



PROJECT EXECUTIVE SUMMARY

GEF COUNCIL SUBMISSION

AGENCY'S PROJECT ID:
GEFSEC PROJECT ID: 2113
COUNTRY: Caribbean Regional Project in: Dominica, St. Kitts & Nevis, and St. Lucia
PROJECT TITLE: Eastern Caribbean Geothermal Development Project
GEF AGENCY: UNEP
OTHER EXECUTING AGENCY(IES): Co-executed by OAS and AFD
DURATION: 7 years
GEF FOCAL AREA: Climate Change
GEF OPERATIONAL PROGRAM: OP 6 Promoting the Adoption of Renewable Energy by Removing Barriers and Reduction Implementation Costs
GEF STRATEGIC PRIORITY: S3: Power sector policy frameworks supportive of renewable energy and S4: Productive uses of renewable energy
Pipeline Entry Date: 24 March 2006
ESTIMATED STARTING DATE: 2006
IA FEE: COVERED BY EXECUTING AGENCIES

FINANCING PLAN (US\$)	
GEF PROJECT/COMPONENT	
Project	7,500,000
PDF A	
PDF B	700,000
PDF C	
<i>Sub-Total GEF</i>	8,200,000
Co-FINANCING	
GEF Agency	
Governments	1,050,000
Bilateral	1,550,000
NGOs	
Others	4,070,000
<i>Sub-Total Co-financing:</i>	6,670,000
<i>Total Project Financing:</i>	14,170,000
FINANCING FOR ASSOCIATED ACTIVITIES IF ANY: - -	
LEVERAGED RESOURCES IF ANY: US\$ 350 MILLION	


*Details provided under the Financial Modality and Cost Effectiveness section (the figures in the table do not include the preparation costs financed without GEF involvement)

CONTRIBUTION TO KEY INDICATORS OF THE BUSINESS PLAN: The project will represent a reduction of GHG emissions of up to 250,000 tonnes of CO₂ per year based on the implementation of projects in the three Project countries. Over the project duration (7 years) up to 2 million tonnes of CO₂ can be reduced. The project will leverage up to US\$ 350 million in geothermal power stations, production drilling and interconnection lines. On the basis of all of the identified projects being implemented with the assistance of the Risk Reduction Financial Tool, (RRFT) direct CO₂ emission reductions can reach 5 million tonnes over a 20 year period according to GEF standards. Taking into account the possibility that the RRFT is replicated in the region after demonstrating success, direct post project CO₂ emissions could again reach an amount of 5 million tonnes.

RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT(S):

Country	Representative	Title	Agency	Date
Dominica	Eliud T. Williams	Permanent Secretary	Communications, Works and Housing	16 June 2003
St. Kitts & Nevis	Hilary Hazel	Permanent Secretary	Finance, Development and Planning	26 May 2003
St. Lucia	Martin Satney	Permanent Secretary	Physical Development, Environment and Housing	7 May 2003

Approved on behalf of the *UNEP*. This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the GEF Project Review Criteria for work program inclusion.



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Date:

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1. PROJECT SUMMARY

a) PROJECT RATIONALE, OBJECTIVES, OUTPUTS/OUTCOMES, AND ACTIVITIES.

Background and Context:

The countries of the Eastern Caribbean depend heavily on imported fossil fuels to meet their electricity generation requirements. Diesel generators are the principle electricity source for all of the region's utilities, given their low initial capital cost and relative ease of operation. Dependency on small diesel gen-sets results in many serious challenges for these Small Islands Developing States ("SIDS"), including vulnerability to volatile international oil prices, significant drain on foreign exchange, and susceptibility to environmental impacts associated with fossil fuel consumption. Further, use of diesel fuel for electricity generation results in carbon emissions and contributes to global climate change.

Alternatives to diesel gen-sets, including renewable energy technologies, natural gas, and coal, have not been successfully developed within the Eastern Caribbean countries. The small size of the power generation requirements make achievement of economies of scale a serious challenge, and the high front-end capital costs associated with many of the renewable alternatives pose a hurdle to the fragile Eastern Caribbean economies.

Most of the Eastern Caribbean countries, however, are volcanic in origin and therefore may have the potential for geothermal power generation, with the exception of Antigua and Barbuda. Geothermal power offers the only baseload renewable energy alternative in the Eastern Caribbean (given that Dominica has exhausted all significant hydro reserves). As of 2005, of the Eastern Caribbean countries, only Guadeloupe currently produces electricity from geothermal resources.

With the objective of addressing the challenges that have heretofore limited the commercial development of geothermal power production in the Eastern Caribbean, the concept for the Geo-Caraïbes Project was launched. The PDF Block B grant activities concerning the design of the Project began in March 2004. At that time, three Project countries – Dominica, St. Kitts & Nevis, and St. Lucia – confirmed their commitment to participate the regional geothermal development Project.

The Project Countries have relatively small populations by international standards. Their respective populations are: Dominica, 78,000 inhabitants; St. Lucia, 155,000 inhabitants; and St. Kitts & Nevis, 45,000 inhabitants.

The basic economic structure of the three countries is similar and was traditionally based on agriculture (bananas, sugar). Currently, there are trends towards the provision of more services (tourism, offshore banking and information services) as well as higher value added agriculture (agri-business and agro food processing). Both trends, as well as population growth and the general

increasing living standards on the islands, create conditions for increased electricity demand.

