging energy in the developing world. In its first 18 years, the fund has provided US\$ 1.1 billion for these types of projects to private enterprises through the market. It is worth noting that 21 per cent of these funds were devoted to Caribbean countries.

GEF has also provided support to developing countries and transition economies to deregulate the generation of renewable energy, and continues to develop and strengthen local capacity to adopt, finance, install, operate and maintain renewable energy technologies (RET). Investments in promising RET, both pre-commercial and commercial, have been a key element of the GEF strategy, and over the past 18 years, GEF has supported the transfer of more than 20 RET to the developing world. It is estimated that activities supported by GEF relating to RET will avoid directly at least 290 million tons of CO₂. On average, GEF invests US\$ 3.97 per ton of CO₂ emissions avoided.

In June 2009 the renewable energy component of GEF Climate Change Project Portfolio amounted to US\$ 1.1 billion, with co-financing amounting to US\$ 8.3 billion.

In the near future, GEF will focus its support to renewable energy in the following areas:

- Creating favourable markets for renewable energy: GEF intervention under this objective will be a combination of technical assistance to support policy and regulation, strengthening the technical and institutional capacity and creating financial mechanisms for investment in the use and dissemination of energy sustainable technologies (EST).
- Investment in transferring RET: GEF will increase its investment in the transfer of EST that have been commercially proven and will emphasise market demonstration and commercialisation of promising new technologies. It will also intensify its efforts to promote the next stage of intervention in regard to the technologies demonstrated

¹¹ Information regarding funds and programmes was retrieved from each institution's website.

successfully in order to remove barriers to commercialisation and reduce costs with the passage of time.

- Promoting access to modern energy services: Given the large demand for energy access and services in rural areas of developing countries, GEF will also support decentralised electricity production and heating from indigenous renewable sources. GEF markedly increased their investments, especially in Sub-Saharan Africa, South Asia and small islands developing States.

The Global Energy Efficiency and Renewable Energy Fund (GEEREF): This is the most important financing mechanism in the organisation of the European Union. According to GEEREF, funds are invested in emerging markets and priority is given to countries with appropriate frameworks on energy efficiency and renewable energy, where high quality renewable energy resources and steadily reducing technology costs create compelling investment opportunities.”

GEEREF's investments focus on generating benefits thus:

- People: provide access to sustainable energy and increase energy efficiency in developing countries and economies in transition.
- Planet: fight climate change and contribute to a sustainable environment.
- Profit: achieve robust financial returns.

The fund invests exclusively on projects in emerging markets that qualify as recipients for Official Development Assistance. In this regard, Dominica is part of the 146 countries registered by the Organization for Economic Co-operation and Development.

Regarding the technological scope of projects, GEEREF invests in specialized funds for developing small to medium-sized initiatives in the following sectors:

- Renewable energy, including small hydro, solar, wind, biomass and geothermal.
- Energy efficiency, including waste heat recovery, energy management in buildings, co-generation of heat and power, energy storage and smart grids.

GEEREF engages with projects early in their development and seeks to enhance strategy, team capability and structure, given that these are often the core elements for investors in a fund. Underpinning GEEREF's investment strategy is a fundamental commitment to financial, environmental and social sustainability.

GEEREF funds typically have:

- Strong technical and private equity transaction skills
- A regional focus, with established local presence and networks
- An overall size of between € 50 and € 200 million

GEEREF has two portfolios dedicated to the Latin America and Caribbean region, these being the Emerging Energy Latin America Fund II and the MGM Sustainable Energy Fund (MSEF). The former targets high growth economies, while the latter has a broader scope that could benefit the Caribbean subregion. MSEF invests in projects on the demand-side of energy efficiency and renewable energy sectors, specifically 70 per cent in energy efficiency and 30 per cent in renewable energy. GEEREF has committed € 10 million to MSEF.

The European Investment Bank (EIB): EIB is the most important bank in the framework of the European Union for supporting energy and environment programmes. Approximately 90 per cent of the funds are attributed to promoters in member states of the European Union. However, the bank also supports external partner countries. Caribbean countries can benefit from projects within the Sub-

Saharan Africa, Caribbean and Pacific & Overseas Countries and Territories portfolio. In 2014, lending to this group showed approvals for € 971 million and disbursements for € 622 million.

The bank also has guidelines that define the “Energy Lending Criteria”, with emphasis on energy efficiency and renewable energy projects, including heating and cooling and large hydro. In addition, investments in renewables have also been grouped into *mature renewables* and *emerging renewables*, thereby expanding investment opportunities since the bank also finances technologies that are expected to become competitive within a particular timeframe. With regards to energy efficiency, transportation could benefit from the bank’s approach. However, high subsidies and weak institutions are the two main obstacles for this type of investment. Therefore, investments include overcoming barriers and supporting sectoral policies in buildings, transport and industry.

The receiver can also pay, as part of an approved funding plan, up to 50 per cent of the cost of a project (although usually less) in conjunction with resources of the promoter and funds from other sources. The EIB also acts as a lever or catalyst for attracting other sources of financing and co-financing from banks and other credit institutions (public and private), in particular those of the EU members, international financial institutions and regional development agencies. Most loans under the ALA III mandate are between € 20 and € 50 million. Payments can be made in one currency or a combination of currencies according to the recipient's preferences and the availability of cash. Whenever it is feasible, the EIB raises funds in domestic capital markets for its lending in the currency, thus relieving its customers of exchange rate risks.

