

## Clean and Cheap Energy Production for Caribbean Islands

Since we installed the distillation plant in Haiti in 1998 for vetiver oil and Amyris oil (West Indian Sandalwood oil), we moved the Amyris part of the plant to the neighboring Dominican Republic, where the wood actually comes from.(the wood is smuggled to Haiti, which is not a way we wanted to do business in the long run)

Since the supply of vetiver roots is also becoming increasingly difficult in Haiti, for various reasons, we decided to start growing some vetiver in the Dominican Republic. We found large areas of **slightly saline soils**, not very popular with local farmers, and available at low cost, although there is an irrigation canal with good water.

And so earlier this year (in March), we planted some 25 hectares of vetiver near Barahona, Dominican Republic., with the goal to reach 1000 hectares, for two reasons:

- 1) We want to have a source of roots with a good yield per hectare and a good yield of oil in the roots.(the quality of roots is very poor in Haiti, due to exhaustion of the soil)
- 2) We want to have a demonstration plot, to show people the large amounts of dry biomass (dry leaves) produced by the vetiver plant. By our estimation, we can harvest up to 70 tons per hectare per year of leaves for use as boiler fuel in small regional power plants. Remember, it takes four tons of dry leaves to equal the calorific value of one ton of fuel oil. One ton of #6 fuel oil (250 gallons) is worth US\$260 in Haiti today. The equivalent 4 tons of dry leaves can be produced at a raw cost of US\$40 (US\$10/ton)

Below are some pictures of the plantation, as it was 2 months ago at my last visit:

**Vetiver plants two months after planting.**



**The same plantation after 4 months. The plants are 6 feet tall.**



**A new patch being planted, and our rudimentary irrigation system from a canal. It is a far cry from the irrigation system we had in Texas, but it is very much cheaper.**





We still plan to harvest the roots after a year of growth, with a modified version of the machine we developed in Texas. What broke the project in Texas was the large amount of handwork left to totally clean the dirt from the roots, and separate the roots from the stump. With the Haitian labor available in the Dominican Republic, this is not a problem. In fact labor-intensive projects are preferred. We also have a special mower to harvest the grass, which is a key condition for collecting the biomass. (conventional mowers do not cut the vetiver very well, flush with the ground)

The only problem we have with the Vetiver Biomass project is that the government and people of Haiti and the Dominican Republic know nothing about the wonder plant called VETIVER and its potential for biomass production.

If you could back me up with the credibility of the VETIVER NETWORK, which is a worldwide organization (financed by the World Bank, I think?, or whomever), and help me promote vetiver for that purpose, it would be a big help. Just don't promote it for making oil.

Please note that introducing VETIVER as biomass fuel anywhere in the world, would make it ubiquitous and available to all for fighting erosion, which is apparently your main MISSION. In fact our project includes supplying plants to all farmers who need some, and even planting erosion hedges ourselves.

Attached hereto is the English version of the project's ABSTRACT, as we just proposed it to the Dominican Republic government and NGO's. In Haiti there is an NGO called FONDATION HAITIENNE DE L'ENVIRONNEMENT that is actively studying it, and put out a paper in French to submit to the funding Agencies. By the way, we would be happy to help any other developing country in need of cheap electricity to install a similar program.

Best Regards,

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## **ECOLOGICAL POWER & PRODUCTION CENTERS**

### **ABSTRACT OF THE PROJECT**

(available in the Spanish translation)

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### **Concept**

Without independent electric power generation with renewable fuels, there is no permanent and **nationwide** economic development possible, except for isolated, self-contained, diesel-powered, private profit centers, benefiting only a few. At a time when a barrel of crude petroleum reached nearly US\$50/barrel (August 2004), we believe that by utilizing biomass, solar and wind power to produce and sell power to the greater population, we will position ourselves within the ecological trend currently being debated throughout the modern world. By leveraging the resources of our **agrarian society** for biomass fuel production, we will keep the country's valuable foreign currency reserves for more urgent purposes, rather than squandering them on expensive fossil fuels payable in US DOLLARS to Venezuela or the Middle Eastern Emirates.

Given the sensitivity of environmental issues in the Dominican Republic (a tourist economy), we propose to include intense ecological activities as an integral part of our

**Revenue-producing ECOLOGICAL POWER AND PRODUCTION CENTERS**, by setting up an agricultural extension service, which will radiate from such centers and take charge of ecological tasks with a specifically allocated budget, such as reforestation, erosion controls, and the maintenance of biodiversity, on a permanent basis.

We propose to create twelve (12) **ECOLOGICAL POWER AND PRODUCTION CENTERS** in the southern cities of Jimani, La Descubierta, Duverge, Neyba, Tamayo, Salinas, Cabral, Barahona, Enriquillo, Paraiso, Oviedo y Pedernales.

The centers will be cooperative-type, profitable, revenue-producing, and financially self-sustaining business ventures, producing 2.0MW of electricity for sale to CDE, 200,000 gallons per day of potable water, the production of bagged animal feed, etc.