The electricity sector in the Project countries is relatively small. St. Lucia has the largest installed capacity with 56.8 megawatts (MW). The installed capacity in both Dominica and St. Kitts & Nevis is less than 40 MW. The electricity costs in the Project Countries are among the highest in the Americas, ranging from .17 to .32 US\$ per kWh. Electricity rates in the region have risen significantly in recent years. The high prices of electricity in each of the countries are a significant burden on their economic development, and cause considerable hardships for their populations.

The Eastern Caribbean islands are among the most vulnerable areas in the world to the affects of Climate Change. Given the reliance on fossil fuels for electricity production in the Eastern Caribbean, the development of renewable energy supply sources would mitigate the greenhouse gasses (“GHG”), in particular the CO2 emissions of the existing electricity production systems.

Electricity production based on geothermal energy can reduce GHG emissions in the Project countries. Studies conducted during the PDF-B phase indicate that up to 250,000 tons of CO2 per year can be offset from the use of geothermal production instead of diesel generation sets. These estimates are based on the installation of 90 MW for Dominica, 10 MW for St. Kitts & Nevis and 7.5 MW for St. Lucia.

Rationale and Objective:

Electricity demand in the Project countries is increasing with the changing structure of the economies, as well as natural population growth and increasing living standards. The need for increased investment in electrical production capacity of up to 10 MW per country for domestic consumption exists. In the case of Dominica, significant export potential also exists, bringing capacity to 90 MW.

Technical studies to date indicate that the existence of excellent geothermal resources for electricity production in the Project Countries. There is also a demonstrated government will to support alternative sources of energy in order to diversify away from reliance on diesel-generating sets. Nevertheless, the spontaneous development of geothermal resources in the Project countries has failed to occur for a variety of reasons.

The overall goal for the Geo-Caraïbes Project is to enable the commercial development of geothermal energy in the Eastern Caribbean. This will be achieved via GEF support in three activity areas which present barriers to its development, namely technical, financial and institutional.

Objective One: For each of the Project countries, the Project calls for the completion of resource assessments leading to the commercialization of the geothermal project investment. This includes further detailed geophysics and

geochemical surveys in potential drilling locations to better define local subsurface characteristics and optimum drill sites. In addition, exploration activities, including the drilling of test wells will prove and characterize the resources are planned. Finally, a comprehensive geothermal model will be prepared for each country.

Objective Two: The implementation and start-up of a Risk Reduction Financial Tool (RRFT) that will lead to lower exploration and appraisal risk for developers. The public or private developers will thus have easier access to finance for the development of their proven geothermal fields and expected power generation plants.

Objective Three: The Institutional Strengthening and Capacity Building activities will address a host of institutional and human capacity needs in each of the three project activity areas. The individual activities concern mainly the legal and regulatory framework governing investments in geothermal energy in the Project countries. In addition, the activities address tender procedures and project selection.

Successful development of geothermal resources in the Project countries will lead not only to more competitively priced electricity, but will also displace the typical diesel production, thus reducing up to 250,000 tons of CO₂ annually. This goal requires mitigating the principal barriers that have limited its development to date.

Activities and Expected Outputs

Activities related to Objective One include: (a) detailed geophysical surveys in potential drilling location to better defined local subsurface characteristics and optimum drill sites, (b) implementation of a further phase of exploration activities, (c) compilation of a geothermal resource prospectus, (d) advise governments in technical oversight of commercial development

Outputs related to Objective One include: (a) documented technical results and recommendations, (b) design and implementation of further exploration phase, (c) compilation of prospectus, (d) advice to government, (e) periodic review.

Activities related to Objective Two include: (a) preparation of RRFT implementation, (b) designation of RRFT manager and implementation of RRFT, (c) Development of Guideline Procedures for RRFT, (d) Use of RRFT to support drilling activities, (e) Monitoring of drilling projects.

Outputs related to Objective Two include: (a) preparation of RRFT implementation, (b) choice of Financial Tool manager, (c) Guideline procedures, (d) support for exploration drilling/use of financial mechanism, (e) monitoring of drilling projects

Activities related to Objective Three include (a) review existing project conditions for private sector participation in geothermal development, (b) provide models for concession and purchase contracts, (c) assist in Expression of Interest and short

list selection, (d) develop and coordinate tender process, (e) Assist in due diligence activities and data room coordination during the tender process, and (f) assist Governments in contract negotiations with private investors.

Outputs related to Objective Three include: (a) projects selected, (b) preliminary institutional assessment, (c) commercial/investment advice, (d) advice on agreements and contracts, (e) tender process support, (f) appropriate contractual frameworks for geothermal development.

b) KEY INDICATORS, ASSUMPTIONS AND RISKS (FROM LOGFRAME)

Key indicators

GEF support now will lead to a point in which geothermal energy meets a significant portion of the baseload electricity demand requirements in each of the Project countries. Given the current supplies and projected demand, preliminary studies indicate that 10 MW of geothermal power may be developed in both St. Lucia and St. Kitts & Nevis for their domestic requirements.

In the case of Dominica, the conditions exist which may allow for up to 10 MW of geothermal power for domestic consumption and up to 80 MW for electricity exports. An increased capacity geothermal facility on Dominica that provides electricity for both domestic and export use would not only improve the economic rate of return on the project but it would also act as an example for inter-island electricity interconnection.