EIB interest rates conform closely to the cost of their borrowing in capital markets. Loans are generally fixed rate, which is applied either on the date of signing of the contract or more often on the date of each disbursement (open-ended contract). Loans may also be granted under variable, revisable or convertible interest rates.

Regarding repayment, EIB lends to medium and long term projects whose maturity will depend on the nature of the project and the economic life of the assets funded. This is generally up to 12 years for industrial projects and up to 15 years but may on exceptions extend to 20 years) for infrastructure projects, such as industrial energy. Fees and charges are fixed in the interest rate loan agreement, and the grace period is usually between one quarter and one third of the project life.

Like any long-term lender of their resources in capital markets, EIB loans require appropriate safeguards. This warranty is provided by the State concerned or (in the case of private sector projects) by banks or highly regarded companies.

The OPEC Fund for International Development (OFID): OFID provides loans to the public and private sectors for energy programmes on concessional conditions, as well as grants to support small-scale renewable energy projects (table 5). This fund had participation in projects and investment opportunities in Latin America and the Caribbean, in countries such as Belize, Bolivia, Colombia, Cuba, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Paraguay, Peru, Dominican Republic and Venezuela. Dominica has also engaged the fund through four projects, for which US\$ 4 million have been committed. Even though the projects are part of the transport and education sectors,¹² the country could benefit from the already established relation with OFID.

¹² (i) Regional vocational and technical training project; (ii) Road maintenance and rehabilitation project; (iii) two non-sectoral projects.

Table 5
Types of investments per sector

Public sector (loans)	Private sector	Productive sectors
Projects	Technical assistance	Manufacturing, transport and telecommunications
Programmes	Co-financing projects	Energy, water supply and sewerage
Balance of payments support	Emergency financing	Agriculture and agribusiness
	Lease finance (intermediaries)	Education
	Guarantees	

As of 2015, energy operations represented 23 per cent of the fund's commitments, estimated at US\$ 4,096 million, and distributed among 86 countries. It is worth mentioning that OFID has aligned its energy portfolio with Goal 7-Affordable and Clean Energy of the Sustainable Development Goals, in this way acknowledging that energy is closely related to development and growth.

The fund offers investment options for the public, private and productive sectors (see table 7), through various services:

- Loans and lines of credit
- Share participation
- Operations quasi-equity (convertible loans, loans participatory and subordinates, preferred shares, convertible preference shares)
- Credit guarantees
- Insurance

Loans granted to developing countries are linked with average incomes, but most of OPEC's funding is made on concessional terms. In financing the private sector, loan parameters are linked to country and project risks.

The Nordic Development Fund (NDF): The mandate of the NDF has given priority to climate change and development since 2009. The fund focuses its investments on climate change adaptation and mitigation initiatives in low-income countries that are eligible for support from the International Development Association of the World Bank. Both the World Bank and the Inter-American Development Bank are partners of the NDF in the LAC region.

Some thematics covered under climate change are sea level rise; extreme weather conditions and their effects on health and food security; reduction of GHG emissions through improved energy efficiency and use of renewable energy; sustainable transport; and wastewater and sewage treatment. Further, the NDF offers medium and long term loans with preferential conditions for government loans. Its method of sharing in investment projects include:

- Operations co-financing with bilateral organizations and mixed credit, mainly of Nordic origin.
- Co-financing operations with multilateral or international banks in the development of the private sector worldwide.

Priority is given to the following activities:

- Participation in joint ventures through subordinated loans with characteristics of equity. Priority is given to infrastructure projects with private sponsors in cooperation with the state.
- Lines of credit to banks supporting development of small and medium enterprises.
- Participation as a shareholder in the venture capital funds that extend funding to promote the development of the private and financial sector.

The fund's participation in the productive sectors focuses on infrastructure projects such as energy, transportation and telecommunications. It also prioritises social projects in the areas of health, education, water and sanitation.

Conditions of participation in projects and investment opportunities for Latin America and the Caribbean include the amount of the loan, where for example public sector loans usually range from € 1 up to €10 million. The NDF also provides grants, with the amounts varying between € 2 million and € 5 million, according to the scope of the project. The funds are granted in Euros or are convertible to other available currencies.

In addition, NDF supports innovative proposals through the Nordic Climate Facility for which such proposals could receive grants between € 250,000 and € 500,000.

The private sector can also participate in NDF joint ventures through the extension of subordinated loans with equity features. This is referred to as smaller loans that are part of a major loan. Under this system, financing may not exceed 15 per cent of the assets of the company.

Loans with government guarantees may extend up to a period of 40 years, including 10 years of grace. Loans with government guarantees enjoy a 0 per cent interest rate. At the same time, warranties for private projects cannot exceed 50 per cent of the total funding. The commitment fee is 0.5 per cent annually, and the service fee is 0.75 per cent annually.

