REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: FULL-SIZE PROJECT*
TYPE OF TRUST FUND: GEF TRUST FUND

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PART I: PROJECT INFORMATION

Project Title: Stimulating industrial competitiveness through biomass-based, grid-connected electricity generation			
Country(ies):	Dominican Republic	GEF Project ID:[1]	4747
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	100288
Other Executing Partner(s):	National Energy Commission (CNE), National Council for Free Trade Zones (CNZFE), Santiago Free Trade Zone Corporation (CZFIS)	Submission Date: Resubmission Date:	July 16 2013 Sept 10 2013 Oct 02 2013 Oct 29 2013
GEF Focal Area (s):	CCM-3	Project Duration(Months)	48 months
Name of Parent Program (if applicable): ➢ For SFM/REDD+ ☐ ➢ For SGP ☐ ➢ For PPP ☐	N/A	Project Agency Fee ($):	130,000

A. FOCAL AREA STRATEGY FRAMEWORK[2]

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount ($)	Cofinancing ($)
CCM-3	Outcome 3.1: Favourable policy framework created for renewable energy (RE) investments in industrial and commercial applications	Output 3.1.: RE policy and regulation in place Output 3.2.: Electricity and/or heat produced from renewable sources	GEF TF	864,583	1,054,785
CCM-3	Outcome 3.2: Investment in RE technologies increased		GEF TF	435,417	6,565,215
		Total project costs		1,300,000	7,620,000

B. PROJECT FRAMEWORK

Project Objective: To promote the implementation of decentralized, biomass-based energy production in industrial free zones in the Dominican Republic with the aim of reducing GHG emissions, while contributing to their competitiveness.

Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount ($)	Confirmed Cofinancing ($)
1. Policy support for decentralized, biomass-based electricity generation	TA	1. The policy and regulatory environment conducive to decentralized, biomass-based	1.1 Regulation for decentralized biomass-based power generation (environmental impact, nuisance, and water use) has been	GEFTF	287,000	437,000

* Please note that the project follows the FSP format as it was approved under the previous guidelines for GEF-5 projects.
[1] Project ID number will be assigned by GEFSEC.
[2] Refer to the Focal Area Results Framework and LDCF/SCCF Framework when completing Table A.

		power and heat generation has been strengthened.	reviewed, adjusted and streamlined. 1.2 Proposals for financial incentives to stimulate decentralized, renewable energy technologies have been prepared and submitted to the Government for approval. 1.3 Existing information sources on the biomass potential in the national territory have been validated and integrated. 1.4 Sustainable biomass sourcing strategies have been developed in coordination with rural development programmes in the Santiago region.			
2. Demonstration of proven biomass technology for electricity generation	TA	2. A biomass-based electric power plant (envisaged capacity 3 MW[3]) has been adopted by the Santiago Industrial Free Zone.	2.1 A detailed feasibility study for the development of an envisaged 3 MW decentralized, biomass-based electricity plant at the Santiago Free Zone has been carried out. 2.2 Supportive studies and technical designs have been prepared, and permits and concessions obtained. 2.3 Staff from Santiago and other industrial free zones have received training on technical and managerial aspects of small-scale biomass plants.	GEFTF	410,000	410,000
	INV		2.4 The envisaged 3 MW biomass-based electric power plant has been procured and made operational.	GEFTF	325,000	6,275,000
3. Supportive	TA	3. Awareness for the	3.1 A communication plan	GEFTF	113,000	120,000

[3] Please note that final capacity may lie slightly below 3 MW.

activities for training, promotion and dissemination		concept and benefits of biomass power generation has been raised among relevant stakeholders.	has been prepared to interact with civil society organizations and the general public on the topic of sustainable biomass sourcing. 3.2 Operational experience and best practices from the Santiago demonstration plant have been compiled. 3.3 Promotional activities including technical seminars, dissemination events, and drafting of technical manuals and guidelines, have been carried out.			
4. Monitoring and evaluation.	TA	4. A monitoring plan has been prepared and implemented in coordination with UNIDO.	4.1 A monitoring plan (that also covers monitoring of competing uses of biomass) has been designed and agreed upon during the Project's inception phase. 4.2 Project progress on defined indicators and compliance with UNIDO guidelines (including gender) is being monitored. 4.3 A mid-term review and terminal evaluation have been conducted.	GEFTF	50,000	80,000
			Subtotal		1,185,000	7,322,000
			Project management Cost (PMC)[4]	GEFTF	115,000[5]	298,000
			Total project costs		1,300,000	7,620,000

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

Please include letters confirming cofinancing for the project with this form

Sources of Co-financing	Name of Co-financier (source)	Type of Cofinancing	Cofinancing Amount ($)
National Government	CNE	In-kind	475,000

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

[5] Please note that the PMC has been increased from over 4% to over 9% of the subtotal GEF contribution to assure that the project can be managed effectively throughout its duration. This percentage reflects the revised procedures for projects with a GEF grant size of less than USD 2,000,000. The 2012 UNDP salary scale for the Dominican Republic foresees that a consultant with the function of project coordinator can expect to receive between USD 35,000 and USD 40,000 p.a. Hence, a total PMC of USD 52,000 would be insufficient to cover the necessary costs.

National Government	CNZFE	In-kind	400,000
Others	CZFIS	Cash	2,100,000
Others	CZFIS	Hard Loan	4,375,000
Others	CZFIS	In-kind	210,000
GEF Agency	UNIDO	Cash	60,000
Total Co-financing			7,620,000

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY1

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in $)		
				Grant Amount (a)	Agency Fee (b)[2]	Total c=a+b
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total Grant Resources				0	0	0

[1] In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

[2] Indicate fees related to this project.

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount ($)	Cofinancing ($)	Project Total ($)
International Consultants	81,250	18,750	100,000
National/Local Consultants	50,750	12,250	63,000

Please note that work during PPG stage demonstrated that expertise on biomass energy technology in the Dominican Republic is not commonly available. Hence certain tasks will need to be delegated to international consultants, rather than to national consultants.

G. **DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT?** No.

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

No GEF grant support is sought and no reflows to the GEF are foreseen.

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF[6]

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

The National Energy Plan (NEP) 2004-2015 outlines a national energy policy that builds on four pillars (par. 7.1): (i) to guarantee the secure supply of adequate energy at a minimum cost; (ii) to develop domestic energy resources; (iii) to offer freedom-of-choice for economic actors; and (iv) to consolidate the role of the State to lead and regulate the energy sector. With respect to financial sustainability and the current high generating costs of fossil-based power plants, the NEP observes (par. 7.2.6.1): "Renewable energy sources such as wind, biomass and co-generation represent opportunities that should be implemented without delay. The NEP proposes to work specifically on projects that allow reducing marginal generating costs (…)". Further, the need for ongoing institutional strengthening of the CNE is highlighted (para. 7.2.8.4).

The National Development Plan (NDP) 2010-2030 visualizes the country's development path in the context of a globalized economy, sustainability challenges and social demands to increase the living standards for all citizens. Several strategic lines of action are presented, including good governance, social cohesion, and sustainable economic growth. The Project directly supports the following objectives: objective 9-I.2: "Reliable and efficient energy supply: to guarantee a reliable electricity supply at a competitive price under conditions of financial and environmental sustainability."; objective 9-I.5: "A differentiated productive structure that can compete in an integrated global economy: To increase productivity, competitiveness, and environmental and financial sustainability (…)"; and: objective 10-I.3: "Adaptation to climate change: To advance (…) in mitigating the causes of climate change."

The Second National Communication (SNC) identifies opportunities to mitigate the emissions of greenhouse gases by the use of biomass resources, including biofuels (biodiesel and ethanol), bagasse, and agro-industrial residues such as rice husk, fuelwood and charcoal. The SNC points out the large contribution of the energy sector to the national GHG emissions. Renewable energies and the rational use of energy are proposed as key strategies to reduce this impact (and improve economic competitiveness). Most arguments concerning the importance of renewable energies given in the SNC, are adopted in the Law 57-07, including: (i) to reduce the dependence on imported fossil fuels; (ii) to stimulate private investment in renewable energy projects; and (iii) to contribute to the decentralization of electricity generation.

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

The Project is consistent with Objective CCM-3 of the GEF-5 Results Framework (Promote investment in renewable energy technologies) by pursuing the investment in a grid-connected biomass plant for electricity supply, possibly combined with heat and cold generation for use by local industries. Important GHG mitigation effects are expected compared to the baseline situation.

The Project will directly contribute to the core outputs of the GEF-5 Results Framework "Investment in renewable energy technologies increased", and "GHG emissions avoided". The Project will also review the existing regulatory framework for biomass-based energy production and as such, deploy activities aligned with the core output "Favourable policy and regulatory environment created for renewable energy investments". Since regulatory barriers are expected to be of minor relevance, the Project focus is on investment and emission reduction.

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

A.3 The GEF Agency's comparative advantage:

Since its establishment, UNIDO has built up a long track record assisting countries to implement industrial support programmes. UNIDO's Energy and Climate Change Division pursues the integration of reduced carbon objectives into industrial development policies and activities. The GEF Council document specifically highlights UNIDO's comparative advantage in capacity building and technical assistance, which are key components of the proposed project.

More specifically, UNIDO has been implementing since 2008 the 'Observatory for Renewable Energy in Latin America and the Caribbean', a regional programme which aims at establishing bridges inside and outside the LAC region to share good practices and increase the presence of renewable energy technologies. UNIDO has been addressing through this regional programme key efforts to develop a portfolio of projects and programmes at the country level, focusing on technology transfer and cooperation among countries. The GEF project described here has been identified in the framework of the regional Observatory and will benefit from networking opportunities.

UNIDO has widespread experience to interact with stakeholders from the private sector and public sector as well as NGOs. The proposed GEF initiative draws on UNIDO's experience by strengthening the competitiveness of local industries and by introducing renewable energy technologies. The proposed activities range from demonstration and institution building to policy support, involving a broad range of stakeholders. UNIDO is well-placed to implement this Project because of its experience and expertise in renewable energy projects, its long history of cooperation with key stakeholders, and its high standards of fiduciary responsibility.

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

Context summary:

The energy sector in the Dominican Republic is characterized by a heavy reliance on imported fossil fuels and among the highest energy costs for industrial end-users in the region Latin America and the Caribbean[7]. Rising oil prices and the increase in energy demand quadrupled the cost of oil imports between 1997 and 2007[8]. Since the constitution of the National Energy Committee (CNE) in 2001[9], progress is made towards diversifying the national energy mix with support from bilateral organizations, including the World Bank[10]. In August 2011, a new 345 kV transmission line was inaugurated connecting Santo Domingo with Santiago and the Cibao Valley. The same month, IADB approved loans for two wind farms with a total capacity of 80.6 MW.

Investment in renewable energy technologies (RETs) is encouraged by Law 57-07 (2007), which establishes financial benefits and tax exemptions. In June 2011, the CNE approved regulation allowing net metering, which opens possibilities for small-scale generators. However, end-users still face frequent power outages and high energy costs. The technical and commercial losses in the distribution system are well above the average for Latin America[11]. With virtually no exception, industries and large businesses have diesel generators installed for backup power supply. The country's Industrial Free Zones[12] are greatly affected by the inadequate energy service and high costs and become less competitive. Globalization and free trade agreements worldwide have put further

[7] In 2011, electricity prices in the Dominican Republic for commercial users were US$ 0.62/kWh with the average in the region being US$ 0.21/kWh. Similarly prices for industrial users were significantly higher; US$ 0.45/kWh in DR and US$ 0.17/kWh on average in the region. Prices for residential consumers were also significantly higher than in the region on average (US$ 0.40/kWh as compared to US$ 0.19/kWh). Source: OLADE. Energy Economic Information System. Energy Statistics, 2012.

[8] From roughly US$ 814 mln to US$ 3,267 mln. See: Carlos Cuello, "Puntos de vista - El petróleo amenaza la estabilidad macroeconómica," listindiario.com, July 22, 2008. (http://www.listin.com.do/app/article.aspx?id=66921).

[9] Created under the Electricity Law (Ley General de Electricidad) No.125-01, July 26, 2001 and its revision Law No.186-07.

[10] Power Sector Technical Assistance Project 2004-2010 (Project ID: P082715); Dominican Republic Power Sector Program - Second Generation Reforms 2005-2009 (Project ID: P082712).

[11] Estimations of commercial losses vary between 30-50%, even though the residential users below 700 kWh/month pay a subsidized tariff. Since 2007, fraud is considered a crime. See: http://www.sie.gov.do/ archivos/fraude.pdf.

[12] The "industrial free zone" business model offers important tax benefits for manufacturing companies to establish themselves in the country. It has been a spearhead in national development strategies since the 1970s, offering low-skilled jobs to large numbers of people.

pressure on this development model, especially in the apparel industry. Therefore, diversification of economic activities, cost reduction and the efficient use of resources are key elements in a strategy to modernize the sector.

Baseline project

In line with the National Energy Plan, CNE has entered into an agreement with CNZFE[13] (the supervising body for the free zone sector) to address the critical energy situation in the industrial free zones (IZFs). The conservation of employment is a top priority at the highest political level, and a more effective use of energy will contribute to maintain competitiveness. Decentralized electricity and heat generation based on renewable energy sources are thereby recognized as valuable options to reduce energy costs and improve reliability of the electricity supply. The baseline project aims at exploring the opportunities to secure electricity supply and reduce energy costs for IFZs by investing in small power plants for electricity production, possibly combined with heat generation. The available options being considered are systems based on fuel oil, natural gas, or biomass. At the PIF design stage, the baseline project primarily intended to replace the existing, individual diesel back-up systems by an efficient, small power plant. The diesel back-up systems have high operating costs and are polluting but are operated only during a limited time per year. Their main function is to maintain electricity supply in case of a grid power blackout and reduce the risk on commercial losses and possible damage to equipment for the industry. Continuous operation of these diesel systems is prohibitive because of the fuel costs. Recent developments in the electricity wholesale market have exacerbated the urgency for the free zones in the country to address the energy situation. In the light of rising electricity demand and generating capacity falling behind, several contracts between large consumers and private generators were terminated as preference is given to the public distribution companies. New contracts may be signed but at a higher price level, expectedly up to 50%. Therefore, the baseline project has slightly changed and the focus is now on an efficient, decentralized power plant that can supply electric energy at a cost level comparable to the cost of grid electricity. Such a plant may also be operated continually, with grid electricity covering peak power loads as well as function as backup.

Partners in the baseline project are CNE, CNZFE and the Corporación Zona Franca Industrial de Santiago (CZFIS), which is a mixed ('public-private') entity operating the Santiago Free Zone[14] and which has the mandate to foster economic development in the Cibao region. Together they combine the perspectives: (i) energy policy; (ii) socioeconomic development; and (iii) private investment. It should be noted that in response to the changed energy situation in the country, CZFIS has created an energy committee in charge of identifying and implementing measures to reduce energy consumption, modernize the infrastructure and seek alternatives for power generation (including fossil fuel based options as well as renewable energy based ones). Compared to the PIF design stage (2011), the Corporation is now actively leading the process to address the issue of reliable and price-competitive electricity supply to the Santiago Industrial Free Zone.