Taken together, the GEF assisted projects in the three countries will leverage approximately US\$ 350 million in investments in power stations, production drilling and interconnection lines. Through the development and use of geothermal power in the Eastern Caribbean, electricity consumers in the region will benefit from supply of competitive, renewable energy resources that will stimulate economic activity, increase employment opportunities and assist in the reduction of poverty

GHG emission reductions can be achieved by geothermal facilities which offset the emissions from alternative, diesel generation production. Based on a projected installation of 90 MW for Dominica, 10 MW for St. Kitts & Nevis and 7.5 MW for St. Lucia, the maximum CO₂ reductions could reach approximately 250,000 tons of CO₂ per year (or almost 2 million tons over the project duration).

Assumptions and Risks

Economic

The main economic risks to the project involve the relative energy prices and the large up-front costs of the development of the resource. Currently, the high petroleum costs at over US\$ 60 per barrel lead to correspondingly high diesel costs which are passed on to electricity consumers. At this level, case studies have show that geothermal operating costs are very competitive with diesel fuel.

Indeed, sensitivity analysis shows that fuel costs would have to drop to at least US \$36 per barrel again in order for diesel fuel to be competitive with geothermal. Natural gas, as an alternative fuel source, is currently undeveloped in the Project countries, although there are reportedly feasibility studies underway concerning a future pipeline from Trinidad and Tobago. Nevertheless, the realization of such a pipeline, if feasible, is several years off and considerable infrastructure would have to be developed for its use in the Project countries. Moreover, natural gas prices tend to track oil prices, which as stated above, remain relatively high.

The main barrier to the development of geothermal resources, however, is the high risk and costly up-front investments in drilling. Development costs for geothermal power plants are significant and entail a higher level of risk than those encountered for conventional diesel power plants prevalent throughout the region. Drilling costs often exceed \$2 million per hole and there is no guarantee that the resource will prove attractive for exploitation. In the case of many SIDS, drilling costs are even higher, since drilling rigs and other heavy equipment needs to be transported from other countries. The high cost of geophysical surveys and exploratory drilling, or drilling risk, prevents many developers from completing the Project preparation cycle, and from attracting the necessary finance. The RRFT defined in the project activities is designed to address the financial impacts of the drilling risk.

The macro-economic situation in the Project countries is relatively stable. The economies are ranked as upper-middle income by the World Bank, and GDP per capita ranges from US\$ 3662 to 7745. The different economies are in transition from agriculture to more high-end agro food processing and services (including banking and tourism).

Technical

The character of the geothermal resources (resource volume; resource temperature; resource chemistry; redundant; and depletion over time) is a significant technical risk that must be addressed. Several previous geochemical and geophysical analyses in the Eastern Caribbean indicated characteristics that impacted the viability of the resource given earlier technologies.

The Project is accounting for resource quantity and quality risks by providing the governments, utilities, and private developers with as much geophysics, geochemistry, and geology on the geothermal field as possible prior to exploratory drilling. In addition, recent technological advances permitting the use of a broader range of fluids, including very acidic ones, addresses some of the past concerns regarding resource quality.

Political and Institutional

The relative importance and the status of the development of geothermal resources in each of the countries are different. Country representatives, however, grasp the need for energy diversification and have voiced their support of the project throughout the PDF-B phase and in recent workshops. Commitment letters have been obtained from all three Project country governments.

Aside from political issues, the Project countries currently lack consistent geothermal resource development legislation and regulations. Some key issues include: political will of governments to grant licenses, pass legislation, etc, passage of needed legislation/regulatory framework; collaboration with beneficiary countries in the case of interconnection, and the capacity of institutions to deal with geothermal issues.

Social

Social issues include land owners in possession of land with geothermal resources may prefer alternative uses of the land. In addition, there may be a superstitious perception among the population that geothermal development activities may trigger seismic activity. From an environmental point of view, project development must take into consideration public concerns about the natural park area (in Dominica) as well as rights of way and the construction of overhead transmission lines. These issues have already been addressed during discussions with the Project countries and the GEF project will include public information and education components as well as capacity building designed to train local officials and experts on the technical, legal and environmental aspects of geothermal development.

2. COUNTRY OWNERSHIP

a) COUNTRY ELIGIBILITY

Dominica ratified UNFCCC on June 21, 1993
St. Lucia ratified UNFCCC on June 14, 1993
St. Kitts & Nevis UNFCCC on January 7, 1993

b) COUNTRY DRIVENNESS

The present UNEP project proposal has already received formal endorsement from the Project countries. The PDF Block B grant activities concerning the design of the Project began in March 2004. At that time, three Project Countries – Dominica, St. Kitts & Nevis, and St. Lucia – confirmed their commitment to participate the regional geothermal development Project. The United Nations Environment Programme (“UNEP”) through its Division of Technology, Industry and Economics (“DTIE”) assumed the role of Implementing Organization, and the Organization of American States (“OAS”) assumed the principal role of Executing Organization. Further, the Agence Française de Développement (“AFD”), which was actively involved in the development of geothermal energy in the Caribbean, was associated to the Project as Co-Executing Agency. The PDF-B Project fieldwork began in January 2004, and continued over seventeen months through May 2005.

All delegations have reviewed the current version of the proposal presented during the Project workshop in Roseau, Dominica from 15-17th March, 2006 prior to its submission to the GEF and have introduced their respective changes and amendments.

3. PROGRAM AND POLICY CONFORMITY

a) FIT TO GEF OPERATIONAL PROGRAM AND STRATEGIC PRIORITIES

The Project is consistent with GEF Operation Programme 6 – “Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs” (“OP #6”). In accordance with OP #6, the Project identifies and addresses barriers to the adoption of renewable energy (geothermal), including exploration risks, the lack of a policy and regulatory framework conducive to geothermal investments, financial constraints, and a limited regional capacity to implement geothermal energy projects.

