Export Markets for Alternative Energy: Preparing Small Business Enterprises for a Global Green Energy Future

A summary report prepared for the USF Patel Center for Global Solutions[1]

September 17, 2010

[1] This study summarizes reports conducted by five summer student interns who spent 6 weeks in Santo Domingo, Dominican Republic in Summer 2010. The students are: Kedwin Dominguez (University of South Florida), Renzon Mora (Florida International University), Michael Newman (University of Central Florida), Juan Rivera (University of Florida), and Viviana Solorzano (University of North Florida). The internships were funded by a grant from the US Department of Education, Business in International Education Program, with matching funds from the students' universities.

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Abbreviations

BNEU - Balance Energético Nacional por Unidades (National Energy Balance Units)
CNE - National Energy Commission
DAC - Development Assistance Committee
EC -The European Commission
GEERF - Global Energy Efficiency and Renewable Energy Fund
GEF - Global Environment Facility
IAF - The Inter-American Foundation
IBRD - International Bank for Reconstruction and Development
ICSID - International Centre for Settlement of Investment Disputes
IDA - International Development Association
IFC - International Finance Cooperation
JICA - Japan International Cooperation Agency
MIF - Multilateral Investment Fund
MIGA - Multilateral Investment Guarantee Agency
NREL - National Renewable Energy Laboratory
PEN - National Energy Plan
PROFER - the National Energy Savings Plan and Energy Efficiency Program
SENI - The Electrical Grid
SIE - Electricity Supervision Board
SWERA - Solar and Wind Energy Resource Assessment
UERS - Unidad de Electrificacion Rural y Sub-Urbana (Rural Electrification Unit and Sub-Urban)
UNDP - United Nations Development Program

Abstract

The purpose of this report is to provide a summary of research findings concerning the prospective and current use of alternative sources of energy either imported to or produced domestically in the Dominican Republic. The research conducted for this report focused on addressing the following questions, with a particular focus on solar, wind and biomass sources of alternative energy:

- **What government incentives exist to promote development of alternative energy?**
- **What research and development is in progress?**
- **What alternative energy is currently produced?**
- **What energy projects are in the planning stages?**
- **What are the consumer markets?**
- **What commercial opportunities exist for alternative energy in the Dominican Republic?**
- **Who are the potential investors (or investment sources) in alternative energy?**

In order to answer these questions, we started by completing an analysis of the laws and regulations that apply to the alternative energy industry in the Dominican Republic. After an understanding of the law, we conducted a series of interviews with experts in the alternative energy market of the Dominican Republic. These interviews provided most of the information and data that we used to answer the objectives of this report.

Throughout our research, we have found that energy is being produced from alternative sources in the Dominican Republic and the prospective for these sources to become a more dominant part of the Dominican energy profile is expanding. However, our research has also shown us that there are still many challenges that need to be addressed in order to make the Dominican alternative energy market more easily accessible to small businesses globally.

Methodology

In this section, we describe how we went about gathering the information we used to complete the report. We began with an analysis of the laws and regulations that stem from Law 57-07, which refers to renewable sources of energy, its incentives, and special regimes. Through this analysis we separated Law 57-07 into three sections: regulations of the law, incentives of the law, and requirements of the law.

After completing our analysis, we conducted a series of interviews with experts in alternative energy in the Dominican Republic. Our first interview was with engineer Manuel Peña. Peña is the current Director for the Alternative Energy Sources and Energy Efficiency department of the National Energy Commission (CNE – Comisión Nacional de Energía). Peña assisted us with a majority of the information used for this report, including providing us with the Humberto Report, concessions information, and contact information for most of our other interviewees.

Our second interview was with Mr. Hector L. Martínez, President of the Renewable Energy Enterprises Association of the Dominican Republic. He provided us with insight into the types of products and services that are currently being offered in the Dominican Republic, both by way of import and produced domestically, and information pertaining to the types of consumers for these products and the demand that the current market has shown thus far.