Identified barriers:

As mentioned, compared to the situation described in the PIF, industrial free zones now look more actively into opportunities for energy self-supply. With a view on market development strategies, this can be considered as an important step forward. The Santiago Free Zone goes one step further, by also considering a renewable energy source (biomass) to reduce its dependence on imported fossil fuels with fluctuating but increasing prices. Notwithstanding increased awareness, the following barriers[15] are still present which may affect the development of the Santiago biomass project, and will hamper the wider application of biomass energy technology for power generation in the Dominican Republic.

Policy: The National Energy Plan 2004-2015 and the Law 57-07 provide the high-level policy framework for promoting decentralized power generation and renewable energy technologies in the country. The Law 57-07 aims to: (i) reduce the dependence on imported fossil fuels; (ii) stimulate private investment in renewable energy

[13] Consejo Nacional de Zonas Francas de Exportación.

[14] The Santiago Industrial Free Zone (also known as Zona Franca Industrial "Lic. Victor M. Espaillat Mera") is one of the oldest and largest of the country in terms of employment and accumulated investment. In 2011 it employed a total of 14,250 people (6,872 male/7,378 female), out of a total of 125,117 free zone workers nation-wide. In terms of accumulated investment, Santiago ranks third in the country (US$ 283 mln on a total value of US$ 2,914 mln). Source: CNZFE. Informe Estadístico Del Sector Zonas Francas 2011.

[15] Following the GEF "5-pillar" approach.

projects; and (iii) contribute to the decentralization of electricity generation. Some tax incentives are in place. Notwithstanding, there is still scope for strengthening the policy and regulatory framework to support developers of small-scale, decentralized renewable energy systems. In addition, renewable energies (specifically biomass-based power plants) may benefit from more specific regulation with respect to nuisance and environmental impact, including particle emissions and water usage. Other issues, including social impacts, gender-related effects and overall sustainability, need to be addressed by producing guidelines, best practices and analytical tools. Regulation would involve CNE, the Ministry of Environment, and water and municipal authorities.

Technology: While biomass-based power generation is in principle mature, a technological barrier exists because of the lack of experience with the design and operation of decentralized energy systems in the Dominican Republic and biomass technology for electricity generation in particular. A successful power plant operating would therefore be a significant step towards demonstrating technical and commercial feasibility. The prefeasibility study carried out during the PPG phase focused on direct combustion of biomass feedstock for steam production to operate a Rankine steam cycle, and on gasification. Project risks increase with technological complexity but both technologies are considered mature. One manufacturer of small-scale gasifiers operates from Santo Domingo to assemble and export equipment worldwide.

Sourcing of biomass material is an intrinsic aspect of the technology. Sugar mills use a small portion of the available bagasse to produce heat and electricity[16]. Two textile companies have installed biomass boilers for steam production under the CDM mechanism and created a special-purpose company to collect the biomass material and control the supply chain. There is no experience as yet in the country with the use of biomass for electricity generation by an industrial complex.

Business skills and delivery model: The PIF identified the lack of consensus between CZFIS and the hosted companies as a barrier for developing the demonstration plant and proposed guidance to establish a dialogue between all stakeholders. In the present situation, the Corporation has taken the lead to develop the power plant and has proposed a business model for ownership and operation[17]. This model is in line with the Corporation's mandate and capabilities and provides a solid basis for the commercial development and exploitation of the demonstration plant. CZFIS has also proposed a model to secure the supply of biomass. The demonstration project will be a test case to verify the validity of this sourcing model. Work during PPG stage also demonstrated that expertise on biomass energy technology in the Dominican Republic is not commonly available. The few professionals working in this field are generally linked to technology suppliers, hence independent technical advice is difficult to find. By consequence, industries and investors are generally not familiar with this type of project. This situation is expected to improve once successful biomass technology plants are operating in the country and a market (for equipment and consultancy) starts developing.

Information: Even though awareness among industries and industrial free zones about the cost of electricity has increased since the PIF design phase in 2011 (especially in free zones such as Santiago, which are directly affected by the supply deficit on the wholesale market), there is still a general lack of knowledge about the opportunities for introducing RETs in industry. Investments to modernize the sector are not aggressively pursued, which is probably related to systemic barriers (including the fact that energy is not core business for the industry, facilities are rented by the hosted companies, and the alternative for foreign companies to relocate production to other countries).

During the PPG phase, a quantitative assessment has been made of the availability of biomass resources from agriculture, forestry and municipal waste in an area around Santiago. It was concluded that a number of agricultural residues and (non-native) wood plantations are available in sufficient quantity as feedstock for the demonstration plant[18]. An analysis of the transport of biomass delivered to the Santiago Free Zone indicates that supply is economically and energetically viable, and emissions due to transport are within acceptable limits. At

[16] See, for example, CNE National Energy Plan 2004-2015, p. 107-115.
[17] In this model CZFIS will be the majority shareholder and the hosted companies can become co-investors. A separate legal entity (company) will own the power plant assets and be in charge of management and operation.
[18] Please refer to the prefeasibility study (Annex J) and the biomass assessment prepared under the PPG (Annex I).

the national level, several international agencies and universities are involved in exploring the biomass potential in the national territory. This information needs to be validated and made available to assist project developers.

Finance: Access to investment capital is not a major barrier for large companies in the Dominican Republic. However, the financial risks associated with new electricity generating plants are considered high; by consequence new power plants do not materialize to match the increasing demand. For biomass plants, the lack of acquaintance with the technology, the lack of a track record and perceived concerns about the sustainability of the biomass supply add to this risk profile. Investors are therefore reluctant to develop such projects. Investments in biomass power plants can be made more attractive by reducing project risks (including those associated with biomass sourcing) during the development phase and fine-tuning the existing financial incentives for this type of investments. The partial use of electricity for self-supply is a favourable factor for small-scale, decentralized production, as it guarantees a constant flow of revenues, thereby reducing exposure of the investment to the risks on the national electricity market. The Santiago Free Industrial Zone operator (CZFIS) has the capacity to finance decentralized power systems.

A. 5. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

In response to the findings of the PPG, the Strategic Results Framework for the Project "Stimulating industrial competitiveness through biomass-based, grid-connected electricity generation" has been revised. The development objective is: "To reduce GHG emissions from industrial free zones in the Dominican Republic by stimulating the use of renewable biomass-based electricity production for self-supply and sales of surplus energy to the grid."

Compared to PIF Stage, the approach of the demonstration project in Santiago has changed. Initially, there was no leading role foreseen for the operator of the Santiago Industrial Free Zone (the Corporation CZFIS). Therefore the PPG was focused at facilitating a joint effort by CZFIS and the industries hosted at the Free Zone 'Lic. Víctor M. Espaillat Mera' (PIVEM). This Santiago Industrial Free Zone is one of the 51 free zones in operation in the Dominican Republic in 2011[19]. Altogether the free zones concentrate a total of 578 companies and employ more than 125,117 people. The free zones are largely clustered around Santiago in the North (47.1%) and Santo Domingo in the South (23.5%)[20]. About 1/3 of the free zones are public-owned (29.4%). Today most are private (64.7%) while a small number is mixed capital (5.9%)[21]. Free zones generally host a variety of enterprises, but can also be owned by one large company (special free zones). In 1990, the variety of different operating regimes was harmonized by new regulation through Law 08-9019, which promotes the establishment of new free zones and the development of existing ones. The sector is supervised by the National Free Zone Council (CNZFE)[22].

The CZFIS is a not-for-profit organization that manages the Lic. Víctor M. Espaillat Mera Industrial Park (PIVEM), which is the largest in Santiago and was one of the first industrial parks to be established in the Dominican Republic. The Víctor M. Espaillat Mera Industrial Park covers an area of 720,000 m2, which is occupied by industrial factories (covering amongst others the production and/or assembly of electronic products, high-technology equipment, tobacco and tobacco products, shoes, leather goods, jewelry and textiles), industrial warehouses, investor services offices, health centers, a fire station, and technical training centers. Supported by the Dominican free trade zone system that grants national and foreign investors with exemptions on tariffs, income taxes and other fiscal duties, it constitutes a model of production and export that is 100% fee of all types of national taxes.

CZFIS is part of the sustainable development model for the province of Santiago. Its board of directors includes representatives of business organizations, educational bodies as well as governmental and municipal entities. Moreover, the Corporation is responsible for the management and distribution of energy within the industrial park and as such carries the following activities with respect to electrical energy: i) operation of the business cycle of

[19] Informe Estadístico Del Sector Zonas Francas 2011, pg.2
[20] Informe Estadístico Del Sector Zonas Francas 2011, pg.2, 3
[21] Informe Estadístico Del Sector Zonas Francas 2011, pg.2
[22] Consejo Nacional de Zonas Francas de Exportación

the internal administration of energy; ii) administration and management of the purchase of electric power; iii) maintenance and control of the distribution of energy; and more recently, iv) assessment and management of energy projects.

So while originally it was envisaged that a "local trust fund" would be established to which CZFIS as well as the industries in the industrial free zone would contribute to assure that a biomass-based power plant could be financed, the situation changed early 2012, as it became clear that existing wholesale contracts would be rescinded. In response, CZFIS firmly took the lead in the process and established an energy work group, which became the direct counterpart for UNIDO, CNE and CNZFE in Santiago. GEF resources during the PPG phase have supported the compilation of a prefeasibility study for a biomass-based energy generation plant, which has been used as a basis for the CZFIS to enter as a co-financing partner of the GEF project. Moreover, the corporation has reviewed several options for business models concerning plant ownership and operation, and securing of the biomass resources. Given the adequate financial capacity of the corporation to finance the Project, it was concluded that the envisaged trust fund does no longer provide any added value; it has therefore been removed from the project strategy.

The legal entity to operate the demonstration plant will be under the auspices of CZFIS and provide a solid platform for operational and financial sustainability, thereby securing the results generated with GEF funding in Santiago. Technical assistance in the field of energy and environmental policy is absorbed by CNE and MIMAREMA and likely to benefit from close working relations with universities in Santiago (Universidad ISA) and Santo Domingo (Instituto Tecnológico de Santo Domingo – INTEC). There is still a need to strengthen institutional capacity at the government level. Notwithstanding, progress in this respect is being made by CNE. The Project will contribute to this process and UNIDO is confident that its results can effectively be anchored within CNE.

Compared to the PIF, the overall structure has been slightly modified by adding a fourth component to accommodate for monitoring and evaluation, involving UNIDO co-financing:

- Component 1. Policy support for decentralized, biomass-based energy generation.
- Component 2. Demonstration of proven biomass technology for electricity generation.
- Component 3. Supportive activities for training, promotion and dissemination. And:
- Component 4. Monitoring and evaluation.

Furthermore, co-financing for components 1 and 3 has been reduced and partially reallocated to component 2 to assure that sufficient funds for constructing a viable biomass-based power plant are available.

The following paragraphs provide a brief description of the purpose of the anticipated project outputs and their contribution to the defined outcomes.

Component 1. Policy support for decentralized, biomass-based energy generation.

Outcome #1. (GEF: US$ 350,000; co-finance: US$ 437,000) The policy and regulatory environment conducive to decentralized, biomass-based power and heat generation has been strengthened. This project component is aimed at strengthening the existing regulatory framework for small-scale, decentralized power plants. While high-level policy generally allows decentralized power generation, there are no specific incentives to promote small-scale generation as part of the national power system. Project developers such as the CZFIS therefore prefer to operate under the self-supply modality, which leaves the potential of small power plants selling to the grid, untapped. Regulation and permitting procedures are designed for large power plants, and may likely be simplified for small-scale power systems. GEF support will thus assist in fine-tuning existing regulation and incentives to make investment in energy generation attractive for these market players. Additional regulation may prove beneficial to address specific concerns about biomass plants, such as nuisance and particle emissions.

Output 1.1 **(GEF: US$ 80,000; co-finance: US$ 112,000) National and municipal regulation for decentralized biomass-based power generation (environmental impact, nuisance, and water use) has been reviewed, amended and streamlined.** Procedures to obtain concessions for electricity generation and environmental permissions are not geared to biomass technology, small capacities and the self-supply operation modality. Specific aspects of biomass technology, such as water usage, particulate emissions and other nuisance, may require more detailed guidelines or regulation to mitigate environmental and social concerns. This output will take benefit from the lessons learnt during the development of the biomass plant in Santiago to review existing regulation and permitting procedures, and propose amendments for improvement and simplification. The following activities will be implemented using GEF resources: (i) subcontracted study of relevant regulation (covering environmental impact, nuisance, water use, public safety); (ii) subcontracted drafting of proposals for amendments to regulation; (iii) national expert hired for technical support; (iv) international expert(s) for technical backstopping and advisory tasks.

Output 1.2 **(GEF: US$ 50,000; co-finance: US$ 100,000) Proposals for financial incentives to stimulate decentralized, renewable energy technologies have been prepared and submitted to the Government for approval.** At the current cost level of electricity in the wholesale market, decentralized generation is increasingly becoming economically attractive. Even though large consumers (such as CZFIS) have the financial capacity to invest in power systems, they do not consider it core business. Due to the lack of successful precedents in the country, one cannot adequately evaluate project risks. Also, investments and project preparation are higher than in a mature market. Financial incentives can encourage project developers and investors to embark on decentralized power generation. As outlined in Annex H, current financial incentives for renewable energy in Law 57-07 include, for example, various tax exemptions. This output will enhance present financial incentives to make them accessible to the targeted actors such as project developers and intermediaries as well as develop proposals for new incentives specifically targeted at decentralized electricity and heat generation (as necessary). The following activities will be implemented using GEF resources: (i) subcontracted study to review existing incentives and identify and detail opportunities for improvement; and (ii) national expert hired for technical support.

Output 1.3 **(GEF: US$ 70,000; co-finance: US$ 50,000) Existing information sources on the biomass potential in the national territory have been validated and integrated.** Under the PPG, an assessment has been carried out of the options to supply the demonstration plant at Santiago (on which the present proposal is based). It was also found that other stakeholders are in the process of assessing the potential of biomass resources for energy generation in the Dominican Republic[23]. The present output aims at validating and integrating these sources of information under leadership of CNE, and possibly create a database covering relevant parts of the national territory. Through this approach, it is expected to reach a high level of donor coordination and establish tangible results with modest GEF inputs. The following activities will be implemented using GEF resources: (i) national expert hired to identify all data sources, act as direct counterpart for national and international organizations and agencies, and incorporate existing information into one integrated system; (ii) subcontracted study to apply life-cycle analysis (LCA) methodologies on selected biomass sources in relevant regions of the Dominican Republic (including the Santiago demonstration project).