The Project falls under GEF Strategic Priorities S3 (“Power sector policy frameworks supportive of renewable energy and energy efficiency”) and S4 (“Productive uses of renewable energy”). The Project contributes toward these priorities (i) by supporting local capacity building and technical assistance; (ii) by promoting sector reforms that support geothermal electric generation; and (iii) by providing financial and other incentives for geothermal developments, with a particular focus on the private-sector project financing.

b) SUSTAINABILITY (INCLUDING FINANCIAL SUSTAINABILITY)

The sustainability of the Project will be determined not only by the commitment of the Executing Agencies and Implementing Agencies, but also by the governments of the Project Countries involved. The overall risk can be reduced if the citizens of the Project Countries participate in the Projects implementation as a result of the public education and awareness which has been proposed. Educating and involving the stakeholders on the key objectives of the Project can further minimize the risks involved in the Project.

Policy reform in each of the Project Countries will help to achieve the regional Project objectives and sustainability. The risk of changes or upheavals in the government(s) could also affect the commitment to the Project. This risk can be reduced through policy affecting the various Project components, which would increase the awareness of the sustainable development needs of the Geo-Caraïbes Project and the many benefits of the Project.

The sustainability and stability of the Executing Agencies is very important to the sustainability of the Project. Regional/Institutional sustainability is helped by the continued presence of the Executing Agencies (OAS and AfD) in the region, and the inclusion of the principles of the Geo-Caraïbes Project into these institutions.

Economic/financial risk can be detrimental to the sustainability of the Project. The Project Countries are especially vulnerable as they are small economies that can be easily affected by any negative change in the global economy. This change could not only affect the governments’ involvement in sustaining the Project, but also their ability to take on more financial burden once the GEF’s financial responsibility is ended.

In terms of specific project components, the RRFT is designed to initially support US\$ 4.5 million worth of production drilling level investments. The emphasis placed on exploratory drilling to adequately characterize the geothermal resources in the first project activity will mitigate the technical risks of drilling at the commercial stage. Moreover, project investments are likely to be staggered, given the different speeds of development in the different Project countries, which will reduce the RRFT financial exposure at any one time.

c) REPLICABILITY

Replicability is a key feature of the Project design. Many Eastern Caribbean islands are volcanic and present important geothermal development potential. The successful development of geothermal energy in the Project countries could realistically serve as an example for potential investors in other countries of the region and prove the technical and economic feasibility of geothermal power generation in the Eastern Caribbean. The implementation of the proposed Risk Reduction Financial Tool, as well as the creation of the proper institutional and legal framework, should also provide practical feedback for the other islands, as the lessons learned from this experience (both positive and negative) could then be applied to neighboring countries. Ultimately, the scope of geothermal development could therefore be extended beyond the three countries of the Project.

In the same way, the promising prospect of an electrical interconnection between Dominica and both Guadeloupe and Martinique, if confirmed feasible, can also be replicated for possible exports of geothermal-based electricity from St. Kitts & Nevis and St. Lucia to other islands. Future studies to be undertaken in order to prepare interconnection links

d) STAKEHOLDER INVOLVEMENT

The Project shall lay the foundation for sustainability by pursuing a three-fold objective: (i) engaging a broad spectrum of the Project Country stakeholders at each pivotal decision point to maximize their buy-in to the geothermal-development goal articulated by the regional policy; (ii) establishing public awareness of the benefits of sustainable geothermal energy and thereby overcoming misinformation, and (iii) establishing a trained cadre of Project Country professionals

Precedent demonstrates that the success of Projects and policy reforms depends on the degree to which Projects and policies encompass stakeholder interests. The Full Project objectives – and the legislative, regulatory and institution framework that implement them – must take into account the potential and perceived affect on stakeholder interests. Failure to assure shared goals among all the stakeholders may well result in opposition to and delay of the Project. Sustainability in a geothermal power Project is best ensured if the major stakeholders – the utilities, the private-sector opinion makers and prospective developers – share common goals with the government decision-makers.

Stakeholder participation and consultation is a fundamental principle of the Geo-Caraiibes Project, impacting every aspect from technical studies to selection of geothermal resource developers. Integrating key stakeholders in the decision-making process provides them with genuine opportunities to influence the execution of the Project from inception to

completion, ensuring stakeholder “ownership” of the Project and its related activities. Of equal importance, such stakeholder participation builds the knowledge base that is the foundation of sustainability.

e) MONITORING AND EVALUATION

For purposes of achievement, learning, measurement and accountability, the Geo-Caraïbes Project will follow the internal UNEP-GEF Monitoring and Evaluation approach and procedures.

The Geo-Caraïbes project approach monitoring and evaluation as the systematic and deliberate set-up of an integrated structure, processes and tools to support project management in its aim of continuously improve decision-making. The project will use the following 6 management processes: project planning, risk management, monitoring and control, review, internal evaluation, and independent evaluation.

Monitoring and evaluation will be financed by in-kind contributions from the Executing Agencies.

4. FINANCIAL MODALITY AND COST EFFECTIVENESS

Co financing (both in-kind and cash) has been confirmed from several multi and bi lateral sources, as well as from the host governments. A brief explanation of the co-financing sources is below, while the following table states the pledged amounts.

Organization of American States. OAS managed the PDF-B phase of the GEF project. In the Full Project Phase, OAS will provide in kind contributions for project management, staff and support for Coordination Task Force.