### **AGRICULTURAL REQUIREMENTS**

Each center will call for 1,300 hectares (3,212 acres) under **labor-intensive** cultivation in the immediate surrounding areas, for supplying biomass fuel, aromatic plants, and grains crops, creating tens of thousands of revenue-producing jobs for local farmers, over and above the hundreds of industrial jobs at each location. This acreage and much more already exists in each one of the 12 locations as underutilized, or low grade (saline) farmland. We propose to provide the support necessary to local farmers for applying modern agricultural methods to the production of the crops called for by this project. This project will also involve nurseries, tree planting , erosion control and watershed management as an integral cost of the operation, thus guaranteeing the continuance of such programs.

### **GENERAL STRUCTURE OF THE PROJECT**

The details of all the aspects of the above plan, originally submitted by the BOUCARD GROUP , authors of the project, to the Haitian Government, will be the subject of careful reviews, cost estimates and revenue projections, which will be submitted in due course, after the initial funding by private donors and institutional lenders. It is our intention to handle the entire project as a **private, revenue-producing, business entity**, under the auspices of a reputable NGO, capable of coordinating, installing, and managing the project, so as to deliver valuable products and services to Dominican Republic's rural population.

Many benefits will be derived from such a joint-venture with a non-profit NGO, such as trustworthy management of funds, selection of decision makers, contractors and experts.

At the same time, an experienced NGO will bring greater efficiency to bear in coordinating the work of the various agencies involved such as USAID, UNDP, World Bank, and the European Community, as well the client relationships with the Dominican Republic government entities.

Given the socio-economic and political value of this project, we will request that certain specific emergency procedures be put in place by the Dominican authorities (law of eminent domain; central bank guarantees; import franchises; tax exemptions, etc) to facilitate the implementation of our non-profit, humanitarian and ecological vision for the revival of the economy in the Deep South of the Republic, as proposed by our companies TEXAROME INC. and DOMAROME CxA. A sine qua non requirements shall be to obtain solid payment guarantees by the government for all services provided to local and national government entities.

### **Immediate Action**

The primary purpose of this abstract is to first approach eligible NGOs and international funding authorities. We shall request a meeting with all authorities potentially involved, in order to present the project and obtain as many endorsements as possible. The entities that could possibly be involved, and whose mission it is to promote such projects, are the following:

USAID  
UNDP  
World Bank  
IMF  
GTZ (NGO)  
Sur Futuro (NGO)  
Presidencia de La Republica  
Secretaria de Agricultura.  
Secretaria de Medio Ambiente y Recursos Forestales  
Secretaria Tecnica de La Presidencia

Following the endorsement and approval of our project by such competent authorities, the chosen NGO will set out to raise the necessary capital for the installation of the project in the form of grants and institutional loans.

## **A. The goals of the project are as follows:**

1. The **collecting** and **sorting** of **municipal wastes** and the utilization of the dry, combustible matter as boiler fuel. The wet organic material will be separated for composting, and the balance of the waste will be disposed of in a properly designed landfill. Revenue stream #1: **The city shall be charged a fee for this service, which shall include the maintenance of City Parks and green areas.**
2. The production of **2.0 Megawatt of electricity** with steam boilers featuring multi-purpose furnaces, capable of burning biomass, low grade fossil fuels, and municipal waste. The primary fuel will be biomass, cultivated locally on a large scale for that purpose. Biomass fuel will become the new **cash crop** for tens of thousands of small and large farmers alike. The chosen biomass will be **vetiver grass**, but the power plant will also purchase agricultural waste, such as coconut hulls and leaves, driftwood, etc. Revenue stream #2: **The electricity produced, shall be sold to the CDE and connected to the existing power distribution grid.**
3. The waste energy of the power plant will serve to operate a downstream **seawater evaporator**, which will produce some **200,000 gallons per day** of potable water for the town and the surrounding area. Revenue stream #3: **The water will be pumped into the existing water distribution system and sold to the city. (Lago Enriquillo, Laguna de Rincon, y lugares con acceso al mar).**
4. Aside from running and supporting organized farming for the production of biomass fuel, the project will commission from local farmers a large acreage in **lemon grass** and **milo**. Once the valuable essential oil is extracted from the lemongrass with the steam of one of the Industrial Park processing facilities, the cellulosic grass will be mixed with the milo and some molasses to produce an all-purpose **animal feed pellet, which will be bagged and sold (by a subcontractor) at a subsidized price to participating local farmers:** Revenue stream #4.
5. The only non-revenue producing activity of the proposed project shall be the creation of an **Ecological Extension Service**, which will be budgeted as a percentage of sales, and financed by the project to engage in **tree nurseries, reforestation, erosion control, and watershed management.**

## **B. INVESTMENT**

It is estimated by the authors of this project that each one of the twelve (12) **ECOLOGICAL POWER AND PRODUCTION CENTERS** will require a one time capital investment of US\$3.5Million. This claim by the authors can be verified in due course by independent reviewers and engineering firms, and funded by those interested in the project's implementation.

This being a UTILITY PROJECT, we propose that it should be managed like a cooperative and operate on a marginal profit, so as to make the services available to the general population at the lowest possible cost. Any accumulating profits should be retained as cash reserves, intended only to optimize and/or expand the operation.

The motivation of the authors of the project is to a large extent civic in nature, with a desire to run their existing businesses in a prosperous and peaceful Dominican Republic, and contribute positively to the national economy.

The authors being already in the business of biomass (vetiver) production and the construction of agro-processing plants, they would entertain the possibility of acting as general contractors and suppliers of biomass for the project.