Output 1.4 **(GEF: US$ 150,000; co-finance: US$ 175,000) Sustainable biomass sourcing strategies have been developed in coordination with rural development programmes in the Santiago region.** The biomass resource assessment carried out during the PPG highlighted the existence of development programmes to improve quality of life and income levels among the rural population in the region. The pre-feasibility study also came to the conclusion that it will be important for any biomass-plant operator to develop proprietary production systems or form associations with local producers to not only minimize the risks related to biomass supply, but also to assure the sustainability of the supply chain. In the case of CZFIS, which plays a leading role as a promoter of economic and social development in the Santiago region, this could entail taking control of the production and transport chain by associating itself with the smallholders in the region and offering them attractive prices under long-term agreements. Models of association could include, amongst others, social community development programmes and joint venture agreements between the biomass 'consumer' and 'producer'. This project output will explore

[23] For example, Worldwatch, which is compiling available data on agro-industrial wastes for energy utilization and hopes to have its report ready mid 2013.

potential synergies between existing programmes being carried out by NGOs and/or CSO and biomass energy projects, and devise sourcing strategies for biomass supply (residues from agricultural and forestry) by small-scale farmers under sustainable management schemes, placing a particular focus on gender-relevant aspects. The communication plan envisaged under 3.1. will tie in directly with this output. The purpose of this output is to extend the business model proposed by the Santiago Industrial Free Zone project and outline integrated sustainable sourcing strategies for replication elsewhere in the country. The following activities will be implemented using GEF resources: (i) subcontract to a local institute, company or NGO to work in relevant regions (Santiago plus two other provinces) to design sustainable biomass sourcing mechanisms; activities will depart from identified biomass sources and interact closely with rural development programmes and local stakeholders; (ii) training activities on sustainable biomass production (rice and other agricultural residues, forest management) for rural groups; and (iii) international expert(s) for technical backstopping and advisory tasks.

Component 2. Demonstration of proven biomass technology for electricity generation.

Outcome #2. (GEF: US$ 735,000; co-finance: US$ 6,685,000) A biomass-based electric power plant (envisaged capacity 3 MW[24]) has been adopted by the Santiago Industrial Free Zone. This project component envisages creating a successful showcase of the application of biomass technology for electricity generation at an industrial free zone in the Dominican Republic. This demonstration plant will cover the base load of the Santiago Industrial Free Zone and operate under the self-supply modality. The project development and realization process is expected to generate a wealth of experiences regarding the appropriateness of existing regulation and permitting, environmental issues, biomass logistics, cost-effectiveness and interaction with civil society, as well as useful lessons for replication. It is anticipated that the traffic-light approach developed under the global GEF project 'Establishing Sustainable Liquid Biofuels Production Worldwide (A Targeted Research project)' (ID# 3224) will also be tested.

Output 2.1 **(GEF: US$ 145,000; co-finance: US$ 65,000) A detailed feasibility study for the development of an envisaged 3 MW decentralized, biomass-based electricity plant at the Santiago Free Zone has been carried out.** This project output will provide technical assistance to the Santiago Free Industrial Free Zone Corporation (CZFIS) to carry out a detailed feasibility study for the envisaged biomass power plant. Considering the current electricity consumption profile of the Industrial Free Zone in Santiago, it was presently determined that 3 MW would fully cover the base load over a 24-hour operation period. The study will be part of an integrated due diligence procedure and cover technical, economic, social and environmental aspects. The biomass assessment carried out during the PPG phase (Annex I) identified three sources of biomass as having high, local availability and thus being a suitable source of biomass supply for the proposed, decentralized power plant in Santiago: 1) Acacia mangium wood chips from the Northeast (60 to 120 km distance), (2) freshly cut rice stalks and (3) dry rice husks, both from around Santiago (10-100km). The following tables from the pre-feasibility study (Annex J) provide further info on these sources:

Type of biomass	**Potential of biomass**	**Distance**
	tons/year	km
Rice husks (dry)	22,500	< 100
Rice stalks (freshly cut)	225,000	< 100
Acacia Mangium	119,190	60 – 120

Type of biomass	**Density**	**Humidity**	**Specific energy**			
	kg/m^3	(%)	MJ/kg	MJ/m^3	MWh/m^3	BTU/m^3
Rice husks (dry)	150	15.3%	14.483	2,172.5	0.603	572
Rice stalks (freshly cut)	170	24.0%	3.575	607.8	0.169	160
Acacia Mangium	400	37.5%	16.636	6,654.4	1.848	1,752

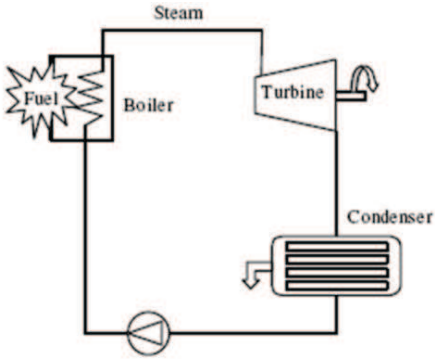
[24] Please note that final capacity may lie slightly below 3 MW.

Currently the most readily available, non-seasonal type of biomass is Acacia Mangium. Based on a supply of this for the proposed plant at the Santiago Free Zone, three energy generation scenarios were explored during the PPG phase (see Annex K): Rankine cycle, Rankine cycle with co-generation and biomass gasification. Based on the prefeasibility study carried out (see also Annex J), a conventional steam cycle (Rankine) is a likely option, though the final technology and capacity to be installed will only be decided upon once the results from the full feasibility study are known. Co-generation by producing additional steam or using residual heat will be treated as an add-on (once the project is satisfactorily producing electricity), in order to avoid technical complexities and risks during the realization phase of the project. The following activities will be implemented using combined GEF and co-financing (cash) resources: (i) subcontracted feasibility study for the envisaged biomass power plant at the Santiago Free Zone; and (ii) international expert(s) for drafting of terms of reference, technical backstopping and advisory tasks to CZFIS, UNIDO and CNE.

Output 2.2 **(GEF: US$ 260,000; co-finance: US$ 245,000) Supportive studies and technical designs have been prepared, and permits and concessions obtained.** Project preparation and permitting procedures require inputs concerning social and environmental impacts, water usage, grid interconnection, site planning and preparation, transport and storage of biomass stock, as well as an evaluation of technical options and mitigation measures. Based on these inputs, the technical design of the power plant can be finalized, including a detailed cost estimate. The project plans will be submitted to the corresponding authorities (CNE, MIMARENA, and municipality) to obtain the required permits and generating concession. The proposed output will support the Santiago Free Zone Corporation during this process by providing financial support and expertise to mitigate project risks during the preparation phase. This output will further detail the business model for the ownership and operation of the power plant and the supply of biomass. The following activities will be implemented using combined GEF and co-financing resources: (i) subcontract to deliver detailed technical studies for the envisaged biomass power plant at the Santiago Free Zone; (ii) subcontract to carry out required additional studies, including environmental and social impact assessment, and requests and background documents for permitting; and (iii) international expert(s) for drafting of terms of reference, technical backstopping and advisory tasks to CZFIS, UNIDO and CNE.

Output 2.3 **(GEF: US$ 5,000; co-finance: US$ 100,000) Staff from Santiago and other industrial free zones have received training on technical and managerial aspects of small-scale biomass plants.** The biomass power plant will be operated by technical staff contracted by CZFIS. This output covers proper training of plant personnel and other staff involved in biomass storage, maintenance of equipment, inspection of the power plant and auxiliary systems, and compliance with environmental and other regulation. Technical training will be requested from the supplier of the power plant. Under the supervision of CNE and CNZFE and assuring that both men and women benefit equally, technical staff from other Free Zones may be invited to participate in the training activities. The following activities will be implemented using GEF resources: (i) subcontract to design training activities on technical and managerial aspects of small biomass power plants, including efficient operation and logistics.

Output 2.4 **(GEF: US$ 325,000; co-finance: US$ 6,275,000) The envisaged 3 MW biomass-based electric power plant has been procured and made operational under an appropriate business model.** This project output envisages the procurement, installation and transfer to the owner of the envisaged, 3 MW electricity generating plant at the Santiago Industrial Free Zone as assessed in the prefeasibility study (Annex J) and to be further detailed as indicated under Output 2.1. Since the biomass plant will play a critical role in CZFIS´ future energy sourcing policy, technical risks should be kept under control by choosing proven technology. Based on the prefeasibility study, a likely technology is a basic conventional steam cycle (Rankine) system as follows:



Condensing Turbine

Please note that the final technology will be determined based upon the outcomes of the full feasibility study. Depending on the final choice of technology, the source of the technology will be chosen. If a Rankine system is chosen, a North-South or South-South technology transfer is likely to be the case. In the case of a gasifier, domestic technology would be available. In order to keep generation costs at an acceptable level and avoid speculation in the biomass market, a command-based, vertically integrated business models is pursued to secure biomass resources and eliminate actors who do not add value to the supply chain. This integration of the supply chain to reduce costs has also already been reflected in the IRR calculations undertaken as part of the pre-feasibility study (Annex J) carried out during the PPG phase. With an envisaged, nominal capacity of 3 MW, the plant will be sufficiently large to cover the Free Zone´s base load consumption. As such, the plant will only produce for self-supply, avoiding thereby the complexities for entering the wholesale market. This demonstrates the clear view of the Corporation on the role and conceptualization of decentralized power generation at the Santiago Free Zone. While it was originally anticipated that a local trust fund involving various stakeholders based in the free zone would have to be created for the financing of this output, in light of the changed energy situation in the country, CZFIS has taken full responsibility for providing the finance needed to facilitate reliable and price competitive electricity supply for the industries located in PIVEM.

GEF resources will be used for equipment that goes beyond baseline investments (specifically to ensure that the plant will meet internationally accepted standards with respect to water usage and discharges, noise and particle emissions, and general safety for personnel, society, and the environment. GEF support will (partly) offset the expected higher costs of this project, thereby contributing to speed up market development. Monitoring and optimization of plant performance will be part of the terms of reference for the supplier of the technology. The following activities will be implemented: (i) one or more subcontracts for procurement of equipment and installations to guarantee the social and environmentally responsible design and operation of the envisaged biomass plant (such as: support for wastewater treatment, filters to prevent particle emissions, equipment for efficient transport and treatment of biomass material); (ii) investment in the biomass plant by CZFIS (cash and hard loan co-finance).

Component 3. Supportive activities for training, promotion and dissemination.

Outcome #3. (GEF: US$ 113,000; co-finance: US$ 120,000) Awareness for the concept and benefits of biomass power generation has been raised among relevant stakeholders. The objective of this project component is to address barriers related to information and business skills that may affect market development of biomass power generation in the Dominican Republic, as well as the implementation of the envisaged pilot project. Considering that the acute energy situation in the Dominican Republic also affects the other free zones in the country, it is anticipated that, if proven successful, the model for decentralized power generation for self-supply on the basis of biomass will have great potential for replication. Especially the environmentally and socially sensitive approach towards securing biomass supply that the project promotes should facilitate wide-spread uptake. All outputs under this component will pay particular attention to gender aspects to assure that both men and women will benefit equally.

Output 3.1 **(GEF: US$ 50,000; co-finance: US$ 50,000) A communication plan has been prepared to interact with civil society organizations and the general public on the topic of sustainable biomass sourcing.** As part

of the due diligence process during preparation and implementation of the biomass pilot plant, a communication plan will be designed to structure and organize the dialogue with stakeholders from civil society. The purpose of this activity is to avoid unnecessary negative perceptions by society that might affect the implementation process and the good name of the proponents, but also to collect viewpoints and information as a basis for defining mitigation measures, as and if appropriate. This output will cover: (i) one or more subcontracts to national companies, institutes or NGOs to develop a communication plan and lead the communication process until successful project termination.

Output 3.2 **(GEF: US$ 10,000; co-finance: US$ 10,000) Operational experience and best practices from the Santiago demonstration plant have been compiled.** Besides providing the Santiago Industrial Free Zone with reliable, renewable electric energy, the demonstration plant is expected to generate a host of lessons and experiences with respect to project development, biomass sourcing, technical performance and reliability, operation and maintenance, costs, nuisance, impact on the environment, and perception by other, potential project developers and free zones. The following activities will be implemented using GEF resources: (i) subcontract to collect operational experiences and best practices from the Santiago biomass plant, review international experiences and produce a report and multimedia material for dissemination (in coordination with CNE, CNZFE and CZFIS).

Output 3.3 **(GEF: US$ 53,000; co-finance: US$ 60,000) Promotional activities including technical seminars, dissemination events, and drafting of technical manuals and guidelines, have been carried out.** The proposed UNIDO/GEF initiative pursues triggering a market for biomass-based electricity generation by industrial zones. To this purpose, specific technical information will be shared with peer organizations of CZFIS under leadership of the sector Council, CNZFE. Together with CNE, UNIDO and other stakeholders, promotional events and seminars will be organized. In addition, one year prior to the end of the project, an assessment will be carried out to establish to what extent scaling-up and replication is likely to be achieved on the basis of the on-going and planned activities. Recommendations for additional support (as needed) are to be made to assure the sustainability of the project beyond its conclusion. Specifically, this output will cover the following activities: (i) subcontract to draft technical manuals and guidelines for prospective biomass project developers, including the national industrial free zone sector; (ii) one or more subcontracts for organizing and hosting seminars and dissemination events; (iii) one subcontract for an assessment of the likely effectiveness of ongoing activities carried out as part of output 3.3.

Component 4. Monitoring and evaluation.

Outcome #4. (GEF: US$ 50,000; co-finance: US$ 80,000) A monitoring plan has been prepared and implemented in coordination with UNIDO. Monitoring of project progress is essential for the adequate and timely delivery of results. This project component covers project monitoring and oversight by UNIDO in close coordination with CNE and the project partners in Santiago, as well as mid-term review and terminal evaluation of the Project.

Output 4.1 (GEF: US$ 15,000; co-finance: US$ 22,500) A monitoring plan (that also covers monitoring of competing uses of biomass) has been designed and agreed upon during the Project's inception phase. This output covers the organization of an inception workshop, the definition of progress and impact indicators and the design of a detailed monitoring plan and methodology. In order to assure that CO_2 emissions are not just shifted but actually reduced, the monitoring of competing uses of the targeted biomass sources for energy will be included in the plan and any impact on GHG emissions evaluated. The following activities will be implemented using GEF and UNIDO cash resources: (i) subcontract for hosting of inception workshop; and (ii) subcontract for design of monitoring plan and tools for data collection and recording; and (iii) subcontract for M&E specialist to provide backstopping.

Output 4.2 **(GEF: US$ 5,000; co-finance: US$ 47,500) Project progress on defined indicators and compliance with UNIDO guidelines (including gender) is being monitored.** This output covers backstopping to review project progress and compliance with UNIDO guidelines and best practices concerning social, economic, environmental, and human development. Special attention will be given to opportunities to strengthen the position of women. Relevant project activities, specifically related to training, communication with civil society groups, and biomass sourcing involving smallholder families, will be reviewed on gender-specific issues and opportunities. The

activity implemented will be: (i) national consultancy in gender issues and human development; and (ii) regular monitoring site visits by PM and PEB.

Output 4.3 **(GEF: US$ 30,000; co-finance: US$ 10,000) A mid-term review and terminal evaluation have been conducted.** This project output consists of the mid-term review and the GEF terminal evaluation, to be carried out by independent international consultants. The mid-term review will be carried out by UNIDO and CNE after 18-20 months of project implementation, using UNIDO co-finance. The GEF terminal evaluation will be held in the last month before project termination. The activities to be implemented are: (i) international consultancy for mid-term review; and (ii) international consultancy for GEF terminal evaluation.