The Caribbean Renewable Energy Fund (CREF): This fund of CARICOM seeks to provide equity and debt financing to renewable energy projects. CREF will co-invest with regional financial institutions (FIs) and also under the Caribbean Renewable Energy Development Programme (CREDP). CREDP eligible projects fall into two categories:

1. Grid-connected: wind, biomass co-generation, small and mini hydro, and geothermal.
2. Off-grid and rural electrification: photovoltaic, micro hydro and solar water heating.

Projects are financed through the Caribbean Renewable Energy Technical Assistance Facility (CRETAF), which is a US\$ 1.6 million initiative that provides early-stage, high risk financing for qualified projects. The facility could assist developers in the preparation of proposals through analyses such as feasibility studies, resources assessments and environmental impact assessments.

Project qualification criteria include the following:

- After tax Return on Investment (ROI) > 15 per cent
- Benefit costs ratios 1 or NPV > 0 or Discount Rate > 1.5
- Net foreign exchange savings
- Net reduction in green house gas (GHG) emissions
- Project equalised cost of energy and capacity < avoided cost of electric energy and capacity
- Show a strong potential for duplication
- Must have signed letter of support from the respective governments

2. Bilateral funds¹³

The Inter-American Development Bank (IDB): IDB finances projects to improve energy efficiency, promote cross-border energy integration and diversify the energy matrix. Some of these include large-scale wind farms, solar power for rural areas, bio fuel facilities and retrofitting hydroelectric facilities. The bank also supports pilot projects to test the viability of renewable energy initiatives.

IDB has approximately 30 energy projects that account for US\$ 2.4 billion in financing. Loans have been awarded for various purposes, the most important being institutional strengthening (US\$ 732 million), rehabilitation and efficiency (US\$ 376 million), distribution and transmission (US\$ 349 million), and hydropower projects (US\$ 250 million). IDB public sector operations support energy efficiency projects (mostly in a range above US\$ 100 million investment).

The Energy Sector Framework is organised in four strategic thematic lines that guide the bank's work:

- (i) Energy access
- (ii) Energy sustainability
- (iii) Energy security
- (iv) Energy governance

IDB offers various financial solutions:

Guarantees:

- Types of guarantees: partial credit guarantees or political risk guarantees.
- Use of guarantee enhancement of bond issues, project finance, asset-backed securities, securities backed by future flows, structured trade transactions.
- Amounts calibrated to optimise impact on the underlying instruments rating.
- Tenor: up to 30 years.
- Fees: facility fee charged for guarantees with sovereign counter-guarantee operations fees operation fees and determined on a case-by-case basis.
- Local currency (LC) denominated guarantees offered subject to market availability.
- Fees charged in LC reflecting IDB's fee structure for guarantees applicable at the time of approval.
- Called guarantees become a loan in the currency of denominated same terms and conditions of LC loans apply.

The bank provides funding particularly through its Inter-American Investment Corporation in close cooperation with UNDP and the GEF of the World Bank. The IDB-GEF portfolio comprises 53 projects that total US\$ 301 million in GEF grants and US\$ 2 billion in co-financing from the bank and other counterparts. Approximately 25 per cent comes from IDB lending and non-lending instruments. These projects are grouped in four categories, namely multifocal, international waters, biodiversity and climate change. The latter registers 25 projects, mostly related to energy efficiency, renewable energy and carbon markets.

¹³ Information regarding funds and programmes was retrieved from each institution's website.

Caribbean Development Bank (CDB): The CDB provides loans as co-financier to the public and private sector with special interest in energy and environmental protection. In 2014, CDB approved projects for US\$ 243 million, of which, only US\$ 500,000 were destined to renewable energy and energy efficiency initiatives. However, it is worth mentioning that, in January 2014, the bank established a Renewable Energy and Energy Efficiency Unit to develop the institution's Energy Sector Policy and Strategy.

Energy security was designated as a strategic cross-cutting theme for the period 2015-2019. This is reflected in the bank's Energy Sector Policy, which has identified four focus areas for the period:

- (i) Promoting energy efficiency for more affordable and stable energy costs, and for establishment of a green economy
- (ii) Promoting renewable energy for more sustainable, affordable, and accessible energy, and for a green energy economy
- (iii) Promoting energy infrastructure to provide cleaner and more reliable power supply
- (iv) Promoting sector reform, good governance and capacity strengthening

A Geothermal Risk Drill Facility at this bank has been proposed to facilitate geothermal energy programmes.

Conditions for participation in projects and investment opportunities in Latin America and the Caribbean include the following:

- Amount: The minimum loan amount for the public sector is US\$ 200,000. Direct loans may be granted up to US\$ 750,000. The CDB finances up to between 70 and 80 per cent of the cost of the project, depending on the country involved. For private projects, it finances about 40 per cent of the cost of the project, considering only projects with certain level of debt/equity.
- Interest rates: 7.5 per cent, semi-annually reviewable.
- Loan terms: maximum 10 to 30 years, depending on the country; and up to 14 years for private projects.
- Grace periods: up to 5 years depending on the country.
- Guarantees required: usually works with government guarantee

The Energy and Climate Partnership of the Americas (ECPA): The ECPA is an initiative led by the United States and supported by regional and multilateral institutions, such as OAS, IDB, OLADE and WB, as well as by the academia, private sector and civil society. ECPA focuses on seven priority areas:

- (i) Energy efficiency
- (ii) Renewable energy
- (iii) Cleaner and more efficient use of fossil fuels
- (iv) Energy infrastructure
- (v) Energy poverty
- (vi) Sustainable forests and land use
- (vii) Adaptation

ECPA follows a flexible and collaborative approach, through which countries can obtain guidance from best practices, share sustainable energy solutions, benefit from toolkits, and receive

technical assistance in general. According to ECPA (2015), Dominica is engaged in a series of initiatives, such as the ECPA Caribbean Initiative, Connecting the Americas 2022, and Energy Innovation Centre.