Agence Française de Développement. AfD participated in the PDF-B phase of the GEF project. In the Full Project Phase, AfD will provide both in-kind and cash contributions for project management, staff and support for the Coordination Task Force.

Fonds Français pour l'Environnement Mondial. FFEM will provide funds for the resource characterization and RRFT mechanism.

Participating Governments. Participated via in-kind contributions during the PDF-B phase. During the full Project phase, participating governments will continue to provide in-kind contributions of support staff, office logistics, transport, and office space.

Interreg is financed under the European Regional Development Fund (ERDF) of the European Union and is designed to stimulate interregional cooperation. The INTERREG III B Programme "Caribbean Space" concerns cooperation between 44 countries (not including French overseas Regions). One of the INTERREG III-B Programme's priorities is to promote the use of renewable energy within the cooperation area, including support for pilot projects.

The Interreg financing is composed of contributions from several institutions and governments. In this instance, the financing is broken down in the following: FEDER 47%, ADEME, 26%, BGRM, 20%, Dominica, 6%, Guadeloupe, 3% and Martinique, 2%. The current financing package has been presented to the committee and is under review with a initial decision expected in April, 2006.

Co-financing Sources				
Name of Co-financier (source)	Classification	Type	Amount (US\$)	Status*
Organization of American States	Multilateral Development Agency	In-kind support	350,000	Confirmed
Agence Francaise de Développement	Bi-lateral development agency	In-kind and Cash	1,550,000	Confirmed
FFEM (France)	Bilateral environmental facility	Grant	2,400,000	Confirmed
Interreg	European Union development mechanism	Grant	1,320,000	Confirmed
Participating Countries	Beneficiary Governments	In-kind support	1,050,000	Accepted
Sub-Total Co-financing			6,670,000	

* Reflects the status of discussion with co-financiers.

The Project will benefit from the inputs of a range of institutions and experts that are already active in the region. Hence project impacts in terms of capacity building, CO₂ emissions reduction, and more generally market transformations are achieved with relatively limited contribution from GEF. In terms of cost effectiveness, the present project not only raises approximate matching funds to the GEF contribution, but its successful implementation will also leverage another US\$ 350 million in investments in the Project countries.

The project financing is given in table below.

Project Financing by Co-financing Partner and Component

Main Project Components		\$		
		GEF	OTHER	TOTAL
1 Resource Characterization		4 500 000	3 770 000	8 270 000
a	Improving Technical Knowledge and Capacity	700 000	1 270 000	1 970 000
b	Thermal Gradient Holes	800 000	700 000	1 500 000
c	Slim Holes	3 000 000	1 800 000	4 800 000
2 Risk Reduction Financial Tool		2 600 000	2 600 000	5 200 000
a	Risk Reduction Financial Tool Design	400 000	300 000	700 000
b	Risk Reduction Financial Tool Implementation	2 200 000	2 300 000	4 500 000
3 Institutional Strengthening and Capacity Building		400 000	300 000	700 000
TOTAL PROJECT BUDGET		7 500 000	6 670 000	14 170 000

The financing required for the project comprises activities under each immediate objective to be implemented in the three Project countries together with co-financing partner institutions with compatible mandates to those of the GEF. The resources requested from the GEF would be allocated as follows:

Objective 1: Completion of resource characterizations		\$
	Total resource requirements	8,270,000
	GEF contribution requirements	4,500,000
Objective 2: Implementation of RRFT		
	Total resource requirements	5,200,000
	GEF contribution requirements	2,600,000
Objective 3: Institutional Strengthening and Capacity Building		
	Total resource requirements	700,000
	GEF contribution requirements	400,000

Project Execution and Support Costs

The project will be executed jointly by OAS and AFD. Both institutions will support the project execution costs via in-kind contributions of staff time and other inputs. The project will be managed jointly via the respective headquarter offices in Washington, DC and Paris, France as well as arrangements with local governments for their in-kind support.

5. INSTITUTIONAL COORDINATION AND SUPPORT

a) CORE COMMITMENTS AND LINKAGES

The project is designed to promote the commercial development of geothermal resources in several Eastern Caribbean countries, which will lead to productive use of available renewable energy resources. Moreover, the introduction of this new, alternative energy source will lead to impacts on electricity prices and offset the GHG gases that would have occurred through reliance on diesel generation technologies.

The UNEP is fully committed to implement this project as part of its role in assisting other United Nations Agencies and regional commissions. In addition, the UNEP/DTIE in Paris is uniquely placed to assume the role of the Implementing Agencies for a project in which one of the central activities is the establishment of a risk-reduction financial tool. UNEP has developed, over the last 10 years, a stable and constructive relationship with the financial community, represented, in particular, the launching of the UNEP Finance Initiative and the establishment of the SEFI (Sustainable Energy Financing Initiative).

As mentioned in the Project Brief, there are few initiatives in the region involving renewable energies and, geothermal energy in particular. The Geo-Cariabes project design has been carefully thought out so that its objectives and activities do not conflict with any other ongoing initiatives in the region. Indeed, an effort has been made to allow for cooperation during the Project execution. For example, the Geo-Cariabes project will collaborate with the GEF-Funded Caribbean Renewable Energy Development Project (CREDP) which is executed by the CARICOM Secretariat and the German aid agency, GTZ. CREDP addresses a broad range of barriers facing renewable energy development in the region. It delivers multiple services including information dissemination, capacity building, policy reform, and financing assistance for a range of renewable energy systems. However, the CREDP will not address the specific needs of geothermal development, including the more significant upfront investments required for resource exploration and the unique policy and regulatory measures that are necessary. The geothermal energy projects, and related geothermal technical and market assistance, were assigned to the responsibility of the Geo-Cariabes Project.

b) CONSULTATION, COORDINATION AND COLLABORATION BETWEEN IAS, AND IAS AND EXAS, IF APPROPRIATE.