We also interviewed engineer Bienvenido Sánchez, Director of Photovoltaic Energy for the Rural and Suburban Electricification Unit (UERS - Unidad de Electrificación Rural y Sub-Urbana). His interview gave us most of our information regarding electrification of rural and suburban areas without access to the grid.

One of our final interviews was with engineer Américo Montás, a biomass expert that the CNE has worked with on various occasions. He has successfully worked with private pilot programs for the cultivation of oil and ethanol from sunflower seeds, sugar beets, and sweet sorghum. The pilot projects have evolved into a start-up venture to produce oil and ethanol from various feed stocks.

Apart from the interviews, we also used several reports, studies, maps, etc. to better understand the alternative energy industry in the Dominican Republic and support our conclusions.

Objective 1: What government incentives exist to promote development of alternative energy (Wind, Solar, Biomass)?

Law 57-07 was passed May 7, 2007 and is the only law in the Dominican Republic directly related to renewable energy. The CNE plays a huge rule in implementing this law and its benefits. If any business or institution is interested in benefiting from this law they are required to fill out proper documentation with the CNE before receiving any benefits. The information is fundamental for businesses and institutions wanting to invest in the Dominican Republic. A deep understanding of this law is crucial to any organization wanting to obtain all the benefits and reimbursements the country offers for renewable energy projects.

The following is an overview of what Law 57-07 entails, including regulations, incentives, and requirements:

Regulations to Law 57-07 for Renewable Energy (Wind, Solar, Biomass)

The CNE will decide in advance regarding zones not suitable for use of wind power and photovoltaic systems, in order to avoid damage to protected or especially vulnerable zones. For this purpose, the CNE will create a list of:

a. Natural or scenic zones that are protected and excluded.
b. Zones that are considered urban or soon-to-be urbanized.
c. Excluded zones for industrial or agricultural/livestock reasons, tourist zones, or areas of some other national interest.
d. Excluded zones due to a statistically high risk of hurricanes and subject to great destruction.
e. Excluded zones because of instability or insufficiency in the electrical grid.

(Regulation 57-07, Chapter V, Section I, Article 30)

Solely with respect to the electrical energy generation with renewable sources of energy destined to the grid (SENI), the SIE, in coordination with the CNE, will fix limits regarding concentration of supply by province or region as well as the percentage of penetration of electrical power in each substation of the transmission system. The SIE and CNE are doing this with the purpose of making sure the electrical flow injected into the SENI remains balanced. (Regulation 57-07, Chapter II, Article VI)

For concessions granted or put in place after January 1, 2028, the CNE will be responsible for issuing a "Resolution" on a yearly basis to determine annual reference payments. The CNE will recommend a minimum annual reference payment to the SIE for every type of renewable energy supplied to the SENI. The CNE will define the criteria to update payment and their temporary duration. (Regulation 57-07, Chapter VIII, Article 110)

Incentives

The CNE recommends exemption of import taxes on all equipment, machinery, and accessories needed for the production of renewable energy. The CNE also provides an annual report to the National Congress with an extended list of equipment, parts, and systems that are likely to benefit in the future from exemptions. An initial list of equipment, parts, and systems to receive customs exemption includes:

a. Photovoltaic panels and individual solar cells to assemble the panels in the country.
b. Long duration stationary accumulators.
c. Inverters and converters essential for the operation of renewable energy systems.
d. Fuel batteries and equipment for hydrogen generation.
e. Hydrogen-generating equipment and its purifiers, rectifiers, and measures for production starting off from water, alcohol or biomass.