China Development Bank (ChDB): This bank specialises in medium to long-term financing, with trajectory in financing infrastructure and industrial projects. The institution has assets up to US\$ 1 trillion dollars. Among their priorities are energy conservation and environmental protection projects.

The bank has participated in projects and investment opportunities in Latin America and the Caribbean with previous experience in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Venezuela.

It offers participation in infrastructure projects, basic / core industry, and restructuring, innovation and improvement. Issuance of debt, evaluation and consultation guaranteed loans, loans in foreign currency remittances, securities in foreign currency exchange rate guarantee, international agreement projects financed under loans. Interest rates are in line with the unified arrangements made by the ChBD. Interest rates may go down appropriately within the range stipulated by the ChBD.

The following are priority areas for the bank: construction of roads, railways, petroleum, petrochemical, coal, telecommunications, agriculture, forestry, water supplies, public infrastructure, education, social interest, international cooperation, emerging industries, restructuring, innovation, coordinated regional development, modernisation, protection environmental, energy conservation and emission reduction, cultural industry.

Repayment: loans are divided into short-term (maturing within one year), medium-term (1-5 years) and long term (over 5 years). For large infrastructure projects, the maturity may be extended according to the needs of the industry.

Guarantees required: varies depending on the type of project

Agence Française de Développement (AFD): This agency can provide funds for energy programmes to the private and public sectors, in particular to French interest areas. Besides loans for the public sector, AFD also works through banking intermediation, subsidies and partnerships, which are guided by the Sustainable Energy for All Initiative. Acknowledging the importance of energy for development, since 2007 AFD set up a Sectoral Intervention Framework for energy, which is articulated under three pillars: sustainable energy, energy security and access. In five years the amount for this sector quadrupled, and in 2011 comprised one third of AFD financing. Since 2007, energy projects have received € 5 billion.

The strategic objectives of the AFD in the region are part of the priorities identified by the "French Cooperation Framework Document" and the following areas are priorities for intervention:

- Promotion of strategic alliances between France and Latin America, and between France and the Caribbean through the French overseas departments;
- Support for the financing of public and private investment;
- Support and drivers of inclusive urban policies productive activities;
- Assistance in the implementation of environmental policy and struggle against climate change.

AFD has previous experience in Argentina, Brazil, Colombia, Dominican Republic, Ecuador, Haiti, Mexico, Nicaragua, Panama, Paraguay, Peru, and the Caribbean as a whole. It provides loans and grants, guarantees, grants overall budget, warranties and financing of SMEs overseas. AFD and its subsidiary French Society for the Promotion and Participation in Economic Cooperation (PROPARCO), combine grants with a wide range of financial instruments including donations by

private capital and innovative techniques loans and venture capital. Most of the funds of the AFD come from international financial markets.

Financial products are tailored to the needs of the recipient, and loans to States are generally long term and bonuses apply to interest rates, when the object of the funded activity requires.

AFD mainly focuses its operations in sectors which have comparative advantage and where the French experience and know-how is supported. The goal is also to support or create partnerships with local and regional authorities, companies and experts. AFD focuses on the following productive sectors:

- Public and private investment in infrastructure, particularly for energy efficiency and renewable energy
- Inclusive and driving urban policies and development for productive harmonious activities in cities
- Environment and policies that address climate change
- Agricultural, ecological production and forest management
- Trilateral Cooperation with Africa and the LAC region.

AFD works through strategic alliances, partnering with multilateral and bilateral agencies in the region, such as IDB, ECLAC, World Bank, and AECID of Spain, among others.

The French Society for the Promotion and Participation in Economic Cooperation (PROPARCO) participation in projects and investment opportunities in Latin America and the Caribbean addresses problems of climate change and energy security, while it finances flagship investments in renewable energy technologies, including the first major PV project in Latin America.

It also plays an important role in a large number of infrastructure programmes, particularly in the areas of telecommunications and transport.

PROPARCO has been promoting green and inclusive growth, and has contributed to the expansion of educational and health infrastructure, expansion of renewable energy and development of agribusiness - a sector that faces significant environmental challenges. In 2011, PROPARCO intensified its work in Argentina, Ecuador, Panama and Paraguay. To date, PROPARCO has invested 27 per cent of its portfolio in the region.

In Latin America and the Caribbean 45 per cent of PROPARCO commitments are aimed at agribusiness financing. It increased its presence in Latin American banking, awarding Argentine, Brazilian and Paraguayan banks a total of five credit lines dedicated to financing agribusiness.