Global GHG Benefits

The global environmental benefits of the Project are associated with (i) the implementation of on-grid renewable energy (biomass-based electricity generation); and (ii) market development of RE-based electricity generating capacity. The following table (based on the GEF Manual[25], page 3) summarizes the methodology used:

Type of GHG emission reduction	**Direct (A)**	**Indirect (B, C)**	
Component of GEF intervention that can cause this type of GHG emission reduction	Direct implementation of RE technologies	The Project does not establish a direct replication mechanism. GHG benefits obtained from leveraged investments are considered as effects of market transformation.	Market transformation
Logframe (SRF) level	Outputs 2.1-2.5	n/a	Medium-term impact after project termination (10 years)
Quantification method	Direct evaluation of environmental benefits over lifetime (verification of installed RE capacity and baseline assumptions)	n/a	Top-bottom approach based on expected market development of biomass technologies for electricity generation in the Dominican Republic.
Quality of Assessment	Based on the expected performance of the envisaged 3 MW power plant in Santiago. Error range is estimated at +/-30%.	n/a	Based on: (i) assumption that 10 MW biomass-based energy capacity is being added to the national system annually (for self-supply and/ or decentralized power generation); (ii) baseline shifts are included in the applied GEF causality factors; (iii) CO2-intensity of electricity generation sector in Dominican Republic is 0.7 tCO_2 per MWh). The error range in the assessment is expected to be -50% to +25%.

(A) Direct greenhouse gas benefits: Biomass-based power plant for electricity generation (3 MW)

The direct GHG benefits of the Project are achieved by the development, construction, and operation of the anticipated 3.0 MW biomass-based power plant at the Santiago Industrial Free Zone. The baseline for the demonstration plant is electricity generation by the national grid, which has a GHG-intensity of 0.70 ton CO_2eq/MWh.

[25] GEF/C.33/Inf.18, April 16, 2008

The production and use of biomass material also involves greenhouse gas emissions, which partly offset the overall environmental benefits of the Project. The emissions related to biomass production are outside the system boundaries however. The same holds true for the baseline situation, which does not consider the emissions related to gas/oil exploration, coal mining, refining and transport to the Dominican Republic. A lifecycle analysis of the overall biomass chain will be performed during the Project as input for policy making and to assess in detail the impact of upscaling of biomass production and usage.

In order to estimate the emission of greenhouse gases due to transport, it is assumed that the biomass material is delivered by the producers at a one recollection point, from where it is brought to the Santiago power plant. The bulk transport of the biomass material involves the consumption of diesel fuel by trucks. The following estimate is based on the case of woody biomass obtained from existing plantations (Acacia mangium) east of Santiago. The plantations and the power plant are well connected by road. The distance is of the order of 100 km (one-way). Transport is performed by medium-sized trucks with a cargo of 20 tons. It is assumed that 5% of the biomass is lost due to handling and transport, hence 19 tons of biomass are effectively delivered per truck. Fuel consumption is estimated at 45 litre per cargo[26]. The combustion of 1 litre of diesel releases 2.7 kg of CO_2eq[27], equivalent to 121.5 kg CO_2eq per cargo, or 6.4 kg CO_2eq per ton biomass delivered.

The emissions generated by this transport can be related to the energy content of the primary biomass inputs for the power plant. For biomass material with a low energy density, the energy and emissions involved in transport can be a limiting factor for environmental and economic feasibility. The overall efficiency of the power plant is also a key factor, as it determines how many inputs (truck loads) are needed to produce a certain volume of useful energy (electricity). This has been summarized in the following table. For the calculations, an overall plant efficiency of 16.1% is taken[28].

CO_2eq emissions for transport of biomass to Santiago plant					
Energy density biomass		**transport emissions**			
Type	MJ/ton	kg CO_2eq per ton biomass delivered	kg CO_2eq per MJ primary biomass	kg CO_2eq per MWh primary biomass	kg CO_2eq per MWh electricity produced
Rice husks	14,480	6.39	0.0004415	1.59	9.89
Fresh rice stalks	3,580	6.39	0.0017887	6.44	40.07
Acacia mangium	16,640	6.39	0.0003844	1.38	8.61

As one can see, the efficiency of the power plant has a large impact on the transport emissions per MWh of electricity delivered. Also, fuel consumption can vary with +/- 50%. Assuming Acacia mangium is used, the greenhouse gas emissions as a result of the transport of biomass are estimated between 4.3 and 12.9 kg CO_2eq per MWh electricity produced. It is concluded that greenhouse gas emissions as a result of transport are of the order of 10 kg CO_2eq per MWh electricity. This figure is small in relation to the emission reductions achieved by the power plant compared to the baseline situation (700 kg CO_2eq per MWh electricity produced). The effective emission reduction by the Santiago power plant is approximately:

(700 kg– 10 kg) = 690 kg CO_2eq per MWh electricity.

The estimated GHG reductions of the power plant are presented in the following table:

[26] Fuel consumption for trucks can vary substantially. Here a figure of 0.015 litre per ton and per kilometer is used. For 20 tons over 100 km, this translates into 30 litre of diesel fuel. For the return leg (empty truck), a 50% reduction is assumed, totalling 45 litre. As a source of information, please refer to: http://www1.eere.energy.gov/vehiclesandfuels/ pdfs/deer_2005/session5/2005_deer_erkkila.pdf.

[27] Source: Emission Factors for Greenhouse Gas Inventories (last Modified: 26 September 2011 (Table 2); http://www.epa.gov/climateleadership/documents/emission-factors.pdf.

[28] This figure is based on the technical assessments of the Santiago power plant performed under the PPG.

Direct GHG emissions for biomass to Santiago plant									
System			Annual energy production			estimated GHG reduction compared to baseline		lifetime	Total GHG reduction
technology	size	unit	plant factor	operating hours	MWh/yr	tons CO_2eq/MWh	tons CO_2eq/yr	years	tons CO_2eq
biomass-based steam cycle	3.0	MW	90%	7,884	23,652	0.69	16 320	15	244,800

The total direct GHG reductions obtained from the demonstration plant in Santiago over the lifetime of the investment is

=244,800 tons CO_2eq (or 245 kton).

(B) Indirect greenhouse gas benefits: Market transformation
Following a top-bottom approach, it is assumed that over a 10-year period, an average capacity of 10 MW biomass-based power plants is added in the Dominican Republic as a result of the market transformation initiated by the GEF intervention. Assuming capacity is added linearly over time, 100 MW will be effectively in operation during 5.5 year over the 10-year period. A plant factor of 90% is assumed, resulting in a total generated energy volume of:

= 90%*100*5.5*8,760 = 4,336,200 MWh.

At an emission intensity of 700 kg CO_2eq/MWh for the power sector (to be corrected with 10 kg CO_2eq/MWh emissions for the transport of biomass) the associated emission reductions are: 2,991,978 tons CO_2eq (2.99 Mton CO_2eq). Assuming a "GEF causality factor" of 40% ("level 2, modest", the indirect emission reductions that can effectively be ascribed to the Project are:

= 1,196,791 ton CO_2eq (or 1197 kton).

(C) Total environmental benefits
The total direct GHG benefits delivered by the Project are:

= 245 kton CO_2eq.

The total indirect GHG benefits delivered by the Project are:

= 1197 kton CO_2eq.

The total (direct plus indirect) benefits of the proposed UNIDO/GEF Project are of the order of:

= 1442 ktons CO_2eq (or 1.442 Mton CO_2eq).

In summary, the UNIDO/CNE Project "Stimulating industrial competitiveness through biomass-based, grid-connected electricity generation" will generate environmental benefits in the form of avoided GHG emissions (CO_2) in the Dominican Republic to an estimated total of 1.442 Mtons CO2eq , of which 0.245 Mtons are direct benefits obtained from the implementation of a demonstration biomass-based power plant (3 MW) at the Santiago Industrial Free Zone, and 1.197 Mtons as a result of market transformation in the 10-year period after project termination (the "GEF impact horizon"). The indirect emission reductions are estimated applying a GEF causality factor of 40% ("level 2, modest").

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

Risks	Likelihood	Remedial actions
1. National political support for the project would be withdrawn.	Low	The Government of the Dominican Republic firmly adheres to the country's obligations under the UNFCCC. The Project is considered instrumental to reduce GHG emissions by the industrial sector and has been endorsed at an early stage during PIF development. The Project is focused at securing employment and economic competitiveness, which are top political priorities. The political priorities identified at PIF stage are continued after the 2012 presidential election. This governance risk is therefore assessed as low.
2. Local governance and technical capacities to implement the Project would prove insufficient.	Medium	The National Energy Committee CNE has demonstrated capacity to implement government and donor-funded programmes. The proposed Project fits into CNE's mandate and agenda. Notwithstanding, staff rotation remains a challenge, potentially affecting the consolidation of technical expertise and executing capacity within the organization. This factor translates into a governance risk, which is assessed as medium level. This risk is mitigated by: (1) the chosen implementation modality with direct supervision and contracting by UNIDO in Vienna; (2) structuring of the Project in components that can be implemented independently; (3) decentralized execution of the investment component in Santiago; and (4) a high level of stakeholder coordination in the Project's Steering Committee.
3. Investment capital for the demonstration biomass plant would not be provided.	Low	The development of the envisaged 3 MW biomass plant in Santiago is strongly pursued by the Free Zone operator (CZFIS). This commitment is ratified in a co-financing letter, which has been signed on the basis of a prefeasibility study of the Project. The Free Zone operator is one of the main entities promoting social and economic development in the Santiago region and has strong financial capacities. By consequence, the probability of default (financial risk) is considered low.
4. Technical implications might affect the successful design and construction of the demonstration plant.	Low	The envisaged demonstration biomass plant is a 3 MW electricity generator. The choices (1) to use biomass fuel; and (2) to generate electricity for self-supply, are innovative for CZFIS and for the country. In order to minimize project risks, technologies are preferably mature and known in the Dominican Republic. Based on technical and economic criteria, a steam-cycle power plant appears to be the most attractive option. This choice will be further examined and quantified in a full feasibility study (under the Project). Technical risks still exist, but are mostly related to site-specific issues, including technical measures to control nuisance, emissions, increased cargo traffic, water usage, and environmental impacts. These risks will be addressed by careful project design and the implementation of adequate design standards, with the aid of GEF resources. Based on these considerations, the technical risks are judged as low.
5. Supply of biomass resources would prove insufficient for the cost-effective, continuous	Low	The location of Santiago in the fertile Cibao Valley – the country's main agricultural centre – should assure sufficient supplies from agricultural residues and woody biomass. Hence, risks related to sustainable feedstock for the biomass power plant

Risks	Likelihood	Remedial actions
operation of the demonstration plant.		are considered manageable. The availability of biomass (rice husk and stalks, Acacia mangium from commercial wood plantations) has been confirmed by a detailed assessment carried out under the PPG. Notwithstanding, robust sourcing mechanisms still need to be designed, formalized and implemented by local stakeholders. This is particularly important in light of potentially rising prices for various types of biomass as demand increases. Several scenarios have been proposed to this purpose, all tending towards a vertical integration of the supply chain and the establishment of long-term agreements between the plant operator (CZFIS) and local producers, including rural smallholders. These agreements are expected to create a win-win situation for both parties. The existence of commercial Acacia plantations provides a safe start-up scenario. Therefore, this implementation risk is considered low.
6. Climate change mitigation might not be delivered as expected.	Medium	It has been demonstrated that processing and transport of biomass is energetically and economically viable in the Santiago region. However, greenhouse gas emissions by the supply chain may be considerable and can absorb the benefits compared to the baseline situation (electric power produced by the National System). Localized data on emissions by the biomass transport chain need to be collected, after which one can optimize the supply chain and minimize environmental and social externalities. Ongoing monitoring of supply chain operations, including proper training of operators and drivers, are key to controlling externalities throughout the Project's lifetime. The climate change mitigation impact achieved through a market transformation will depend on the availability of biomass resources in the country and the opportunities to establish efficient, low-impact supply chains. The demonstration project will provide particularly useful input information to validate the potential for indirect GHG benefits.
7. Biomass supply varies due to climate change	Low	Biomass supply can vary in terms of volume and composition due to climate change effects in the Dominican Republic, such as higher frequency of storms or draughts. However, as such effects take some time to manifest themselves on the environment and thus the biomass sources, the risk of it has been assessed as low, particularly during the project lifetime (4 years). Furthermore, it is expected that agricultural activities will adapt to changing climatic conditions thus further lessening any potential impact on biomass supply.
8. Perceived social and environmental impacts may impede the development of biomass power plants in the country.	Medium	The extraction of biomass resources from agricultural and forest areas is critically observed by civil society, including environmental protection groups. The construction of small-scale biomass-based power plants nearby densely populated areas, may cause resistance. While nuisance and impacts on environment and public health should be kept as small as possible, negative perception by the public may affect project progress and jeopardize the image of the involved counterparts. Since

Risks	Likelihood	Remedial actions
		perception is difficult to control, this implementation risk is deemed medium. As a mitigation measure, the Project will prepare a detailed communication plan to interact with civil society.

A.7. Coordination with other relevant GEF financed initiatives

No other GEF financed initiatives relevant to this Project have been identified within the Dominican Republic. However, the project will benefit from UNIDO's growing portfolio of projects focusing on biomass-based energy generation. Notably, experiences gained during the on-going implementation of the GEF project 'Generation and Delivery of Renewable Energy Based Modern Energy Services in Cuba' (ID# 1361), which includes the installation of one biomass gasifier electro-generator plant on the Isla de la Juventud, will be drawn upon. Additional GEF projects such as 'Promoting sustainable energy production and use from biomass in Pakistan' (ID# 3921) and 'Promotion of waste-to-energy applications in agro-industries of Tanzania'(ID# 4873) are also expected to provide valuable insights and synergies. Moreover, the global project 'Establishing Sustainable Liquid Biofuels Production Worldwide (A Targeted Research project)' (ID# 3224) has brought forward a traffic-light approach to evaluating environmental and social aspects of liquid biofuel production in developing countries, which shall be adapted to the purposes of this Project to help determine overall environmental and social impacts and particularly the sustainability of the biomass sourcing strategy.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation.

The GEF Implementing Agency for the Project will be UNIDO in Vienna. The executing counterpart will be the National Energy Committee (CNE - Comisión Nacional de Energía) of the Government of the Dominican Republic. Some activities will be executed by the National Council of Industrial Free Zones (CNZFE - Consejo Nacional de Zonas Francas de Exportación). Please note that a collaboration agreement between both entities also exists. The demonstration biomass plant in Santiago will be constructed under responsibility of the Santiago Industrial Free Zone Corporation (CZFIS – Corporación de la Zona Franca Industrial de Santiago), who will be the owner and operator of the power plant and assume the investment costs. The corporation expects to create a special-purpose company. Either the corporation itself or the special-purpose company would enter into a contractual agreement with UNIDO for the purposes of carrying out the activities specified under Component 2. As a not-for-profit organization, the corporation has a managing board that is made up of representatives of the business and academic sectors, and social and economic development promoters in Santiago and the Dominican Republic in general. Being responsible for undertaking all necessary steps to support the construction, installation, extension, working, administration, operation and development of the Santiago Free Zone, they also have the capacity to undertake the proposed project.

Implementation arrangement

The Project will be implemented directly by UNIDO in Vienna. The responsibility for the Project's execution lies with the CNE, the CNZFE and CZFIS. CNE will designate a person who will act as the National Project Director (NPD) and who will be hosted by CNE in Santo Domingo. The NPD will be responsible for assuring that the project is represented on the national level and that all communications are channeled correctly between the relevant (governmental) actors.