f. Synchronous inverters with the capacity to dispatch leftover energy to the network in net measurement.
g. Hydraulic turbines and their regulators.
h. Turbines or wind motors or wind power generators.
i. Solar water heaters or steam production heaters that can be made of rubber, plastic, or metals and adopt any technology that is: flat plate, hollow tubes, or parabolic mirrors or any combination of these.
j. Parts and necessary components to assemble solar collectors to heat water.
k. Steam turbines with power not higher than 80 MW and mixed steam boilers, solely based on combustion from biomass resources and municipal and industrial waste. Equipment that uses auxiliary fuel in special applications can be included whenever it does not represent more than 20% of the fuel used.
l. Turbines and conversion equipment accessories for energy of marine origin: waves, tides, deep currents, or thermal gradient.
m. Generating equipment for poor gas, air gas, or water gas, digesters and purifying equipment for the production of biogas from agricultural biomass waste, acetylene generators, and similar gas generators using the humid route with their water purifiers.
n. Equipment for combustible alcohol production, biodiesel, and synthetic fuels from agricultural or industrial products and waste.
(Law 57-07, Chapter III, Article IX, Paragraph I - III)

Other tax incentives include a ten-year income tax exemption, from the start of operations, that is valid through 2020 (Law 57-07, Chapter III, Article X), a tax reduction on external financing (Law 57-07, Chapter III, Article XI), and a tax credit of up to 75% of the cost investment in equipment for proprietors and commercial or industrial facilities that change or extend to renewable energy systems. (Law 57-07, Chapter III, Article XII)

Institutions of a social nature (i.e. community organizations, associations of producers, registered and incorporated cooperatives) that wish to develop renewable sources of energy on a small scale (up to 500 Kw) and for community use have access to financing funds at the lowest rates in the market. The amount can be up to 75% of the total cost of the parts and installation. (Law 57-07, Chapter III, Article XIII)

Distribution companies are also obligated to buy surpluses sent to the networks at prices regulated by the Electricity Supervision Board (SIE). (Law 57-07, Chapter IV, Article XX) This provides a guaranteed market for participating electricity providers, thus lowering their risk exposure.

Requirements (Wind, Solar, Biomass)

A body of specialists trained by delegates from each of the institutions responsible for power development in the Dominican Republic will support the CNE in its role to analyze, evaluate, and authorize with transparency the incentives for renewable energy projects which would qualify for the incentives established by Law 57-07. (Law 57-07, Chapter I, CC)

Parties interested in receiving benefits should submit an initial application to the National Energy Commission that includes technical and economic studies justifying the project, followed by an application to the Electricity Supervision Board. (Law 57-07, Chapter IV, Article XVI)

To qualify for benefits and incentives, projects must adhere to the following standards:

a. Wind projects may not surpass 50 MW.
b. Micro, small hydroelectric facilities may not be over 5 MW.
c. Electro-solar facilities of any type and any power level are acceptable.
d. Thermo-solar facilities may produce up to 120 MW of power by power station.
e. Electrical power stations that use primary biomass as their main fuel must produce energy that is able to be used directly or after a transformation process (a minimum of 60% of primary energy) and whose installed power does not surpass 80 MW per thermo-dynamic or power station unit.
f. Bio-fuel production plants of any magnitude or production volume.
g. Energy farms, agricultural or agro-industrial plantations, and infrastructures of any magnitude must be exclusively for the production of biomass for power consumption, using vegetable oils or pressure for the manufacture of biodiesel, and also hydrolyzing production plants for sugar liquors for ethanol fuel manufacture and /or for energy and /or bio-fuels.
h. Oceanic energy exploitation facilities, whether they be waves, sea currents, thermal differences of oceanic waters, of any magnitude.
i. Thermo-solar facilities of average temperature dedicated to obtaining sanitary hot water and air conditioning in association with absorption equipment for the production of cold.
(Law 57-07, Chapter II, Article V)

Research and Development
Objective 2: What research and development is in progress? (Wind, Solar, Biomass)

Due to the time restrictions of the project, it was difficult to investigate all the different research and development projects going on all over the country. It was also difficult because many firms keep their research and development private due for competitive reasons. Additionally, the primary perspective we were working with was that of a government institution, the National Energy Commission, and our resources were limited to what they were aware of.

Our research mostly illustrates the R&D projects that are public and published. The most important findings, elaborated upon in this section, are three research projects administered by a reputable government organization, a government consultant, and a government engineer.