PROPARCO offers the following services:

- (i) Investment in capital to firms and banks;
- (ii) Support for private equity investment;
- (iii) Medium and long term loans;
- (iv) Development of products in local currency, for projects funded Currency Local and foreign exchange risk facing the market.

In addition to funding in the form of loans, guarantees and subsidies, it supports its partners with training tools, analysis and evaluation.

Some conditions for participation in projects and investment opportunities in America and the Caribbean are:

- Loan amount: PROPARCO usually provides funding between € 2 and € 100 million. Project promoters should contribute a proportion of roughly 30 per cent in the case of a project expansion program and 40 per cent in the case of a new project.
- Repayment for projects of medium and long term is between 3 and 15 years.
- Grace periods are possible.
- Guarantees required: bank guarantee, warranty group, pawn, storage, others.

Private Energy Market Fund (PEMFUND of Finland): The Fund operates globally, but with special emphasis on those countries that have restructured and/or deregulated their energy sectors, such as Eastern Europe and Asia. PEMFUND has the support of FINNFUND, Electrowatt-Ekono and other private funds making investments, and acts as sponsors of activities.

Method of sharing in investment projects: Joint Venture Interest in participating in energy projects.

- Combined Heat and Power (CHP): these plants generate heat and electricity simultaneously on one floor. CHP have high operational efficiency and can use a variety fuels. These types of plants are typically more efficient than traditional plants and are environmentally sustainable.
- Alternative energy sources: as bio energy, urban waste or industrial.
- Energy Service Companies (ESCO).

Conditions for participation in projects and investment opportunities in Latin America and the Caribbean:

- Amount of investment: average investment is € 3 to 5 million.
- Participation: recipient must maintain a minority stake as a long term investor.
- Deadlines: fund may extend for about 4-8 years. This period is negotiable.

It is noteworthy that the PEMFUND favours their interests in companies or projects that have experienced local sponsors, highly qualified teams, environmentally sustainable projects, benefits from changes in the energy sector, provides expectations of future development, as well as those projects characterised by financial and technically manageable risks.

Commercial Banks: Under normal trading conditions, these banks offer loans to many types of projects. Notwithstanding the recent global financial crisis, commercial banking systems are functioning and providing loans, and warranties, among others. It is also possible to obtain a line funding for micro projects.

3. Government agencies

Government agencies finance all types of projects. Nevertheless, it is possible to achieve better results in the study and social project applications. Below is a list of government agencies that fund energy projects. The list includes only the main government agencies around the world.

- Australia: Clean Energy Council (CEC) / Department of the Environment, Water, Heritage and the Arts
- Austria: Lebensministerium
- Norway: Ministry of Foreign Affairs and the Ministry of the Environment and International Development Canada: Canadian International Development Agency (CIDA) / Energy Efficiency Coalition

- Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
- Ireland: Sustainable Energy Authority of Ireland (SEAI)
- New Zealand: Ministry of Business, Innovation and Employment
- Spain: Institute for Diversification and Saving of Energy (IDAE),
- The Netherlands: Ministry of Housing, Spatial Planning and the Environment (Dutch abbreviation VROM)
- United States: Agency for International Development (USAID) / National Research Energy Laboratory (NREL)
- Switzerland: State Secretariat for Economic Affairs
- United Kingdom: Department for International Development (DFID) /Department of Energy and Climate Change (DECC)

4. Carbon offsetting and Clean Development Mechanism

Amid the struggle to deal with the consequences of climate change, the Clean Development Mechanism (CDM) was adopted in the Kyoto Protocol in 2005 as a funding mechanism through the market to invest in the development of renewable energy in developing countries. Through this mechanism, developed countries -responsible for the emission of greenhouse gases-can promote renewable energy projects in developing countries by issuing Carbon Credits, which are supported by Certified Emission Reduction of greenhouse gases in the countries that receive the loans. However, the value of bonds in the market has been facing a downward trend, falling from a value of US\$ 30 to US\$ 0.30, which has led many projects based on such funding to enter in a very precarious situation, even affecting Caribbean countries such as Jamaica.

The drop in demand has been affected due to the prevailing international economic crisis, and actions taken by the EU to restrict the use of this method.

This situation reveals the weakness of measures based on value stocks, as they do not necessarily guarantee the sustainability of resources needed for the development of renewable energy projects. Nevertheless, the General Director of IRENA in a recent interview in Lima (CoP 20) stated that such “new” green bonds reached US\$ 14 billion in 2013, while the estimate for 2014 was US\$ 40 billion and US\$ 100 billion for 2015.