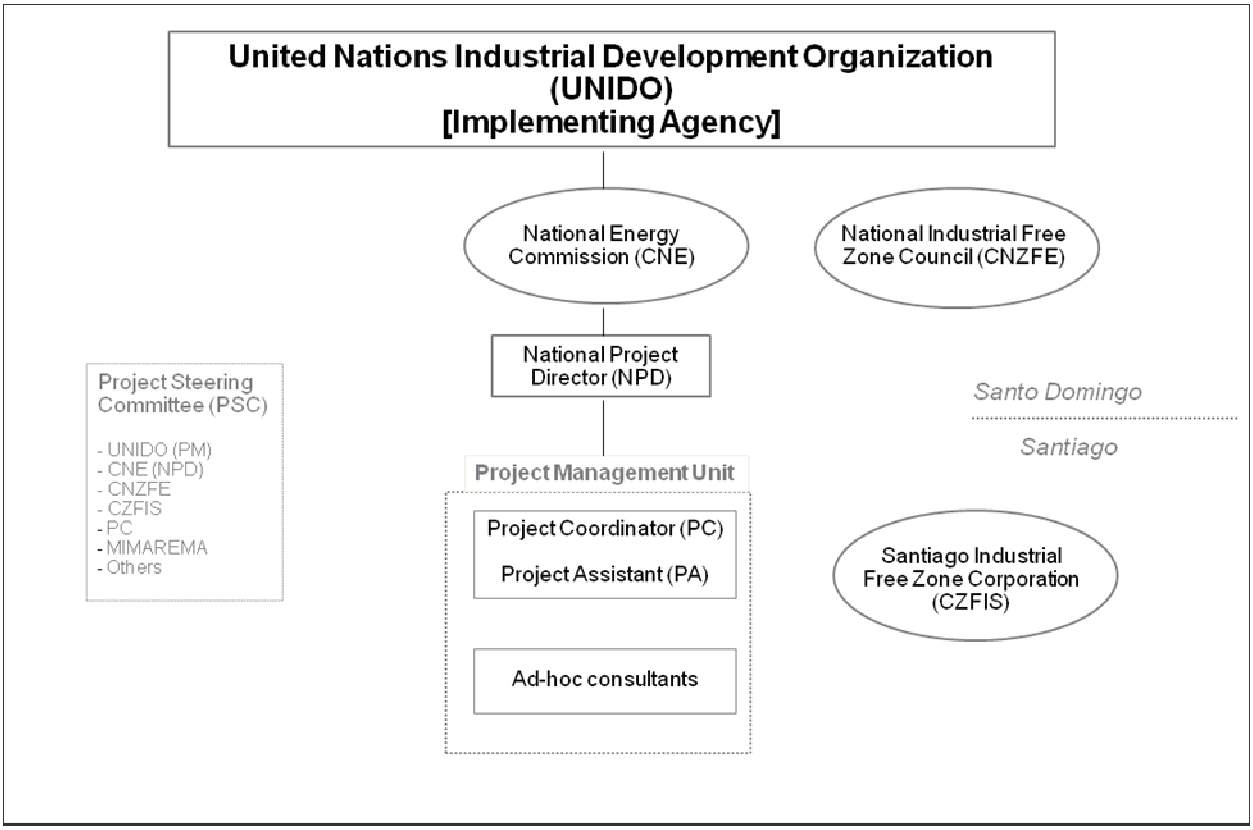
For daily management and coordination of project activities, a project management unit (PMU) will be set up. This PMU will have a national Project Coordinator (PC), who will be responsible for the day-to-day management and supervision of the project, including technical aspects of the project and the coordination of contracting (national consultants, sub-contracts) and monitoring activities. The Project Coordinator shall satisfy the selection criteria described in the Terms of Reference (TOR) and be hired using GEF as well as project co-financing

resources (CNE/CNZFE). His/her duty station will be Santiago. The PC will be supported by a Project Assistant (PA), which will be hired using co-financing resources (CNE). Both persons (PC and PA) will be based in Santiago. All PMU members will be national consultants (Dominican Republic), unless otherwise agreed. The PMU will be assisted by national and international consultants conforming to the TORs for specific assignments. CNE, CNZFE and CZFIS will provide in-kind support (office, communication, transport, local staff as established in the Budget and Procurement Plan).

The Project will establish a Steering Committee (PSC) as the highest decision-making authority, the preliminary composition of which is as follows:
(1) Representative of UNIDO;
(2) Representative of CNE;
(3) Representative of CNZFE;
(4) Representative of CZFIS;
(5) Project Coordinator;
(6) Representative of MIMAREMA.

The Steering Committee will be chaired by the Project Coordinator and convoked on a semestrial basis. If considered necessary, UNIDO and CNE can request extraordinary meetings of the Steering Committee.

The responsibilities of the Steering Committee include:
(i) revision and approval for annual work plans;
(ii) revision and approval of annual GEF reporting (PIRs);
(iii) revision and approval of annual budgets;
(iv) monitoring of Project progress; and
(v) guidance on strategic issues and activities.
The following diagram summarizes the implementation arrangements for the Project:



Other stakeholders

- At PIF stage, it was expected that CZFIS and the industries hosted at the Free Zone would jointly develop the demonstration biomass plant. In 2012, CZFIS decided to take the lead in the process, which is in line with its mandate and responsibility to provide an adequate infrastructure and services at the free zone, including the supply of affordable electric energy. CZFIS will establish a legal entity (a company) to own and operate the biomass plant. The Corporation will be the majority shareholder but expects to invite other companies from the free zone to participate.
- The Project will cooperate with NGOs / CSOs, particularly rural development organizations and programmes in the Santiago region, with the objective to design and operationalize sustainable sourcing mechanisms for biomass (envisaged: agricultural and forestry residues). The purpose is to create new income opportunities for rural families. Positive experiences in the central part of the country have been achieved under the Plan Sierra[29].
- The Project will establish a communication plan to interact with local stakeholders in Santiago, including representatives of neighbourhoods in the vicinity of the envisaged demonstration plant, civil society organizations, municipal authorities, environmental agencies, and water and waste authorities. The results of social, economic and environmental impact studies will be shared with relevant stakeholders and mitigation measures reviewed and agreed, as and if appropriate.
- During PPG, the Project has interacted with universities in Santo Domingo (Instituto Tecnológico de Santo Domingo) and Santiago (Universidad ISA), as well as organizations involved in international cooperation (GIZ, Worldwatch Institute) to discuss the Project's concept and strategy and to exchange information and viewpoints regarding the status and potential for biomass energy applications in the country. It is planned that the Project will intensify this interaction during its execution – particularly with the Universidad ISA and the Worldwatch Institute – and create synergies, specifically in the field of resource assessment, the application of analytical methodologies (such as life-cycle analysis) on biomass investments and the integral supply chain, and the evaluation of social, economic and environmental impacts. In addition, interaction with the National Cleaner Production Network, that is to be established, shall be sought.

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

The Project will strengthen the resilience of the national economy by providing renewable, biomass-based electricity at a competitive cost level, thereby controlling one of the two main cost drivers for the manufacturing companies established at industrial free zones in the Dominican Republic[30]. The Project is aimed at demonstrating and promoting the viability and benefits of decentralized electricity generation in the country, both for self-supply and for sales of surplus electricity to the national grid. The application of co-generation schemes will depend on the individual composition of electricity vs. heat demand and may not always be feasible. Notwithstanding, the Project envisages to make optimum use of available, domestic biomass resources whenever possible. Decentralized, biomass based electricity is expected to deliver electric energy for industrial users at a cost level 15-40% lower than prices on the deregulated market (which is due to imperfections in the national electricity market), simultaneously providing backup power to protect industrial areas from eventual blackouts. The price difference will directly translate into reduced operating costs, hence improving the operational result of an enterprise, especially for energy-intensive industries and sectors with narrow profit margins.

The access to secure and economical electric energy is a major asset for the industrial free zones in the country to maintain industries in the country. Improving the industrial performance is instrumental for preserving employment, with great social impact at the national and provincial level. From a national perspective, the high energy costs make Dominican Republic less attractive for foreign companies. Already established companies, of which many are (at least partially) owned by Dominican capital, face trouble to compete and may close down. Job

[29] See for example: http://www.theredddesk.org/countries/dominican_republic/info/activity/plan_sierra.

[30] The two main cost drivers are: energy (electricity and fuels) and work staff salaries

conservation is therefore one of the Government's key priorities. This particularly holds for the Santiago area, which depends heavily on the economic activity in its free zones.

Once demonstrated, it is expected that biomass-based energy generation will be adopted by industrial free zones and other large consumers in the country. In 2011, 51 free zones were operating in the Dominican Republic concentrating a total of 578 companies and employing more than 125,000 workers[31]; thus constituting a significant potential for replication. Early involvement of sector stakeholders (CNZFE, and sector associations) is part of the strategy to disseminate the outcomes of the Project and replicate the economic and environmental benefits. The Project is therefore expected to contribute to the transformation of the sector towards a more secure, economical and environmentally sustainable energy supply.

The Santiago Free Zone Corporation (CZFIS), which has the mandate to promote social and economic development in the region, will actively promote the interaction with local biomass producers. As part of the demonstration Project in Santiago the Project will cooperate with rural development organizations to design and organize sustainable biomass production and supply for the power plant while simultaneously diversifying income sources for rural families and land owners. Long-term agreements between small-scale producers and the power generator are considered the best way forward, enabling a stable revenue flow for producers in exchange for a secure supply of biomass material. Based on this pilot experience, the Project will generate lessons learnt and best practices for biomass sourcing strategies elsewhere in the country, and abroad.

During PPG, gender-specific issues were looked into. It is expected that social and economic benefits from biomass-based electricity supply will be shared equally by male and female workers in the industrial free zones. In the case of Santiago employment per gender is roughly 50%-50% but in other industrial zones, the situation may be different. Direct creation of jobs such as plant operator, truck driver, harvesting and biomass collection and processing (cutting, compacting) will likely favour men more than women, considering that this type of work is typically done by male workers. However, women often have a predominant role to sustain smallholder economies. Hence gender aspects will be paid particular attention to during the design of the biomass sourcing strategies. Similarly, communication and training activities will be reviewed to assure that they specifically address the needs of women. The Project will hire a gender expert to identify and assess gender aspects in more detail, to help design gender segregated targets and to propose gender mainstreaming measures, as and if appropriate.

B.3. Explain how cost-effectiveness is reflected in the project design:

The electricity volume produced by the demonstration biomass plant is equivalent to 23,652 MWh per year. The electricity production of biomass-based power plants as a result of market transformation is calculated at 433,620 MWh per year. The cost-effectiveness of the UNIDO/CNE initiative is estimated at US$ 5.31/ton CO_2eq, considering only the direct GHG benefits (245 kton CO_2eq). If the indirect GHG benefits (total 1.197 Mton CO_2eq) are included, the cost-effectiveness is of the order of US$ 1.09/ton CO_2eq.

C. DESCRIBE THE BUDGETED M &E PLAN:

Project monitoring and evaluation (M&E) will be conducted in accordance with established UNIDO and GEF procedures. The M&E activities are defined by Project component #4 and the concrete activities for M&E are specified and budgeted in the M&E plan (please see the table below). Monitoring will be based on indicators defined in the strategic results framework (which details the means of verification), and the annual work plans. Monitoring and Evaluation will make use of the GEF Tracking Tool, which will be submitted to the GEF Secretariat three times during the duration of the project: at CEO Endorsement, at mid-term, and at closure.

UNIDO as the Implementing Agency will involve the GEF Operational Focal Point and project stakeholders at all stages of project monitoring and evaluation activities in order to ensure the use of the evaluation results for further planning and implementation.

[31] Source: CNZFE. Informe Estadístico del Sector Zonas Francas 2011.

MONITORING AND EVALUATION PLAN AND BUDGET (INDICATIVE)

Type of M&E activity	Responsible Parties	Budget USD*			Time frame
		GEF	UNIDO	Gov't (in-kind)	
Inception Workshop (IW) and inception report	UNIDO Project Manager (PM); Project Management Unit (PMU)	0	2,500	7,500	Within first two months of project start up
Design of monitoring plan and tools for data collection and recording	UNIDO Project Manager (PM); Project Management Unit (PMU); expert consultancy	8,000	0	5,500	Within first two months of project start up
Backstopping by M&E specialist	UNIDO Project Manager (PM); Project Management Unit (PMU); expert consultancy	5,000	2,500	0	Annually
Review of project activities on gender-specific issues	UNIDO Project Manager (PM); expert on gender issues	2,000	4,000	2,000	Annually
Periodic progress reports and monitoring of project impact indicators (as per LogFrame)	UNIDO Project Manager (PM); Project Management Unit (PMU); Project Steering Committee (PSC); expert consultancy	0	23,500	5,000	Semi-annually
Measurement GEF Tracking Tool specific indicators	UNIDO Project Manager (PM); Project Management Unit (PMU); Project Steering Committee (PSC); expert consultancy	0	2,500	0	Mid of project and at project completion
Mid-term Review	UNIDO Project Manager (PM) or independent evaluator	10,000	10,000	0	Mid of project
Independent terminal Project Evaluation	Independent evaluator for submission to UNIDO Project Manager (PM)	25,000	15,000	0	Project completion (at least one month prior to the end of the project and no later than six months after project completion)
TOTAL indicative cost		50,000	60,000	20,000	

According to the Monitoring and Evaluation policy of the GEF and UNIDO, follow-up studies like Country Portfolio Evaluations and Thematic Evaluations can be initiated and conducted. All project partners and contractors are obliged to (i) make available studies, reports and other documentation related to the project and (ii) facilitate interviews with staff involved in the project activities.

Legal Context:
The Government of the Dominican Republic agrees to apply to the present project, mutatis mutandis, the provisions of the Standard Basic Assistance Agreement between the United Nations Development Programme and the Government, signed on 11 June 1974 and entered into force on 8 May 1975.

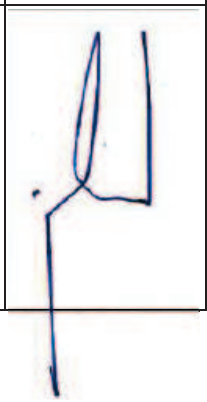
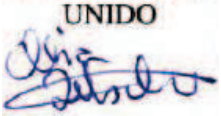
PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):): (Please attach the Operational Focal Point endorsement letter(s) with this form. For SGP, use this OFP endorsement letter).

NAME	POSITION	MINISTRY	DATE *(MM/dd/yyyy)*
Ms. Patricia Abreu Fernandez[32]	GEF Operational Focal Point	MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES	06/10/2011

B. GEF AGENCY(IES) CERTIFICATION

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

Agency Coordinator, Agency Name	Signature	Date Month/Day/Year	Project Contact Person	Telephone	Email Address
Philippe Scholtès Officer-in-Charge Programme Development and Technical Cooperation Division (PTC) UNIDO GEF Focal Point		10/29/2013	Nina Zetsche, Industrial Development Officer, PTC/ECC/RRE, UNIDO 	+43 (1) 26026 3569	n.zetsche@unido.org

[32] Letter of Endorsement was signed by the former Operational Focal Point Mr. Pedro Garcia Brito. The new OFP fully supports the project.