One organization that has done extensive research is the National Renewable Energy Laboratory (NREL), a governmental entity under the U.S. Department of Energy. This organization has completed studies researching wind and solar radiation energy potential in the Dominican Republic. This research can show what locations around the island can be utilized for renewable energy production.

Another major research project was a report done for the Dominican government by Dr. Humberto Rodriguez, a renewable energy consultant. Dr. Rodriguez was given the task of analyzing all of the potential for alternative energy production in the Dominican Republic and his findings explored the potential for solar, wind, and biomass energy production.

The final piece of research came from a study done by Américo Montás, a Dominican electrical and mechanical engineer. He had previously assisted with an extensive amount of research done by the National Energy Commission in renewable energy, and from that experience began his own research which experiments with the production of sunflowers and sugar beets as sources of energy. Montes is the first person to grow substantial quantities of sunflowers in the Dominican climate and he continues to explore how these crops can assist in easing his country's dependency on foreign oil.

Since the Dominican Republic is still a developing nation, there are many challenges it must overcome before it can be a player in the alternative energy market. Infrastructure problems that need addressing are a

priority, which in turn leaves few resources for research and development of new technologies. With a new global industry emerging in the area of renewable energies, the Dominican Republic is taking steps to invest more of its resources into the sector. Because little information regarding potential, implementation, and commercialization of renewable energies is available, much of the research is done by external international organizations.

Realizing the danger in rising carbon emissions around the world, many developed nations are taking the initiative and leading less-developed nations toward the establishment of clean energy resources. By funding and executing international research for renewable energy potential, developed countries are giving their developing counterparts the tools to become energy independent while also lowering their carbon footprint. Being that the Dominican Republic is in the Caribbean, with valuable assets that include its tropical climate and a significant amount of sunlight, many nations see the renewable energy potential of the country.

Many reports have investigated how renewable energies could play a major role in the future development of the Dominican Republic. The National Renewable Energy Laboratory (NREL), a laboratory under the jurisdiction of the United States Department of Energy that is "…dedicated to the research, development, commercialization and employment of renewable energy and energy efficiency technologies" (NREL, 2010), has created a Solar Radiation Map and Wind Energy Atlas of the Dominican Republic. By mapping the thermal and wind measurements across various locations throughout the Dominican Republic they have highlighted specific areas that would yield high amounts of energy.

It also helped to identify commercial opportunities for investment in the country, due to the abundance of wind and sunlight. In order to illustrate the potential for wind energy in the study, "…the Dominican Republic was divided into four regions—southwestern, northwestern, central, and eastern. Each region covered an area of approximately 160 km by 160 km." (NREL, 1999) According to the study, the areas that yield the best wind energy potential are Puerto Plata and Monte Cristi in the northwestern provinces and Pedernales and Barahona in the southwestern provinces. The NREL has played a vital role in the initial research and development of wind energy in the Dominican Republic. With their research, they have set the groundwork for internal organizations on the island to make the idea of potential wind energy a reality.

Dr. Humberto Rodríguez's 2007 report illustrated the alternative energy potential in the Dominican Republic. He was hired as a consultant by the CNE and asked to diagnose the alternative energy subsector, develop short- and long-term goals for alternative energy development and integration, and strategize how to make "energy agribusiness" a new national industry. (Rodriguez, 2007)