IV. Conclusions

The following key conclusions derive from the assessment of the financing prospects for Dominica in the area of renewable energy and energy efficiency:

- Dominica is very dependent on imported fossil fuels for energy, which makes the country vulnerable to price increases and supply shortages. Nevertheless, Dominica is in a better position than other OECS member states, having already achieved about 30 per cent of electricity generation from renewable energy.
- According to preliminary studies elaborated with assistance from the German Agency for International Cooperation (GIZ) within the Caribbean Renewable Energy Development Programme (CREDP), good potential exists for the development of renewable energy, especially with respect to geothermal and hydropower.
- In order to develop this potential; adequate policies, plans need to be developed and feasible projects designed maximize Dominica's use of renewable energy. Dominica is already well on the way to achieving this goal.
- However some key challenges remain including: human resources limitations (qualification and availability); low public awareness; reduced interest on energy efficiency and renewable energy from both public and private institutions; high cost of more efficient equipment and investments for renewable energy production; and deficient availability and transparency of statistical information on energy.
- The process of financing for energy related projects should be accompanied by training on project elaboration and management. Among the key steps in this process are: determination of energy balance forecast and goals of the financing; definition of donors, funders and sponsors; a study on presence of intermediary entities; specification of financing lines of entities which offer financing; checking the existence of appeals and proper elaboration of document formalities.
- Given the complexity of the project preparation process, the creation of work groups to support the process within some of the institutions is highly recommended.

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Annexes

Annex 1

Table A.1

Energy efficiency and renewable energy projects accomplished in Dominica

Main agencies of financing

No.	Classification	Source	Project name	Objectives	Implementing/ Executing agency	Associated agencies	Funding estimated	Actual status	Observations
1	Commercial	RE EE	USD 10 Million Line of Credit to Support SMEs and Renewable Energy in Dominica	<ul style="list-style-type: none"> Renewable energy and energy efficiency projects will benefit from a dedicated USD 1.3 million component and will further benefit from an interest rate subsidy to facilitate investment in these sectors. 	Dominica Agricultural, Industrial and Development Bank ("AID Bank")	European Investment Bank ("EIB")	US\$ 10 million US\$ 1.3 million for EE and RE projects	Ongoing Start in 2010	This line of credit is the first EIB project to materialise under the Caribbean Joint Action Plan that the European Investment Bank signed with the Caribbean Development Bank, Finance for Development ("FMO").
2	Commercial	Geothermal	15 MW Geothermal Plant/ Preparation of a Geothermal-Based Cross-Border Electrical Interconnection in the Caribbean	<ul style="list-style-type: none"> The construction of production wells could start by the end of 2011 with a small 2 MW plant and a medium sized 15 MW plant by 2013 It is also anticipated that a 30 MW capacity plant could be ready by 2014 and a second 30 MW capacity plant by 2017. The project will help decrease the cost of fuel imports, adding that the drilling of test wells in the Roseau Valley area was part of government's thrust towards satisfying the long-term energy needs of citizens. 	Ministry of Public Utilities, Energy and Ports, Government Headquarters	CFG Services (Subsidiary of BRGM)	US\$ 95 million	2008-2013 ongoing	Comprehensive geological, geochemical and geophysical and related environmental and feasibility studies have revealed that the Commonwealth of Dominica, situated between the two French Departments of Guadeloupe and Martinique, has the largest geothermal potential in the Caribbean.

No.	Classification	Source	Project name	Objectives	Implementing/ Executing agency	Associated agencies	Funding estimated	Actual status	Observations
3	Commercial	Wind and Solar	Rosalie Bay Resort Wind Turbine & Solar Panels	• Wind power is expected to account for roughly 70 percent of the resort's electricity, with rooftop solar panels making up the difference.	Rosalie Bay Resort	None	unknown	Completed 2010	The Rosalie Bay Resort, a new eco-friendly resort in Dominica, will also be home to the island's first wind turbine.
4	Commercial	EE/GSEII	Energy Efficiency in DOMLEC Distribution System	looks at interventions aimed to reduce energy and power losses in the DOMLEC distribution system	DOMLEC Capital Investment Plan	GSEII	US\$5.1 million	Completed	The GSEII phase of the project was completed in 2007 with the DOMLEC Capital Investment Plan, which included three loss reduction efforts with US\$ 5.1 million. This plan will annually save 5 million KWh.
5	Study	EE and RE (Regional Project)	Caribbean Sustainable Energy Program	Facilitate the adoption of energy policies and legislation in the seven Project Countries pertaining to address the market conditions for the development and use of renewable energy and energy efficiency systems by mitigating the barriers to their use	Organization of American States (OAS) UN-ECLAC	OAS, UN-ECLAC	Unknown	ongoing	
6	Study	Climate, Energy, Land (Regional Project)	A Regional Implementation Plan for CARICOM's Regional Climate Change Resilience Framework	To help Caribbean governments come up with a regional Implementation Plan (IP) for coping with climate change.	Caribbean Community Climate Change Centre (CCCCC), Caribbean Community Heads of State (CARICOM)		unknown	Start in 2010	Background analysis, Market analysis, Pathways analysis