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

UNIDO/GEF Project: Stimulating Industrial Competitiveness Through Biomass-based, Grid-connected Electricity Generation.					
Applicable GEF Strategic Objective and Program: CCM Objective 3 "Promote Investment in Renewable Energy Technologies"					
Applicable GEF Expected Outcomes: CCM-3 "Favourable Policy Framework Created for Renewable Energy (RE) Investments in Industrial and Commercial Applications"; "Investment in RE Technologies Increased"					
Applicable GEF Outcome Indicators: CCM-3 "RE Policy and Regulation in Place"; "Electricity and Heat Produced from Renewable Resources"					
	Indicator	**Baseline**	**Targets (End of Project)**	**Means of verification**	**Assumptions**
Project Objective					
To promote the implementation of decentralized, biomass-based energy production in industrial free zones in the Dominican Republic with the aim of reducing GHG emissions, while contributing to their competitiveness.	**CO_2eq emissions**	**Lifetime tons of CO_2eq emissions avoided (0)**	**Lifetime tons of CO_2eq emissions avoided (244,800 tCO_2eq)**	**GEF climate change mitigation tracking tool**	**(1) Project is implemented as planned;** **(2) Data to calculate CO_2eq emission reductions is available**
Component 1	**Policy Support for Decentralized, Biomass-based Energy Generation.**				
Outcome 1. The policy and regulatory environment conducive to decentralized, biomass-based power and heat generation has been strengthened.	**Extent to which RE policies, regulations and strategies have been proposed.**	**No specific support for decentralized RE in place: level 1 GEF Tracking Tool.**	**Various policy measures and strategies have been proposed: level 3 GEF Tracking Tool.**	**Official publications; final evaluation.**	**(1) Sustained government commitment to strengthen policy framework;** **(2) Demonstrated economic, social and environmental benefits of decentralized (biomass) power generation compared to baseline situation.**
Output 1.1 Regulation for decentralized biomass-based power generation (environmental impact, nuisance, and water use) has been reviewed, adjusted and streamlined.	Draft regulation and/or guidelines for: (a) Generating concession, (b) Environmental impact, (c) Nuisance, and (d) Water use.	No special regulation or guidelines on 4 issues are in place (0;0;0;0).	Specific regulation or guidelines proposed on 4 issues (1;1;1;1).	Project records; official publications.	(1) Sustained government commitment to strengthen policy framework; (2) Adequate coordination with MIMAREMA, Santiago Municipality and other relevant authorities.
Output 1.2 Proposals for financial incentives to stimulate decentralized,	Proposal for financial incentives for small biomass	Law 57-07 in place; not effective to stimulate small	Proposal submitted (1).	Project records; official publications.	(1) Sustained government commitment to strengthen policy framework;

renewable energy technologies have been prepared and submitted to the Government for approval.	power plants	decentralized biomass energy plants (0).			(2) Economic benefits of decentralized RETs exist vs. baseline scenario and are acknowledged.
Output 1.3 Existing information sources on the biomass potential in the national territory have been validated and integrated.	Biomass resource database	Resource data fragmented and not validated; no database (0).	Updated database created (1).	Project records, field visits.	(1) Stakeholders are willing to share information and setup a national information point (database).
Output 1.4 Sustainable biomass sourcing strategies have been developed in coordination with rural development programmes in the Santiago region.	Sustainable sourcing strategies documented and endorsed by local stakeholders	Initial business proposals by CZFIS; some programmes targeting forestry in place in the region (Plan Sierra).	Strategies supported by local stakeholders (1).	Project documentation; possible MoU's with local CSOs (including smallholder groups).	(1) Viable biomass sourcing schemes can be devised; (2) local CSOs, smallholders and other stakeholders are interested to consider biomass supply as a source of income generation and land management.
Component 2	**Demonstration of Proven Biomass Technology for Electricity Generation.**				
Outcome 2. A biomass-based electric power plant (envisaged capacity 3 MW) has been adopted by the Santiago Industrial Free Zone.	**Installed capacity (MW); amount invested (US$).**	**(0 MW; US$ 0).**	**(3 MW[33]; US$ 6.5 million).**	**Project records, field visits; final evaluation.**	**1) Project designs are technically, social, environmentally and economically feasible;** **(2) Project financed by project developer;** **(3) Equipment providers and contractors deliver promptly.**
Output 2.1 A detailed feasibility study for the development of an envisaged 3 MW decentralized, biomass-based electricity plant at the Santiago Free Zone has been carried out.	Feasibility study.	No full study (0).	Feasibility study completed (1).	Project documentation; appraisals by counterparts.	(1) Prefeasibility studies are positive; (2) Positive decision by CZFIS and other stakeholders to start the biomass project.
Output 2.2 Supportive studies and technical designs have been prepared, and permits and concessions obtained.	Supportive studies; permits and concessions.	No studies (0); no permits and concessions (0).	Studies completed (1); all permits and concessions obtained (1).	Project documentation; appraisals by counterparts.	(1) Input data for technical studies all available; (2) Adequate site selected and acquired; (3) Adequate access to water use, water discharge, and road infrastructure.
Output 2.3 Staff from Santiago and other industrial free zones have	Trained people (number of persons).	No persons specifically trained (0).	Male staff (10) and female staff (10) trained (1).	Project documentation; appraisal by counterparts and	(1) Demonstration plant (Output 2.4) in place; Key personnel has been assigned

[33] Please note that final capacity may lie slightly below 3 MW.

received training on technical and managerial aspects of small-scale biomass plants				beneficiaries.	by the project operator (CZFIS);
Output 2.4 The envisaged 3 MW biomass-based electric power plant has been procured and made operational under an appropriate business model.	Business model for: (a) Power plant; (b) Biomass sourcing ; Biomass power plant.	No conceptual models in place (0; 0); No power plant (0).	Business models detailed and implemented (1; 1); Power plant operational (1).	Field visits; plant commissioning reports; bill of lading; appraisals by counterparts, final evaluation.	(1) Final project designs are technically, social, environmentally and economically feasible (Outputs 2.1 and 2.2 in place); (2) Project can be financed by project developer; (3) Equipment providers and contractors deliver promptly.
Component 3	**Supportive Activities for Training, Promotion and Dissemination.**				
Outcome 3. Awareness for the concept and benefits of biomass power generation has been raised among relevant stakeholders.	**Number of people that have been engaged with the concept and benefits of biomass power generation.**	**No people engaged with (0).**	**Women (50) and men (50) engaged with (1).**	**Project documentation, publications and proceedings.**	**(1) Demonstration plant procured and operational;** **(2) Sustained interest in biomass generation by industrial free zones.**
Output 3.1 A communication plan has been prepared to interact with civil society organizations and the general public in Santiago.	Communication plan.	No communication plan (0).	Communication plan (1).	Project documentation, publications; meeting minutes with CSOs.	(1) CZFIS and CZNFE are committed to engage with local stakeholders; (2) CSOs are willing interact with the Project.
Output 3.2 Operational experience and best practices from the Santiago demonstration plant have been compiled.	Best practices, especially with respect to environmental and financial performance.	Only experience with biomass based steam generation (0).	Best practices compiled (1).	Project documentation and publications.	(1) Demonstration plant procured and operational (Outputs 2.1-2.4 completed).
Output 3.3 Promotional activities including technical seminars, dissemination events, and drafting of technical manuals and guidelines, have been carried out.	Promotional activities; Manuals and guidelines.	No promotional activities (0); No manuals and guidelines (0).	Promotional activities implemented (1); Manuals and guidelines compiled (1).	Publications, seminar proceedings; Technical reports.	(1) Demonstration plant procured and operational; (2) Sustained interest in biomass generation by industrial free zones.

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

GEF Council IWP February 2012

Dominican Republic: Stimulating Industrial Competitiveness Through Biomass-based, Grid-connected Electricity Generation (UNIDO) (GEF Project Grant: $1,300,000)

Canada Comments:

Q1) The PIF does not make an environmental, financial, or technical case for why biomass is best suited for this project over other sources of renewable energy. The project states that there is no existing demand from industries in the targeted industrial free zones to implement biomass generation plants. There is a need to develop a financially sustainable exit strategy once the project closes.

R1) Please refer to STAP Q1 concerning the choice for biomass technology. Note that the approach of the demonstration project in Santiago has changed. At PIF stage, there was no leading role for the operator of the Santiago Industrial Free Zone (the Corporation CZFIS) and it was foreseen to facilitate a joint effort by CZFIS and the industries hosted at the free zone. This situation changed early 2012, as it became clear that existing wholesale contracts would be rescinded. In response, CZFIS took the lead in the process and established an energy work group, which became the direct counterpart for the UNIDO/CNE Project in Santiago.

The legal entity to operate the demonstration plant will provide a solid platform for operational and financial sustainability, thereby securing the results generated with GEF funding in Santiago. Technical assistance in the field of energy and environmental policy is absorbed by CNE and MIMAREMA. There is a need to strengthen institutional capacity and improve continuity at the government level. Notwithstanding, progress in this respect is being made by CNE, which further receives expert support with donor funding from GIZ. As appreciated during PPG, there are also good working relations with national universities in the field of renewable energy. The Project will contribute to this process and expects that its results can effectively be anchored within CNE.

USA Comments:

We have two concerns about this project and would like to review the full proposal to ensure that it addresses these questions and concerns.

Q2) First, we share the STAP question on what type of biomass will be used and if there is sufficient volume of biomass for the project to be sustainable. The proposal does mention in a footnote that agricultural waste such as rice husk residue will be used but doesn't provide details for the cost of the materials and transport, nor the actual volume available.

R2) Please refer to STAP Q3 concerning the type of biomass used. As part of the PPG, a consultancy has been carried out assessing the availability of biomass feedstock close to Santiago (30 km radius) and in the neighbouring provinces (up to 120 km). This study provides answers with respect to produced volumes, ownership and the existence of supply structures.

Q3) Second, the Secretariat Review document asks how the government will manage the GEF funding, and if 2.5 MW is enough to cover the total energy needs of the Free Trade Zone. Additionally, part of the economic rationale for this project is based on current average electricity costs of $0.18 per kWh, versus a cost of $0.10 for biomass-based power. Industrial users often receive a much discounted rate from the "normal" rate.

R3) The GEF funding will be managed directly by UNIDO and implemented according to the budget included as Annex E. An important revision compared to the PIF is that the establishment of a local financial mechanism in Santiago is no longer pursued. This, given the full commitment of CZFIS to the GEF Project and its leading role for developing, owning and operating the biomass plant, and placing the investment (equity). GEF resources will be used to facilitate the process with technical expertise, for investment in equipment to minimize externalities and environmental impact, and to generate best practices.

The economic performance of the demonstration plant has been evaluated for an electricity cost of USD 110/MW, USD 130/MWh, and USD 150/MWh. The results are positive (please see Annex J for further details). The present electricity purchase price for CZFIS is in this range, but sales to the hosted companies is presently around USD 180/MWh. In order to increase economic competitiveness, CZFIS strives at lowering this price to about USD 160/MWh. While wholesale contracts will be at a substantially higher price in the near future, the biomass plant may provide electricity at a very competitive price level for the local industries.

Q4) Another question is how does the biogas project compare to natural gas? In this light, we have some concerns about the financial viability of the project. In particular, we would like to know whether the fairly modest savings resulting from switching from natural gas to biomass will warrant the overall cost and long-term viability of the project.

R4) Please note that industries do not receive electricity at a discounted rate in the DR. Gas supply to DR is expensive and prices vary with international market prices. Industrial free zones may set up small power plants (engines) operated by natural gas. This would be a technically mature solution. However, in order to be independent from imported energy sources, the Project and CZFIS pursue a biomass-based solution.

France Comments:
The project aims at promoting biomass based electricity production for industrial zones in Dominican Republic. We support this initiative but suggest addressing the following concerns when developing the project brief:

Q5) What is the rationale for selecting biomass power over other renewable energy options? Are there any existing biomass systems in DR which show the financial and technical feasibility of the biomass power systems? Will it be the first such system?

R5) Please refer to STAP Q1.

Q6) The PIF proposes to remove legal and policy barriers. How significant are these barriers? Generic barriers are listed and a systematic DR and biomass power system specific barrier analysis is necessary during project preparation.

R6) Please refer to STAP Q4.

Q7) As STAP said, the focus of the project seems to be establishment of a 2.5 MW biomass power utility. There are only generic statements on promoting large-scale spread of the technologies. But there is need for serious consideration of activities to promote the spread of the technology. For example technology standardization (optimized capacities), national biomass resource map, optimized siting of biomass power plants, cost-benefit analysis, and consideration at what cost biomass and electricity will biomass power will be economical.

R7) Please refer to STAP Q5.

STAP Scientific and Technical screening of the Project Identification Form (PIF);
Date of screening: January 26, 2012

The project aims at promoting biomass based electricity production for industrial zones in Dominican Republic. STAP is supportive of this initiative and recommends consent to the project, but suggests addressing the following concerns when developing the project brief:

Q1) What is the rationale for selecting biomass power over other renewable energy options? Are there any existing biomass systems in DR which show the financial and technical feasibility of the biomass power systems? Will it be the first such system?

R1) The Dominican Republic is dependent on imported fossil fuels for its energy supply in the absence of any national production of oil or gas. Electricity costs in the country are high, expect for residential users below a certain threshold;

fuel costs are also high. For industrial users, even those who can buy on the wholesale market, electricity costs are well above the regional average, greatly undermining competitiveness. This situation is largely due to demand exceeding supply, large commercial losses, and the fact that the regulated users, through the public distribution companies, receive preferential treatment.

Industries respond to this situation by investing in generating capacity for self-supply; such installations are usually site-bound. Proven renewable energy options that fit into this picture include wind, solar and biomass. Wind energy is not easily integrated into industrial areas, which are also not necessarily located in high-wind areas. Wind energy has recently made substantial progress in DR for large-scale generation to feed into the national grid however. Solar water heating has limited scope for industrial purposes, given the demand for high-grade energy (steam and electricity) rather than hot water.

The advantage of biomass is its ability to provide power "on demand", much like other thermal power plants. This consideration, together with the apparent "abundant availability of biomass resources" in the country, defines the rationale for the GEF Project. One of the main objectives of the Project (and CNE) is to assess and quantify the effective availability of biomass for power generation. It is clearly not enough just to have abundant resources. Markets for biomass material and logistical structures are not yet developed, and the economics of biomass usage for energy generation, and its impacts on land use and emissions are not assessed in detail.

The envisaged 3 MW biomass demonstration plant in Santiago is included in the Project to show the viability of self-supply generation in the country, using a renewable source of energy. Its successful implementation would be a major achievement and attract the interest of other industries and investors. It is important to highlight that the commercial risks for investments in self-supply generation are lower than for large-scale power plants. Therefore, successful demonstration can boost the construction of local power plants for electricity and co-generation in the country (either biomass, or fuel-based).

Presently, several biomass-based power plants are in operation in the country, but only for steam production. (These power plants have circumvented the lack of biomass markets in the country by directly securing supply from plantations.)