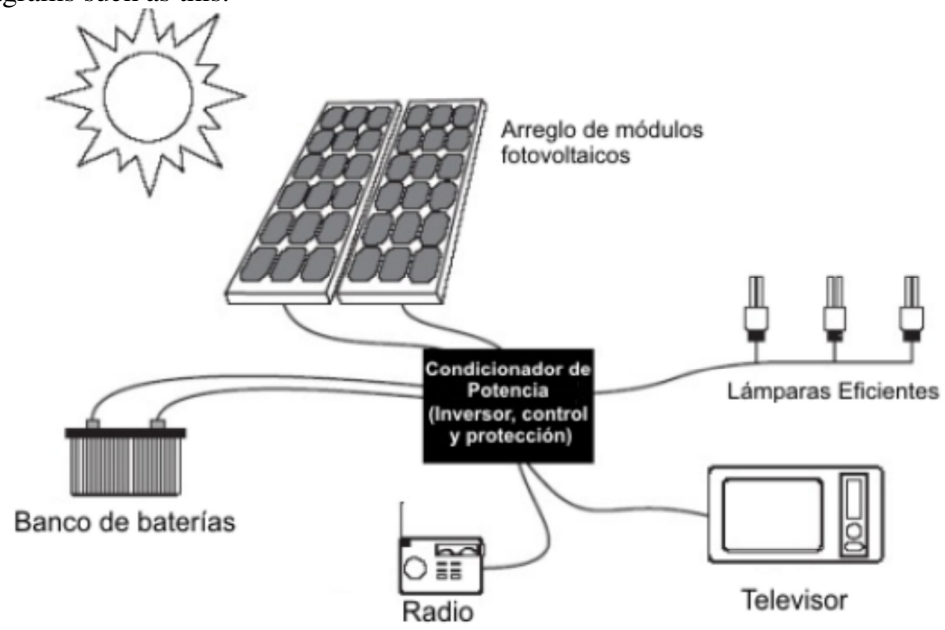
The report was used to advise the CNE in their National Energy Plan (PEN) for 2005-2020. At the time of his analysis, there was very little implementation of renewable energies in the Dominican Republic.

In the report, Rodríguez goes into detail about the three major renewable energies: wind, solar, and biomass, with a focus on biomass. He specifically extrapolates on the most intricate parts of the possibility of biomass for power generation and transportation fuel, i.e. biocombustibles. The report also quantifies the potential for commercial production and estimates cost ranges for the development of Ethanol Fuel, Bagasse cogeneration, generation of electricity, or steam production wastes. He also goes into depth about the generation of energy from other sources. His analysis on the potential of solar, wind, and biomass energy gives great insight as to what strides have already been taken and where the commercial opportunities will be in the future. By giving a cost analysis of different alternative energy technologies he gives the financial feasibility of implementation as well as the benefit to the welfare of the people.

In terms of biomass technology, the report gives a synopsis of the different types of biomass, explaining the energy production from biocombustibles and biogas. He then goes further to explain the difference between the production of biodiesel and ethanol in the D.R. He identifies high energy yielding plants that are compatible with the Dominican Republic agro climate, namely, sugar cane, sweet sorghum and sugar beet for production of ethanol. For the production of biodiesel, the plants most appropriate would be African

palm, Castor tree, Coconut, or Jatropha. He examines many other usages of biomass, but not for a wide scale production of energy. One use that corresponds with an existing industry in the Dominican Republic is the cogeneration of bagasse from the sugar cane industry. Sugar cane, being one of the Dominican Republic's main exports, bears the capacity to cogenerate energy through its mechanical byproduct bagasse. This product is the result of milling sugar cane into sugar. In the past many sugar mills incinerated the bagasse as waste, transferred the energy through low pressure steam boilers to inefficiently power the mills. What Rodríguez shows, however, is that some factories have begun using high pressure boilers and steam turbines, which use bagasse more efficiently. This method provides an energy supply which fills the needs of the sugar mill and, possibly, the greater electrical grid. Considering how much sugar cane is produced in the Dominican Republic, the potential for bagasse as a supplemental source of energy seems to be a plausible idea. Another use of biomass is the energy that can be produced from biogas. By extracting gases from municipal and agricultural waste, a substantial amount of energy can be produced. The large amount of cattle and swine agriculture that is produced in the country and the fecal matter from these animals could provide the methane to produce electricity.