UNEP/DTIE has already organized the consultation and the coordination with the other Executing Agencies. OAS and AFD have collaborated during the PDF-B phase.

c) PROJECT IMPLEMENTATION ARRANGEMENT

The Project will be implemented by the United Nations Environmental Programme (“UNEP”). The UNEP focuses on promotion of clean energy in developing countries. It assists decision-makers in government and the private sector to make better, more informed energy choices, which fully integrate environmental and social costs. The UNEP runs a number of activities in the renewable energy field. These activities, generally focused on the needs of developing and transition economies, involve various facets of the technology research, development, transfer and commercialization process. In particular, it is working in Eastern Africa on a related regional geothermal development Project. The UNEP works with a broad spectrum of partners in these efforts, including industry associations, NGOs, financial institutions and the private sector.

Within the GEF, UNEP is accorded a role in implementing regional Projects, and SIDS is a priority for UNEP. In addition to implementation requirements, UNEP will execute activities consistent with comparative advantage in chairing the Project Steering Committee, capturing synergies with other GEF Projects, and global dissemination.

Project Execution.

As requesting/implementing agency, UNEP will have overall responsibility for the implementation of the Full Project. UNEP will appoint the OAS Office for Sustainable Development and Environment (OAS/OSDE) and AFD Agence Française de Développement as co - executing agencies.

The OAS is a multi-lateral organization representing the interests of 34 countries of the Americas. The GS/OAS has national offices located in 14 Caribbean countries (including Dominica, St. Lucia, and St. Kitts & Nevis) and permanent missions to the OAS from all member countries. Its Office for Sustainable Development and the Environment (OSDE) serves as the coordinating institution for the Renewable Energy in the Americas (REIA) initiative. The OSDE has successfully executed several GEF-supported Projects by The World Bank and/or the United Nations Environment Programme (UNEP) including: The Caribbean: Planning for Adaptation to Climate Change (CPACC); Strategic Action Programme for the Bi-National Basin of the Bermejo River; and Formulation of a Strategic Action Program for the Integrated Management of Water Resources; the Sustainable Development of the San Juan River Basin and its Coastal Zone; and the PDF-B Stage of Geo-Caraïbes.

REIA offers technical, policy and financial assistance for the promotion of sound energy solutions throughout the region, and currently serves as a leading institution in the regional Projects, Global Sustainable Energy Islands Initiative (GSEII) and on the Steering Committee for the execution of the UNDP/GEF Project, Caribbean Renewable Energy Development Project (CREDP).

The Agence Française de Développement (AFD) is a public institution serving the general interest by providing development financing. It is active in over 60 countries in

Africa, the Pacific region, Asia, the Caribbean, the Indian Ocean, the Mediterranean and Central and Eastern Europe, as well as in French overseas areas. It has a network of 45 agencies and offices throughout the world. A specialised financial institution, AFD finances economic and social projects carried by government local authorities, public companies, and the private and associative sectors on five continents. These projects focus on urban development and infrastructures, rural development, industry, financial systems, and education and health. AFD offers a range of financial instruments—subsidies, guarantees, shareholdings, and all forms of assisted and commercial loans—in response to each situation.

ANNEX A

INCREMENTAL COSTS

Broad Development Goal

To overcome the barriers to the development of geothermal power and implement a regional strategy that will create the conditions for successful deployment of one or more commercially viable geothermal power plants in the region.

The commercial use of geothermal resources in the Project countries will lead not only to more competitively priced electricity, but will also displace the typical diesel production, thus reducing up to 250,000 tons of CO₂ annually. This goal requires mitigating the principal barriers that have limited its development to date.

Baseline

Geothermal exploration is continued (or not) in the different Project countries depending upon national priorities and policies. Interreg financing is currently under review for additional geothermal studies for approximately \$US 1.32 million. In lieu of any further geothermal studies, the most likely general future energy production development in the three countries would include:

- continued reliance on diesel generation for the national network,
- the legal and regulatory framework will remain largely unchanged in the Project countries, which promotes a lack of legal security that discourages potential private investors.
- continued reliance on small, diesel power production sets in off-grid areas which despite relatively low capital investment costs, demonstrate high operating costs, especially with imported fuel prices currently hovering over \$60 per barrel of oil;
- continued emission of greenhouse gases;
- the slower adoption and development of these clean and renewable energy technologies in the region.

Global Environmental Objective

To reduce diesel-based electricity production in the Project countries via the introduction of commercially-based geothermal electricity production.

GEF Project Alternative

GEF financing allows for the confirmation and characterization of geothermal resources, the establishment of a financial mechanism to offset the commercial risk perceived by investors, and to provide critical institutional strengthening and capacity building to overcome current legal and regulatory barriers. Leveraged private investments are made in the three Project countries for geothermal production of more than 100 MW, which reduces approximately 250,000 tons of CO₂ emissions per year.