No.	Classification	Source	Project name	Objectives	Implementing/ Executing agency	Associated agencies	Funding estimated	Actual status	Observations
7	Study		Electricity Supply Act (2006) / World Bank - Support For A Regional Electricity Regulatory Body in the Eastern Caribbean	To revise and amend the current Act. To prepare more refined and structured regulation with scope more clearly defined thus allowing for better regulation	The Independent Regulatory Commission (IRC)	Ministry of Public Utilities, Ports and Energy/World Bank	World Bank	Ongoing	Support for the review of the Electricity Supply Act of 2006 and the preparation of draft regulations in respect of the Electricity Supply Act is being provided with support from the German Technical Assistance.
8	Study	Geothermal	Geo-Caraibes/ GSEII/ Geothermal Project- [Dominica]	GSEII works at the national level to develop strategic frameworks for sustainable energy development in the islands— including the necessary policy and regulatory environment, institutional capacity, outreach and awareness, and project support.	Energy and Climate Change Division, OAS Department of Sustainable Development	UNEP and AFD	GSEII, USAID Global Environment Fund	2002-2006	The Eastern Caribbean Geothermal Development Project (“Geo-Caraibes”) will implement a regional strategy that will create the conditions for successful deployment of commercially viable geothermal power production.
9	Study		Alternative Energy Legislation and Regulations for Dominica	• To support the drafting of alternative energy legislation and regulations to provide the legal and regulatory framework for the development of alternative energy technology, including hydropower, solar, wind, and geothermal energy, and any other form of renewable energy in Dominica.	Government of Dominica	Social Protection Technical Assistance Project (GSPTA)	World Bank funded Growth and Social Protection Technical Assistance Project (GSPTA)	Ongoing start in 2009	Part of this process involves the facilitation of a half morning meeting /workshop with local authorities and public and private sector stakeholders in the energy sector, followed by one-on-one meetings over the two days. In January 2009 the Government requested technical assistance from the Energy Unit of CARICOM under the Caribbean Renewable Energy Development Programme (CREDP)

No.	Classification	Source	Project name	Objectives	Implementing/ Executing agency	Associated agencies	Funding estimated	Actual status	Observations
10	Study		Formulation of a National Energy Policy and Sustainable Energy Plan for Dominica	To provide lower cost, more reliable and improved security of the energy needs of Dominica.	Ministry of Energy	CSEP	CSEP	Ongoing start in 2009	In January of 2009 the Government requested technical assistance from the Energy Unit of the CARICOM Secretariat under the Caribbean Renewable Energy Development Programme (CREDP)
11	Study	Wind	Dominica Island-NREL Cooperation	to develop small wind generation as part of the Low Carbon Communities of the Americas program	National Renewable Energy Laboratory	NREL	NREL		
12	Study	Climate Change	Dominica-Pilot Program for Climate Resilience (PPCR)	Adaptation, Finance, Implementation, Low emission development planning, Market analysis	World Bank, Inter-American Development Bank, International Financial Corporation	Ministry of Finance Environmental Coordinating Unit of the Ministry of Environment, Physical Planning, Natural Resources and Fisheries	World Bank, Inter-American Development Bank, International Financial Corporation	2012-2017	
13	Study	Geothermal	Geothermal Energy Project	To develop Dominica's geothermal energy potential with the possibility of exporting excess energy from a 50-100MW plant to nearby islands Guadeloupe and Martinique.	GSEII	OAS, GSEII	5 million euro geothermal resource development program started thanks to OAS efforts	2009-2013	Problems set the project back one year and the estimated completion is not until 2013, though the project is still underway.

No.	Classification	Source	Project name	Objectives	Implementing/ Executing agency	Associated agencies	Funding estimated	Actual status	Observations
14	Study (Multilateral)	Geothermal	Geothermal Development in Dominica	• The project funded a gap analysis to assist the GoCD in gauging the progress, identification of shortcomings and preparation of the Wotten Waven/Laudat geothermal field.	IRENA		Project budget (USD): 295 000 (leverage of 30-40m investment)		<ul style="list-style-type: none"> • In the Caribbean, the World Bank has begun replication of the geothermal project in Saint Lucia and Grenada. • There is a need to mobilise public sector and donor support and to create the right incentives for private sector investment. This is particularly relevant for SIDS where opportunities for market expansion are limited.
15	Study	Wind	4MW Wind Farm	• Support a prefeasibility study for a 4MW Wind Farm by supplying a grant to Dominica Sustainable Energy Corporation (DSEC)	GSEII	GSEII		Completed	Pilot phase to assess potential was performed in 2004 and the initial stages of discussion began in early 2005.
16	Study	Hydropower	• Pre-feasibility study was conducted in 2005 for the development of a DOMLEC Utility Micro Hydro plant.				German aid agency GTZ	Completed	<ul style="list-style-type: none"> • Pre-feasibility study was conducted in 2005 for the development of a DOMLEC Utility Micro Hydro plant. In 2009, German aid agency GTZ submitted a document it prepared in 2007 on technical assistance for a hydro plant at Newton, Dominica.

No.	Classification	Source	Project name	Objectives	Implementing/ Executing agency	Associated agencies	Funding estimated	Actual status	Observations
17	Study	Biogas	A Dominica sustainable energy corporation biogas plant was identified as a possible phase two project in 2003.						
18	Study	Solar Hot Water	Solar Hot Water Heating Financing Program for the Dominica Cooperatives League and Credit Unions						<ul style="list-style-type: none"> • The implementation of a Solar Hot Water Heating Financing Program for the Dominica Cooperatives League and Credit Unions was planned for 2005/2006 based on project performed in Saint Lucia, but the project was not initiated after the problems encountered on Saint Lucia.
19	Social	EE	<ul style="list-style-type: none"> • Eastern Caribbean Energy Labelling Project (CREDP-GIZ-ECS) Campaign through brochures and other media for increase awareness on energy savings of the best use of lighting bulbs. 				More than US\$ 300 million in capital was raised to support renewable energy and energy efficiency projects for hotels, hospitals, schools and utilities. For the 8 countries.		