Q2) Will the systems be based on biomass combustion or gasification systems? Will it be a single 2.5 MW unit or will it consist of multiple units of different capacities? How was this 2.5 MW capacity decided, will it change once the biomass resource is assessed? PPG stage should be used to decide the optimum capacity of the biomass power system; based on the biomass resource and plant load factor feasible.

R2) The final choice for the technology will be made after completion of the full feasibility study. The pre-feasibility study carried out under the PPG indicates that biomass combustion (combined with a Rankine steam Cycle) is economically more attractive than gasification, considering the local circumstances. Steam cycle technology is also better known in the country, while gasification would be innovative, potentially having higher technology risks.

The electricity generation capacity is presently determined at 3 MW to match the Free Zone's base load. This is the most attractive choice from a regulatory perspective, as it avoids the complexity of becoming a generator in the National System. If steam cycle technology is used, it would consist of one unit that would operate at constant power. (In case gasifiers would be used, a modular approach could be taken.) While combined generation of electricity and heat would generally increase the overall energy performance, heat consumption in the Santiago Free Zone has been assessed as modest. Moreover, in the tropical climate there is no demand for low-grade residual heat (for example for space heating). As such, co-generation will not be as energy-efficient here (below 30%) as under optimum conditions. It has thus been decided to focus on electricity generation only.

Q3) A biomass resource assessment for the project is proposed, and it is the first critical step in decisions on capacity. What is the primary source of biomass – crop and plantation residue or from dedicated plantations? Transportation costs and CO2 emissions from transportation should be accounted for and life cycle analysis presented in the project document for CEO endorsement.

R3) A biomass resource assessment has been conducted during PPG, focused on biomass supply for the demonstration plant at Santiago. The study points out that rice husk, rice stalks, organic municipal waste, and woody biomass (Acacia mangium) is available in sufficient quantities. Municipal organic waste is not considered to avoid health issues due to polluting or hazardous substances. The agricultural residues rice husk and rice stalks are available in large quantities within reasonable distance from Santiago. However, there are presently no market structures in place for their delivery. Acacia mangium plantations provide sufficient quantities of wood; the plant in Santiago will have to compete for these resources though.

Since the demonstration plant will be a commercial activity, mitigation of project risks will be done from a business perspective. This extends to the determination of the project's size and to securing of biomass resources. The Corporation of the Santiago Free Zone, under the PPG, has proposed different options to this purpose, all of them based on achieving control over the supply chain. Setting up such a chain, preferably involving small rural producers in the area, may take more time than constructing the power plant. Meanwhile Acacia mangium can serve as an initial source to operate the plant. The prefeasibility study points out that the economy of the power plant is acceptable even at substantial prices for biomass (of USD 45 per ton delivered). An estimate of the GHG benefits for the demonstration plant is included in section A.5. as well as Annex G.

Given the sustained high costs of electricity in the country, economic and financial feasibility for the investor seem guaranteed. However, this situation does not necessarily favour the efficient use of biomass resources and the application of state-of-the-art technology. In the case of non-valued agricultural residues, their cost would basically consist of the cost of treatment and logistics. Externalities related to production, including land use and GHG emissions, would remain out of sight of the final buyer.

The Project acknowledges that life cycle analysis is critical for large-scale replication of biomass power generation in the country. CNE is collaborating with several international organizations to quantify biomass resources in the country. The Project proposes to complement this work (through the planned GEF-funded activities with CNE) to determine the effective economic and environmental benefits of biomass supply chains by applying LCA on different feedstocks and in different regions of the country. UNIDO has in-house expertise in this field. An LCA has not been applied ex ante on the proposed commercial demonstration plant in Santiago, given the limited data on the productive systems of biomass resources for this business case. This will be addressed during the GEF Project and LCA analysis will be used as a tool for optimization of the production and supply chains.

Q4) The PIF proposes to remove legal and policy barriers. How significant are these barriers? Generic barriers are listed and a systematic DR and biomass power system specific barrier analysis is necessary during project preparation.

R4) As assessed during PPG, policy and legal barriers are not critical for the implementation and operation of a local power plant using biomass resources. Improved regulation can speed up processes however. Policy is highly relevant, when it comes to replication and mobilization of available biomass resources in the country.

A specific barrier analysis has been made during PPG and is included in section A.4.

Q5) The focus of the project seems to be establishment of a 2.5 MW biomass power utility. There are only generic statements on promoting large-scale spread of the technologies. But there is need for serious consideration of activities to promote the spread of the technology. For example – technology standardization (optimized capacities), national biomass resource map, optimized siting of biomass power plants, cost-benefit analysis, and consideration at what cost biomass and electricity will biomass power will be economical.

R5) We fully agree that the mentioned activities are critical for large-scale application of biomass resources for power (energy and heat) generation. The decision by a commercial organization (CZFIS) to invest in the envisaged power plant is a very strong demonstration of commitment and will ensure that any risks that may affect its successful operation will be dealt with carefully. This includes economic performance, cost-benefit analysis, and siting to optimize logistics and minimize negative effects for the environment and people. Given the incipient market for biomass technology, there are as yet no criteria for standardization in DR. As became clear during the PPG, independent experts on biomass technology are very rare in the region. The market is largely driven by equipment suppliers looking for

projects. By consequence, customers fear that technical information and analyses be biased. The value-added of the GEF Project to provide impartial technical assistance is recognized by all stakeholders.

Defining the appropriate contracting modality for procurement and servicing will also be highly important. The demonstration plant will expectedly generate useful lessons on this aspect. With respect to improving conditions for large-scale replication, please refer to R.3, last paragraph.

Q6) Two key challenges to promotion of biomass-based energy sources are insecurity of feedstock supply and unpredictable/under-developed government policies. The PIF does address these two barriers at some extent, but it is not clear how sustainable project outcomes will be over the long term (e.g. the typical life-time of the power plants). STAP suggests enhancing project efforts in developing robust models for feedstock supply using e.g., public-private partnerships as a viable alternative in many countries. Often regulating waste management policies in general can be conducive for biomass markets too. Market policies, feed-in tariffs, and mandatory targets for renewable energy including biomass proved to be effective policy instruments. During project preparation it is expected that a more coherent picture on policy support will be presented.

R6) The findings of the PPG are line with STAP observations. At least for the demonstration plant in Santiago, partnerships between the Corporation CZFIS and the biomass producers are the preferred way forward to secure supply, simultaneously stimulating social and economic development by rural families. Several scenarios have been proposed with different levels of vertical integration of the supply chain. The economy of the demonstration plant appears to be solid, with electricity market prices at a sustained high level and biomass prices controllable. As understood during the PPG, the influence of government policy on both variables is small, as prices are largely determined by markets.

The purpose of the GEF Project is not to establish a full market for large-scale biomass-based electricity generators in the country. This would not be feasible at the modest budget available and considering the existing flaws in the functioning of the national electricity market, which go beyond the scope of renewable energy technology. In particular, investments in larger power plants are stalled due to the fact that commercial risks are considered too high. The same risk would be in place for large biomass plants.

Instead, the GEF Project is focused at decentralized, renewable power generation to secure energy supply for industrial free zones and other large consumers. Ideally, local power plants would operate embedded in the National System to exploit the potential benefits of the deregulated market. For the moment, the operator of the demonstration plant in Santiago opts to generate for self-supply only, as this reduces regulatory and commercial complexity. This makes sense as the power plant's capacity is very small to operate effectively as an independent power generator.

Policy action supporting biomass development can be related to regulation, incentives, and control of organic waste flows, including municipal waste, agricultural and forestry residues. This involves mainly CNE and the Ministry of Environment and Natural Resources (MIMAREMA). The Project will provide inputs for policy development and regulation in these aspects. Specific policy targets and supportive regulation for decentralized power generation are other outcomes that can be pursued, and include streamlined permitting, environmental studies, and incentives to facilitate project preparation.

Many of the products delivered with support of the Project (especially related to assessment of biomass resources, logistics, and life-cycle impacts and benefits) will be of use for larger-scale generation as well.

Q7) The PIF states that based on "Preliminary data", biomass based electricity is cost-effective. What is the source or reference of this preliminary data – where was it obtained? Are the costs of biomass production, transport and handling activities included in final cost calculations? What capacity plants and what plant load factor were considered as the cost of power generated will depend on a whole lot of factors. The PIF indicates that costs rather than amount of energy supplies is a critical factor in industrial zones suggesting that cost consideration will be particularly important in this project. STAP recommends conducting detailed cost-benefit analysis of the entire project supply chain from biomass residues supply to power generation and waste disposal to have a full picture of anticipated costs and target interventions addressing identified cost barriers

R7) The preliminary data refer to indicative figures for investment costs, the reference price for electricity, and the costs of biomass resources in existing steam-producing plants in the country.

At the time of preparing the PIF, the Santiago Free Zone (CZFIS) had a supply wholesale contract with a large electricity generator at a favourable price. Substantial investment was made in a new a substation, which is recovered through the internal electricity tariff. Since overall generating capacity in the National System falls short, these private contracts were rescinded by State intervention. New contracts with private generators will be at a much higher price (30%-50% increment). In this new situation, the economy of the envisaged demonstration plant will be more attractive.

The cost for biomass feedstock is based on local market information (for Acacia mangium) which is about USD 48 per ton. This is composed as follows: USD 10 for wood producer; USD 27.40 for harvesting and treatment; USD 10.30 transport. CZFIS expects that costs can be reduced to USD 20 per ton under a vertically integrated production model, and using available agricultural residues and woody material harvested by local farmers in the region. Please refer to further details contained within the main sections of this document as well as the annexed prefeasibility study (Annex J) for a description of assumptions and economic performance.

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ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS[34]

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

PPG Grant Approved at PIF: USD 60,000			
Project Preparation Activities Implemented	***GEF/LDCF/SCCF/NPIF Amount ($)***		
	Budgeted Amount	***Amount Spent To Date***	***Amount Committed***
Documents with: (i) detailed assessment of biomass resources in the Dominican Republic (focus on Santiago region); (ii) identification of market issues, logistics, constraints and risks; (iii) drafting of model contracts with biomass suppliers	20,000	18,222.30	0
Document with detailed assessment of (i) framework conditions; (ii) potentials and possibilities for improvement and/or amendment measures that can be targeted to facilitate the implementation of decentralised biomass-based energy generation in industrial free zones.	6,000	5,656.78	0
Document including: (i) pre-feasibility study of envisaged biomass plant, covering technical, economic and financial parameters; (ii) detailed energy assessment of the Santiago IFZ considering current as well as anticipated future electricity needs; (iii) baseline study and proposed methodology to evaluate GHG benefits; (iv) identification of project risks and barriers.	8,000	0	0
Document including: (i) detailed project plan for the biomass plant, endorsed by all stakeholders; (ii) confirmation of co-funding sources A joint CNE-CNZFE* task force to promote renewable energy technologies and rational energy use within industrial free zones has been established. *CNE, Comisión Nacional de Energía (National Energy Commission). CNZFE, Consejo Nacional de Zonas Francas de Exportación (National Council for Free Trade Zones).	5,000	1,062.05	4,994.44
Outputs: (i) Project document finalized (including strategy, detailed activities per component, indicators, measurement, assumption, risks, monitoring and evaluation plan) (ii) Incremental cost matrix finalized for	21,000	16,277.67	2,996.19

[34] If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities.

GEF budget (including logical framework, baseline, GEF alternative, national and global benefits (iii) Private sector investment plan developed with co-financing confirmed from the various stakeholders			
Total	60,000	41,218.18	7,990.63

With respect to Activity 3, please note that it was conducted using funding provided by UNIDO since no national consultant could be identified suitable to carry out this task.

With respect to Activity 4, please note that the amount committed is to be fully returned to UNIDO upon financial closure of the project.

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

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/NPIF Trust Fund or to your Agency (and/or revolving fund that will be set up)

N/A

ANNEX E BUDGET ALLOCATION

BUDGET ALLOCATION							
COMPONENTS & ACTIVITIES		**BUDGET ALLOCATION**					
		Funding Source					
		GEF	**COF**		**UNIDO Allotment line**		**leading entity**
			in-kind	**cash**	**code**	**description**	
		(US$)	**(US$)**	**(US$)**			
COMPONENT 1. POLICY							
1.1	(i) subcontracted study of relevant regulation	**20,000**	**25,000**	**0**	21-00	subcontracts	CNE/UNIDO
	(ii) subcontracted drafting of proposals for amendments to regulation	**30,000**	**87,000**	**0**	21-00	subcontracts	CNE/UNIDO
	(iii) national expert hired for technical support	**10,000**	**0**	**0**	17-00	national experts	UNIDO
	(iv) international expert(s) for technical backstopping and advisory tasks	**10,000**	**0**	**0**	11-00	international experts	UNIDO
1.2	(i) subcontracted study to review existing incentives and identify and detail opportunities for improvement	**25,000**	**100,000**	**0**	21-00	subcontracts	CNE/UNIDO
	(ii) national expert hired for technical support	**10,000**	**0**	**0**	17-00	national experts	UNIDO
1.3	(i) national expert hired to identify data sources and incorporate existing information into one integrated system	**20,000**	**0**	**0**	17-00	national experts	CNE/UNIDO
	(ii) subcontracted study to apply life-cycle analysis (LCA) methodologies on selected biomass sources	**42,000**	**50,000**	**0**	21-00	subcontracts	CNE/UNIDO
1.4	(i) subcontract to a local institute to design sustainable biomass sourcing mechanisms	**70,000**	**140,000**	**0**	21-00	subcontracts	CNZFE/ UNIDO
	(ii) subcontract training activities on sustainable biomass production	**25,000**	**35,000**	**0**	21-00	subcontracts	CNZFE/ UNIDO
	(iii) international expert(s) for technical backstopping and advisory tasks	**25,000**	**0**	**0**	11-00	international experts	CNZFE/ UNIDO
	Subtotal	**287,000**	**437,000**	**0**			
COMPONENT 2. DEMONSTRATION							
2.1	(i) subcontracted feasibility study for the biomass power plant at Santiago	**135,000**	**25,000**	**40,000**	21-00	subcontracts	CZFIS
	(ii) international expert(s) for technical backstopping and advisory tasks	**10,000**	**0**	**0**	11-00	international experts	UNIDO/ CZFIS
2.2	(i) subcontract for technical studies for the biomass power plant at	**190,000**	**135,000**	**90,000**	21-00	subcontracts	CZFIS