System Boundary

The geographical boundary of the project is the countries of the Eastern Caribbean region. Initially, Dominica, St. Kitts & Nevis, and St. Lucia will be primary focus for project activities. The Project design, however, does allow for the inclusion of other countries with the agreement of the Steering Committee. The project has a strong information dissemination strategy designed to promote the positive experiences achieved and lessons learned to neighboring countries in the region.

Global Environmental Benefits

Geothermal commercial production begins in the three Project countries which leads to reductions of CO₂ emissions of up to 250,000 tons per year. Emissions of SO_x, NO_x, and particulates are also reduced.

Additional Benefits

This project will have a wide range of benefits to committed stakeholders in participating countries. In addition to the potential health benefits derived from reduced GHG emissions, the lower electricity production costs should lead to price impacts for end-users. This effect will have impacts on household budgets and lead to improved operating conditions for energy intensive industries in the respective countries (agro-food processing, banking, and tourism).

On an institutional level, the reform and passage of appropriate legal measures to promote successful commercial geothermal development will lead spin-offs to other sectors. Capacity building will lead to local trained experts in geothermal energy (and commercial procedures, tenders, etc) that can be used for future projects.

ANNEX A: INCREMENTAL COST MATRIX

Project Component/ Activity	Benefits/ Costs	Baseline Scenario	Alternative (GEF -) scenario	Increment
Objective 1: Resource Characterization				
	Global Environmental Benefits	Viabie, geothermal resources exist, but are not currently exploited. Several studies have been undertaken, but no follow up. Electricity generation remains mainly based on diesel generation sets.	Resource characterization is completed. Exploratory drilling commences on the three islands (staggered).	Exploratory drilling permits geothermal development activities to advance significantly.
	Domestic Benefits	Several independent studies indicate that geothermal resources are available. but there is insufficient data for exploitation.	Resource characterization is completed. Exploratory drilling commences on the three islands (staggered). Local experts and authorities are involved and trained.	Development of data regarding geothermal resources that allows for the characterisation of the resources, attraction of developers, and proper environmental monitoring.
	Costs	1,320,000	8,270,000	6,950,000

Project Component/ Activity	Benefits/ Costs	Baseline Scenario	Alternative (GEF -) scenario	Increment
Objective 2: Implementation of Risk Reduction Financial Tool				
	Global Environmental Benefits	No risk mitigation fund exists for the exploration of geothermal sites. Private investors reluctant to invest up front sums.	Identified geothermal projects are evaluated and structured to share risks between public and private participants.	Risk Mitigation Fund established, private investors feel more confident in sharing risks of geothermal exploratory work.
	Domestic Benefits	Geothermal resources remain largely untapped. Potential projects are unprepared.	Specific, geothermal, renewable energy resources are evaluated and prepared to be exploited.	Given successful exploration results, geothermal resources are exploited, generating less CO ₂ than fossil fuel sources.
	Costs	0	5,200,000	5,200,000
Objective 3: Institutional Strengthening and Capacity Building				
	Global Environmental Benefits	Physical, human, policy and data resources are developed independently in the different countries.	Databases, forums, training and evaluation of policies, legal and regulatory frameworks concerning geothermal energy are coordinated.	Legal and regulatory framework is evaluated and modified to encourage private investment in geothermal development in the three project countries.
	Domestic Benefits	Insufficient regional integration + knowledge base concerning development and exploitation of geothermal energy resources	Local experts are involved and trained. New information, know-how and expertise is gained from regional and international interaction	Legal, regulatory and policy frameworks are coordinated and improved to facilitate commercial geothermal development.
	Costs	0	700,000	700,000

ANNEX B: PROJECT LOGICAL FRAMEWORK MATRIX

Objectives and Outcomes	Objectively Verifiable Indicators	Means of Verification	Important assumptions
<p>Global Objective: To reduce diesel-based electricity production in the Project countries via the introduction of commercially based geothermal electricity production.</p>	<p>GHG emissions reduced through geothermal energy production</p>	<p>Environmental monitoring and evaluation reports on avoided GHG emissions; scientific measurements,</p>	<p>Countries willing to implement environmental management and monitoring systems. Utilities are cooperative and provide data.</p>
<p>Development Objective: To overcome the barriers to the development of geothermal power and implement a regional strategy that will create the conditions for successful deployment of one or more commercially viable geothermal power plants in the region.</p>	<p>Reduced dependency on fossil fuels for electricity production, reduced cost of electricity, entry of IPPs based on geothermal production.</p>	<p>Reduced fuel costs by local utilities, verification of production costs via financial statements, number of permits/licenses issued for IPPs (geothermal)</p>	<p>Political and economic stability in the region. Private sector needs for investment security are met by Governments. Governments are willing to implement policies and measures needed for geothermal development.</p>
<p>Project Objective: To facilitate investments in geothermal power production in the Project countries by addressing financial, institutional, information, and resource confirmation-related barriers currently facing geothermal resource development in the region.</p>	<p>Resources are adequately confirmed by surface studies and drilling.</p> <p>Adoption of relevant legislation by respective states concerning geothermal exploitation.</p> <p>Implementation of regulation to facilitate commercial production and sale of renewable energies (geothermal)</p> <p>Introduction of Risk Reduction Financial Tool to attract geothermal developers.</p>	<p>Confirmation study and drilling reports.</p> <p>Megawatts of geothermal energy installed by the completion of the Projects.</p> <p>Existence of appropriate legislation and regulatory framework concerning renewable energy production in general and</p>	<p>Political and economic stability in the region. Government support and willingness to implement necessary measures.</p> <p>Alternative energies (including gasline development) remain unfeasible on technical and/or economic grounds prior to official signing</p>