In the realm of solar energy, the report analyzes which solar technologies would be most beneficial in the country. Rodríguez utilized data collected by Solar and Wind Energy Resource Assessment (SWERA), a program of the United Nations Environment Program that works with many international agencies including NREL. Their study showcased the amount of solar radiation hitting the Caribbean, with coordinates and graphic images that illustrate solar power potential. This data assisted to verify the great opportunity in the Dominican Republic by showing the potential of 5.0-6.0 kWh/m²/day. The report goes on to explain the most plausible uses of solar technology in the country, listing solar water heaters and isolated solar photovoltaic systems as items that are already being utilized in the country. Rodríguez finds that solar water heaters are a very viable technology that has already been adopted in the D.R. and has a lot more potential. What makes this technology so viable is the fact that the solar water heaters provide a simple, economical, and sustainable way to produce hot water for any household use, which is a tangible way the people in the Dominican Republic can see the benefits of renewable energy. Finally, the other technology that seems to be most plausible in the country is the isolated solar photovoltaic system. This system is a stand- alone unit that transfers solar energy into electricity, with little maintenance and can be distributed throughout a building or community. In the Dominican Republic, there are thousands of homes in rural areas that have no electricity, due to their isolated geography and the inability for the electrical grid to reach them. This leaves thousands of people in the Dominican Republic unable to develop connections to the outside world, and subsequently stalls the development of commerce. However Rodríguez portrays the benefits of isolated systems with diagrams such as this:



(Rodríguez, 2007)

This diagram shows that an isolated panel has the potential to fit multiple needs in an area, such as lighting, battery recharging, and radio and television. By providing electricity, many of the stepping stones towards infrastructural development can be reached, therefore benefitting the welfare of the people.

On the topic of wind power in the Dominican Republic, Mr. Rodríguez writes about the need for further research and investigation into specifics of the best wind potential in the country. He references the wind study conducted by NREL, as discussed earlier, as the main source for his analysis. He states that the problem with developing projects from the NREL study is that it only gives a perspective of the country in large regions, which is not sufficient information for an accurate assessment of potential of wind energy to be generated. The report mostly specifies how a wind power project would function, from a technical electricity aspect to the cost analysis aspect.

Américo Montás Research

Américo Montás provides another source of research in the country. Montás is a Dominican electrical and mechanical engineer who has worked with the National Energy Commission on extensive research in renewable energies. With his first hand experience he understands the potential renewable energy can have on his country. In a brief interview, he gave a great deal of insight towards where he thought the most viable options of renewable energy would be in the country. In his research, he has found that the only types of renewable energy that would be compatible with the Dominican Republic would be hydroelectric and biomass. Specifically, in biomass, he has been conducting his own experiments with the growth of sunflowers and sugar beets as ways to ease the dependency off of oil. This is important because he is the first person to actively cultivate a substantial amount of sunflowers in the Dominican Republic, due to the fact that it is not supposedly compatible with climate. Engineer Montás' plan calls for the growth of sunflowers in the Dominican Republic and selling the oil byproduct to other vendors, which can then be refined for energy use. The selling of the sunflower oil and the sugar beets can then lower the expenses spent on oil until the country finds a way to stop its dependency on petroleum. His research provides a first glance at potential new industry in the Dominican Republic. Montás explains that the benefits of growing sunflowers is that they can grow in arid parts of south of the country, and have a 3 month life cycle, much shorter than other plants. He explained that in the Dominican Republic sugar beet yields much more ethanol per hectare than in Brazil, stating "One hectare (in the Dominican Republic) can render 20,000-25,000 liters per year per hectare however; sugarcane in Brazil will render 6,000 liters per year per hectare." (Montás, 2010)

Current Production
Objective 3: What is currently produced?

The Domincan Republic has been producing power from alternative energy sources since the early 1950s with their first hydroelectric plant in Jarabacoa. Since then, the Domincan Republic's alternative energy profile has expanded and currently provides approximately 15% of the Dominican Republic energy (BNEU 2005). The primary sources of alternative energy in the Dominican Republic are sugar cane by-products (bagasse), Hydroelectric, Other Biomass and Solar, respectively.