BUDGET ALLOCATION							
COMPONENTS & ACTIVITIES		BUDGET ALLOCATION					
		Funding Source					
		GEF	COF		UNIDO Allotment line		leading entity
			in-kind	cash	code	description	
		(US$)	(US$)	(US$)			
	Santiago						
	(ii) subcontract for additional studies including environmental impact assessment	**60,000**	**20,000**	**0**	21-00	subcontracts	CZFIS
	(iii) international expert(s) for technical backstopping and advisory tasks	**10,000**	**0**	**0**	11-00	international experts	UNIDO/ CZFIS
2.3	(i) subcontract to design and implement training activities	**5,000**	**30,000**	**40,000**	21-00	subcontracts	CNZFE/ UNIDO/ CZFIS
	(ii) subcontract for hosting of training events in Santiago	**0**	**0**	**30,000**	21-00	subcontracts	CZFIS
2.4	(i) one or more subcontracts for procurement of equipment and installations	**325,000**	**0**	**0**	21-00	subcontracts	CZFIS/ UNIDO
	(ii) investment in the biomass plant by CZFIS	**0**	**0**	**6,275,000**	21-00	subcontracts	CZFIS
	Subtotal	**735,000**	**210,000**	**6,475,000**			
COMPONENT 3. TRAINING AND PROMOTION							
3.1	(i) one or more subcontracts to national institutes to develop and implement a communication plan	**50,000**	**50,000**	**0**	21-00	subcontracts	CNE/CNZFE/ UNIDO
3.2	(i) subcontract to collect operational experiences and best practices from the Santiago biomass plant	**10,000**	**10,000**	**0**	21-00	subcontracts	CNE/CNZFE/ UNIDO
3.3	(i) subcontract to draft technical manuals and guidelines for biomass project developers	**30,000**	**20,000**	**0**	21-00	subcontracts	CNE/CNZFE/ UNIDO
	(ii) one or more subcontracts for organizing and hosting seminars	**8,000**	**30,000**	**0**	21-00	subcontracts	CNZFE/ UNIDO
	(iii) one subcontract for an assessment of the likely effectiveness of ongoing activities carried out as part of output 3.3	**15,000**	**10,000**	**0**	21-00	subcontracts	CNE/CNZFE/ UNIDO
	Subtotal	**113,000**	**120,000**	**0**			
COMPONENT 4. MONITORING & EVALUATION							
4.1	(i) subcontract for hosting of inception workshop	**0**	**7,500**	**2,500**	21-00	subcontracts	CNE/UNIDO
	(ii) subcontract for design of monitoring plan and tools	**8,000**	**5,500**	**0**	21-00	subcontracts	CNE/UNIDO
	(iii) subcontract for M&E specialist to provide backstopping	**5,000**	**0**	**2,500**	21-00	subcontracts	UNIDO
4.2	(i) national consultancy in gender	**2,000**	**2,000**	**4,000**	17-00	national	UNIDO

BUDGET ALLOCATION							
COMPONENTS & ACTIVITIES		BUDGET ALLOCATION					
		Funding Source					
		GEF	COF		UNIDO Allotment line		leading entity
			in-kind	cash	code	description	
		(US$)	(US$)	(US$)			
	issues and human development					experts	
	(ii) regular monitoring site visits by PM and PMU	**0**	**5,000**	**26,000**	16-00	staff travel	UNIDO
4.3	(i) international consultancy for mid-term review	**10,000**	**0**	**10,000**	11-00 / 17-00*	international experts / national experts	UNIDO
	(ii) international consultancy for GEF terminal evaluation	**25,000**	**0**	**15,000**	11-00 / 17-00*	international experts / national experts	UNIDO
	Subtotal	**50,000**	**20,000**	**60,000**			
TOTAL (COMPONENT 1-4)							
	TOTAL	**1,185,000**	**787,000**	**6,535,000**			

*A split of 25% for BL 17-00 and 75% for BL 11-00 is assumed.

SUMMARY BUDGET ALLOCATION (COMPONENT 1-4)*			
UNIDO Allotment line	Funding Source		
	GEF	COF	COF (in-kind)
international experts (11-00)	81,250	18,750	0
national experts (17-00)	50,750	10,250	2,000
subcontracts (21-00)	1,053,000	6,480,000	780,000

*All figures exempt of rounding errors.

PROJECT MANAGEMENT BUDGET ALLOCATION						
COMPONENTS & ACTIVITIES		BUDGET ALLOCATION				
		Funding Source				
		GEF	COF (in-kind)	UNIDO Allotment line		leading entity
		(US$)	(US$)	code	description	
PROJECT MANAGEMENT						
		115,000	**298,000**			
	Project Coordinator (4 yrs) – Santiago	**115,000**	**45,000**	17-00	national experts	UNIDO/CNE
	Administrator (4 yrs) - Santiago	**0**	**48,000**			CNE
	Communication	**0**	**30,000**			CNE/CNZFE
	Office (Santiago)	**0**	**55,000**			CNE/CNZFE
	Transport	**0**	**20,000**			CNE/CNZFE
	Travel	**0**	**20,000**			CNE/CNZFE

PROJECT MANAGEMENT BUDGET ALLOCATION						
COMPONENTS & ACTIVITIES		BUDGET ALLOCATION				
		Funding Source				
		GEF	COF (in-kind)	UNIDO Allotment line		leading entity
		(US$)	(US$)	code	description	
	National Project Director – Santo Domingo	**0**	**80,000**			CNE/CNZFE
TOTAL PROJECT MANAGEMENT COSTS						
	TOTAL	**115,000**	**298,000**			

CONSULTANCY / EXPERT TIME PER ACTIVITY (approximation)					
COMPONENTS & ACTIVITIES		WORKING DAYS			
		GEF		COF	
		intern	national	intern	national
COMPONENT 1. POLICY					
1.1	(iii) national expert hired for technical support		33.33		0
1.1	(iv) international expert(s) for technical backstopping and advisory tasks	16.67		0	
1.2	(ii) national expert hired for technical support		33.33		0
1.3	(i) national expert hired to identify data sources and incorporate existing information into one integrated system		66.67		0
1.4	(iii) international expert(s) for technical backstopping and advisory tasks	41.67		0	
COMPONENT 2. DEMONSTRATION					
2.1	(ii) international expert(s) for technical backstopping and advisory tasks	16.67		0	
2.2	(iii) international expert(s) for technical backstopping and advisory tasks	16.67		0	
COMPONENT 4. MONITORING & EVALUATION					
4.2	(i) national consultancy in gender issues and human development.		6.67		13.33
4.3	(i) consultancy for mid-term review	12.5	8.33	12.5	8.33
4.3	(ii) consultancy for GEF terminal evaluation	31.25	20.83	18.75	12.5
TOTAL (COMPONENT 1-4)					
	TOTAL* (days)	**135.42**	**169.16**	**31.25**	**34.16**

*Contains rounding errors

ANNEX F ANNUAL BUDGET (INDICATIVE; INCL. CASH AND IN-KIND)

COMPONENTS & ACTIVITIES		ANNUAL BUDGET PLANNING (US$)									
		Funding Source		YEAR 1		YEAR 2		YEAR 3		YEAR 4	
		GEF	COF	GEF	COF	GEF	COF	GEF	COF	GEF	COF
COMPONENT 1. POLICY											
1.1	(i) subcontracted study of relevant regulation	**20,000**	**25,000**	20,000	25,000	0	0	0	0	0	0
	(ii) subcontracted drafting of proposals for amendments to regulation	**30,000**	**87,000**	10,000	15,000	10,000	25,000	10,000	25,000	0	22,000
	(iii) national expert hired for technical support	**10,000**	**0**	5,000	0	5,000	0	0	0	0	0
	(iv) international expert(s) for technical backstopping and advisory tasks	**10,000**	**0**	5,000	0	5,000	0	0	0	0	0
1.2	(i) subcontracted study to review existing incentives and identify and detail opportunities for improvement	**25,000**	**100,000**	0	20,000	15,000	30,000	10,000	50,000	0	0
	(ii) national expert hired for technical support	**10,000**	**0**	0	0	5,000	0	5,000	0	0	0
1.3	(i) national expert hired to identify data sources and incorporate existing information into one integrated system	**20,000**	**0**	20,000	0	0	0	0	0	0	0
	(ii) subcontracted study to apply life-cycle analysis (LCA) methodologies on selected biomass sources	**42,000**	**50,000**	22,000	25,000	20,000	25,000	0	0	0	0
1.4	(i) subcontract to a local institute to design sustainable biomass sourcing mechanisms	**70,000**	**140,000**	30,000	50,000	20,000	50,000	20,000	40,000	0	0
	(ii) subcontract training activities on sustainable biomass production	**25,000**	**35,000**	0	0	15,000	20,000	10,000	15,000	0	0
	(iii) international expert(s) for technical backstopping and advisory tasks	**25,000**	**0**	10,000	0	7,500	0	7,500	0	0	0
	Subtotal	**287,000**	**437,000**	**122,000**	**135,000**	**102,500**	**150,000**	**62,500**	**130,000**	**0**	**22,000**
				42%	*31%*	*36%*	*34%*	*22%*	*30%*	*0%*	*5%*
COMPONENT 2. DEMONSTRATION											
2.1	(i) subcontracted feasibility study for the biomass power plant at Santiago	**135,000**	**65,000**	135,000	65,000	0	0	0	0	0	0
	(ii) international expert(s) for technical backstopping and advisory tasks	**10,000**	**0**	10,000	0	0	0	0	0	0	0

COMPONENTS & ACTIVITIES		ANNUAL BUDGET PLANNING (US$)									
		Funding Source		YEAR 1		YEAR 2		YEAR 3		YEAR 4	
		GEF	COF	GEF	COF	GEF	COF	GEF	COF	GEF	COF
2.2	(i) subcontract for technical studies for the biomass power plant at Santiago	**190,000**	**225,000**	100,000	80,000	90,000	145,000	0	0	0	0
	(ii) subcontract for additional studies including environmental impact assessment	**60,000**	**20,000**	20,000	10,000	40,000	10,000	0	0	0	0
	(iii) international expert(s) for technical backstopping and advisory tasks	**10,000**	**0**	5,000	0	5,000	0	0	0	0	0
2.3	(i) subcontract to design and implement training activities	**5,000**	**70,000**	0	0	5,000	20,000	0	30,000	0	20,000
	(ii) subcontract for hosting of training events in Santiago	**0**	**30,000**	0	0	0	10,000	0	10,000	0	10,000
2.4	(i) one or more subcontracts for procurement of equipment and installations	**325,000**	**0**	0	0	150,000	0	175,000	0	0	0
	(ii) investment in the biomass plant by CZFIS	**0**	**6,275,000**	0	0	0	2,175,000	0	4,100,000	0	0
	Subtotal	**735,000**	**6,685,000**	**270,000**	**155,000**	**290,000**	**2,360,000**	**175,000**	**4,140,000**	**0**	**30,000**
				37%	*2%*	*39%*	*35%*	*24%*	*62%*	*0%*	*1%*
COMPONENT 3. TRAINING AND PROMOTION											
3.1	(i) one or more subcontracts to national institutes to develop and implement a communication plan	**50,000**	**50,000**	20,000	20,000	20,000	10,000	10,000	20,000	0	0
3.2	(i) subcontract to collect operational experiences and best practices from the Santiago biomass plant	**10,000**	**10,000**	0	0	0	0	0	0	10,000	10,000
3.3	(i) subcontract to draft technical manuals and guidelines for biomass project developers	**30,000**	**20,000**	0	0	10,000	10,000	10,000	5,000	10,000	5,000
	(ii) one or more subcontracts for organizing and hosting seminars	**8,000**	**30,000**	0	0	0	0	5,000	15,000	3,000	15,000
	iii) one subcontract for an assessment of the likely effectiveness of ongoing activities carried out as part of output 3.3	**15,000**	**10,000**	0	0	0	0	0	0	15,000	10,000
	Subtotal	**113,000**	**120,000**	**20,000**	**20,000**	**30,000**	**20,000**	**25,000**	**40,000**	**38,000**	**40,000**
				18%	*17%*	*26%*	*17%*	*22%*	*33%*	*34%*	*33%*
COMPONENT 4. MONITORING & EVALUATION											
4.1	(i) subcontract for hosting of inception workshop	**0**	**10,000**	0	10,000	0	0	0	0	0	0
	(ii) subcontract for design of	**8,000**	**5,500**	8,000	5,500	0	0	0	0	0	0

COMPONENTS & ACTIVITIES		ANNUAL BUDGET PLANNING (US$)									
		Funding Source		YEAR 1		YEAR 2		YEAR 3		YEAR 4	
		GEF	COF	GEF	COF	GEF	COF	GEF	COF	GEF	COF
	monitoring plan and tools										
	(iii) subcontract for M&E specialist to provide backstopping	**5,000**	**2,500**	1,000	500	1,500	500	1,000	1,000	1,500	500
4.2	(i) national consultancy in gender issues and human development.	**2,000**	**6,000**	1,000	1,500	1,000	2,000	0	2,500	0	0
	(ii) regular monitoring site visits by PM and PMU	**0**	**31,000**	0	8,000	0	8,500	0	8,000	0	6,500
4.3	(i) international consultancy for mid-term review	**10,000**	**10,000**	0	0	10,000	10,000	0	0	0	0
	(ii) international consultancy for GEF terminal evaluation	**25,000**	**15,000**	0	0	0	0	0	0	25,000	15,000
	Subtotal	**50,000**	**80,000**	**10,000**	**25,500**	**12,500**	**21,000**	**1,000**	**11,500**	**26,500**	**22,000**
				20%	*32%*	*25%*	*26%*	*2%*	*14%*	*53%*	*28%*
TOTAL COMPONENT 1-4											
	TOTAL	**1,185,000**	**7,322,000**	**422,000**	**335,500**	**435,000**	**2,551,000**	**263,500**	**4,321,500**	**64,500**	**114,000**
				36%	*5%*	*37%*	*35%*	*22%*	*59%*	*5%*	*1%*

ANNEX G **TRACKING TOOL FOR CLIMATE CHANGE MITIGATION PROJECTS**

Separate file with file name "UNIDO_DR_GEF CC Mitigation Tracking Tool_Annex_G.xlsx"

ANNEX H **ANÁLISIS DEL MARCO REGULATORIA PARA EL DESARROLLO DE GENERACIÓN ENERGÉTICA DESCENTRALIZADA EN BASE A FUENTES DE ENERGÍA RENOVABLES EN LA REPÚBLICA DOMINICANA**

English executive summary available.

Separate files with file names "Policy framework_Annex_H.pdf" and Policy framework_Annex_H_ exec sum.pdf

ANNEX I **DETERMINACIÓN DE LA DISPONIBILIDAD DE BIOMASA EN LOS ALREDEDORES DE SANTIAGO, REPUBLICA DOMINICANA Y MARCOS GENERALES PARA SU TRANSFORMACIÓN EN ENERGÍA**

English translation available.

Separate files with file names "Biomass assessment_Annex_I.pdf" and "Biomass assessment_Annex_I_ eng.pdf"

ANNEX J **TRANSFORMACIÓN ENERGÉTICA DE BIOMASA PARA LA GENERACIÓN ELÉCTRICA EN LA ZONA FRANCA INDUSTRIAL DE SANTIAGO. PLANTA DE BIOMASA DE 3 MW. ESTUDIO DE PREFACTIBILIDAD**

English translation available.

Separate files with file names "Pre-feasibility study Santiago_Annex_J.pdf" and "Pre-feasibility study Santiago_Annex_J_eng.pdf"

ANNEX K **DETERMINACIÓN DE LOS ESCENARIOS DE TRANSFORMACIÓN ENERGÉTICA DE BIOMASA PARA LA GENERACIÓN ELÉCTRICA EN LA CZFIS**

English executive summary available.

Separate files with file names "Technology review_Annex_K.pdf" plus annexes "Technology review_ Annex_K_a.bmp", "Technology review_Annex_K_b.pdf", "Technology review_Annex_K_c.pdf", "Technology review_Annex_K_d.xls" and "Technology review_ Annex_K_exec sum.pdf"