No.	Classification	Source	Project name	Objectives	Implementing/ Executing agency	Associated agencies	Funding estimated	Actual status	Observations
20	Social	RE EE	Ten Island Renewable Challenge is part-and-parcel of a broader Carbon War Room initiative						
21	Study	Wind	• Financed by CREDP-GIZ, Domlec is preparing a 3-6 MW wind farm project. Site identification is ongoing.				CREDP-GIZ		
22	Study	Hydropower	• Also financed by CREDP-GIZ, it is being study and hydro power to be invested by DOWASCO (or another IPP. The project is in final design and it is tender-ready. Investment decision is pending.				CREDP-GIZ		
23	Social		Training Transfer of Energy Information to Teachers of Energy in CXC/CAPE Examinations and Teacher Training Colleges- Dominica	The objective of the Workshop was to seek to transfer energy information to these teachers on current worldwide and regional energy developments as well as technology. In turn, it is expected that this information will be passed on to the students they teach. Various aspects of energy are included in the CSEC/CAPE syllabuses.	Caribbean Energy Information System (CEIS)	Ministry of Public Utilities, Energy and Ports, the Ministry of Education, Human Resources Development, Youth Affairs and Sports		Completed	

Table A.1 (concluded)

No.	Classification	Source	Project name	Objectives	Implementing/ Executing agency	Associated agencies	Funding estimated	Actual status	Observations
24	Social	EE	Energy-Efficient Lighting Project	Energy costs in Dominica are exceedingly high. In order to ameliorate these costs, the energy efficiency lighting project aimed to install energy efficient CFL bulbs in place of conventional lighting.	University of Vermont and the UK-based organization Climate Care	University of Vermont and the UK-based organization Climate Care	University of Vermont and the UK-based organization Climate Care	Completed	Description and Results: In March 2006, an energy efficient lighting project was initiated with the distribution of 200 fluorescent light bulbs in a local Dominican community. This was done with the cooperation of the University of Vermont and the UK-based organization Climate Care. A total of 5,000 energy efficient bulbs were installed by 2007, with energy awareness activities carried out alongside the initial distribution of the bulbs.

Annex 2

Necessary steps for the financing process for each type of project (studies, social or commercial projects)

STUDY TYPE PROJECTS

Studies of policies, laws or quality (labeling & standard) and the evaluation of ideas are the simplest of all financial scheme and is comprised of the following steps

- Project identification (definition of the Terms of Reference or outputs).
- Achieve consensus of stakeholders
- Study and determination of intermediaries and possible sponsors or donors.
- Project presentation to funders
- Approval of project financing
- Hiring consultants or executors
- Development of the study: meeting objectives and timetables
- Review results with stakeholders
- Completion of the project.

Research and development (R&D) studies may be financed by grants from international financial institutions or banks, as well as the so called intermediaries.

R&D projects, from the starting point to pilot stage, have a more complex scheme funding process. The basic steps are:

- Project identification
- Consensus stakeholders
- Study and determination of intermediaries and potential sponsors or donors.
- Review of requirements of bidders
- Development of variants of the project as per requirements:
 - Situation analysis and barriers
 - Objectives
 - Strategy
 - Project results framework (until pilot test of the solutions)
 - Economic and finance or assessment
 - Budget and work plan
 - Project Board definition
 - Management arrangements
 - Monitoring framework and evaluation
 - Risk log analysis
 - Legal context
- Proposed project financing bidders (final or intermediate)
- Approval of project financing
- Hiring consultants or executors
- Development of the study: meeting objectives and timetables
- Review results with stakeholders
- Completion of the project.

SOCIAL TYPE PROJECTS

The main financial sources for social projects are governments and its development agencies. Furthermore, philanthropic institutions also finance such projects. Its scheme is essentially the same as that of R & D projects.

COMMERCIAL TYPE PROJECTS

Commercial projects are most complex project type to evaluate. The requirements of investors or financiers correspond to any assessment of a business. Precision is required in this kind of projects.

It is used to do the process to complete a commercial project using four different analytical levels. The whole process is iterative, where details are deeply studied from one level to other. There is a correspondence between each analytical level and the architecture and engineer works on the project, inter alias

- Level of concept and design: sketch map of the plant
- Level of study of opportunity: main solutions (architecture and engineering)
- Pre-feasibility level: basic engineering or architecture and engineer draft
- Feasibility level: detailed engineering or executive project (final design)

In addition, five viabilities are studied within each level:

- Commercial viability: a study of demand and competition,
- Technical viability: technological possibilities for investment in the chosen site,
- Economic viability: balance of income and expenses over the life of the project. A project is economically viable when its benefits exceeds its costs.
- Organizational viability: how shall be the company (investors, shares) and national regulations that project must be fulfill.
- Financial viability: financial indicators (Net present value; Benefit/Cost ratio; internal rate of return; payback period) and sensitivity analysis. A project is financially viable when it can be financed without liquidity problems