	<p>Implementation of adequate environmental monitoring instrument(s) to track direct and indirect pollution reduction activities of the project.</p> <p>Existence of international geothermal developers interested in GEF project opportunities.</p> <p>Existence of interested electricity buyers.</p> <p>Existence of local trained and knowledgeable staff on technical issues concerning geothermal energy and development and electrical networks.</p>	<p>geothermal production in particular.</p> <p>Existence of operating</p> <p>Existence of environmental monitoring systems and trained staff to implement them.</p> <p>Number of geothermal developers responding to international expression of interest for geothermal development.</p> <p>MOU(s) between potential buyers and sellers.</p> <p>Number and responsibilities of local, trained staff in geothermal development.</p> <p>Number of geothermal energy investments in the region.</p> <p>Monitoring and evaluation reports on geothermal energy investments made; official publications</p>	<p>of adequate PPA's for geothermal production.</p>
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Immediate objectives/outcomes			
Objectives and Outcomes	Objectively Verifiable Indicators	Means of Verification	Important assumptions
1. Priority prospects are confirmed through surface exploration and selected exploration drilling takes place.	Corresponding scientific reports.	Resource characterization reports.	The results of the surface exploration recommend drilling.
2. The financial risk is mitigated through the existence of an appropriate financial tool which attracts potential private developers.	Number of official expressions of interest received by Project countries with properly defined geothermal projects. Confirmation that financial tool is suitable for potential developers.	Official expressions of interest. Effective use of financial tool.	The financial tool is defined and implemented. For private sector entry at this stage: government guarantees, incentives, and policies/regulations provide sufficient security to investors.
3. Necessary institutional, legal and regulatory framework introduced and adequate capacity building takes place.	Approved legislative and regulatory documents, necessary structures and staff is trained.	Legal and regulatory documents, number of staff trained,	Project countries remain committed to private sector participation in geothermal development National legislatures are favourable to passing suggested laws and regulations.

Outputs			
Objectives and Outcomes	Objectively Verifiable Indicators	Means of Verification	Important assumptions
Output 1.1: Documented technical results and recommendations.	Technical reports summarizing geo-scientific activities and recommendations.	Technical studies	Studies continue to be implemented. Reliable data is produced from studies.
Output 1.2: Design and implementation of further exploration phase	Documents, plans, budgets, indicating further exploration phases	Documents, plans, budgets	Studies indicate that further exploration is warranted.
Output 1.3: Compilation of prospectus	Prospectus containing technical data on geothermal development of interest to private developers.	Prospectus	Necessary required by private developers can be produced within given projects/budgets.
Output 1.4 : Advice to Government	Memos, meetings with officials	Memos, minutes of meetings.	Geothermal prospects are developed sufficiently to be commercialized. Government support for tendering.
Output 1.5: Periodic Review	Periodic Reports concerning activities	Report	Existence of monitoring program.
Output 2.1: Preparation of Risk Reduction Financial Tool Implementation	Description of RRFT mechanism.	Minutes of Steering Committee.	Steering committee agrees on appropriate tool and its implementation.
Output 2.2: Choice of Financial Tool Manager	Tender documents for Financial Tool Manager. Tender evaluation report selecting Financial Tool Manager.	Tender documents, Tender evaluation report.	Tender is arranged, publicized and carried out. Multiple bidders that meet evaluation criteria. reply Evaluation committee makes an unbiased choice.
Output 2.3: Guideline Procedures	Guidelines are produced	Guideline documents	Specific guidelines are required to operate the Financial Tool.
Output 2.4: Support for Exploration Drilling / Use of Financial Mechanism	Contracts are prepared between commercial developers including the Financial Tool. Debt write off in the case of exploratory drilling failure.	Contracts. Financial report of RRFT activities. Claim from developer	The Financial Tool is managed by an entity that has the authority to make contracts.

		Affidavit from Geothermal Panel indicating exploratory drilling failure. Decision from Steering Committee.	Procedures are followed and proper documents provided by the developer, Geothermal Panel and Steering Committee.
Output 2.5: Monitoring of Drilling Projects	Monitoring activities	Periodic monitoring reports	Monitoring and Evaluation system is established and operates on a regular basis. Information is freely available.
Output 3.1: Project Selection	Geothermal projects are selected.	Number of projects, Ranking.	Project selection criteria established. Data related to criteria is available.
Output 3.2 :Preliminary Institutional Review	Report reviewing institutional aspects	Report, laws, regulations, acts governing geothermal/energy development in Project countries	Legal, institutional and regulatory information exists and is available. Cooperation of Project country Governments.
Output 3.3: Commercial/investment advice	Advice provided to government officials concerning general commercial/investment climate.	Presentation to Government officials (slides, tables, etc) Minutes of meetings with Government officials	Documents, law, regulations, acts, etc which govern investment in the Project countries exists and is available.
Output 3.4: Contractual advice	Advice to governments on structuring the contracts.	Presentations to Government officials. Contracts	Government officials are reactive and have the ability to sign contracts.
Output 3.5: Tender process support	Tender process organized, publicized, according to international standards	Tender documents, Bidder's responses.	Tender is carried out on time according to international standards. Bidders respond to the tender.
Output 3.6: Sound contractual framework for private developers	Contracts developed for geothermal development in the Project countries.	Contracts	Government officials are reactive and have the ability to carryout tenders.

ANNEX C: STAP ROSTER TECHNICAL REVIEW