Hydroelectric is the most dominant form of alternative energy after bagasse in the Dominican Republic. Hydroelectric produces 6% of total energy production at 195.71 KTEP. As of 2007 there are 21 hydroelectric plants, located mostly in the southwest sector, in the Dominican Republic. These plants produce almost 15% of the electricity produced in the country. The majority of the plants have a capacity of over 5 MW but none surpasses 100 MW capacity (Rodríguez, 2007).

Biomass

Sugar cane bagasse produces 261.80 KTEP (KTEP=1,000 tons of petroleum) per year of energy or 8% of total energy production. Power production, primarily electricity, through Sugar Cane by products is mainly a

function of energy self-producers who sell excess energy to their local grid. 23% of electricity produced in the Dominican Republic comes from self-producers making them an essential part of the electricity portofolio. Most sugar cane production in Dominican Republic is done for the production of Rum. Once the plant is used, the bagasse is usually burned in an on site generator and the power is used for the distiller itself and for sale to the neighbors (Rodríguez, 2007).

Other Biomass accounts for 205.17 KTEP or 1% of total energy production in the Dominican Republic. This production comes from two sources: pilot projects and individual energy self producers. According to the CNE, there are currently 11 biodesiel pilot projects in the Dominican Republic; they are located across the seven provinces of: 3 in Monte Cristi, 2 in Dajabon, 2 in Elias Pena, and 1 in Neyba, Barahona, Valvelde and Azua, respectively. There are also two ethanol pilot projects across 5 provinces producing sugar cane and sweet sorghum ethanol. Besides the 13 pilot projects registered with the government, there are a number of other producers of ethanol and biodesiel that are not registered with the Dominican government. Based on an interview we had with Mr. Montás, there is at least one project under development cultivating sugar beets and sweet sorghum in the Southeastern part of the country (Montás, 2010). Others sources that may be currently used as biomass are: rice by products, plantains by products, swine and bovine fecal matter.

Solar

Solar accounts for .1% with 52.54 KTEP of energy production a year. The percentage for solar is currently an estimate because none of the current solar production is connected to the grid. The solar production in the Dominican Republic is done prodominately in rural areas where connection to the grid is difficult and costly. Currently, 92% of the Dominincan population has some kind of access to the electric grid, leaving only 8% of the population still needing electrification. Efforts to expand the grid have been undertaken but as the expansion has advanced the areas left without electrification are more remote and even more costly to reach. Therefore, alternative energies like solar PV are a cost effective option when compared to the grid. Efforts to provide these alternative energies to rural housing, school, hospital and community areas are being undertaken by the UERS (Unidad de Electrificacion Rural y Sub-Urbana: Rural and Suburban Electricification Unit). They officially started their program in 2009. The data below show the work they have done so far.

Table 1: Allocation by province of photovoltaic system for housing, community center, school, health center, and pumping system.

Region	Province	Percentage of Households without Electricity	Quantity of Households without electricity	Households with Photovoltaic Systems	Rural Clinics with Photovoltaic Systems	Schools with Photovoltaic Systems	Community Centers with Photovoltaic Centers	Pumping Systems with Photovoltaic Systems
East	Monteplata	11.16%	5,750	1,000	2	2	2	2
East	Hato Mayor	15.69%	3,946	700	4	4	4	4
East	El Seibo	16.16%	4,363	1,000	4	4	4	4
East	Altagracia	12.85%	7,339	1,000	2	2	2	2
North	Santiago Rodriguez	19.53%	3,219	500	4	4	4	4
North	Dajabon	5.73%	1,029	500	2	2	2	2
North	Montecristi	17.35%	5,917	900	2	2	2	2
South	Azua	12.47%	6,657	1,000	4	4	4	4
South	San Juan	15.50%	9,132	2,000	4	4	4	4
South	San Jose de Ocoa	12.46%	2,172	800	4	4	4	4
South	Elias Pina	57.41%	4,322	1,500	2	2	2	2
South	Bahoruco	17.46%	2,964	300	2	2	2	2
South	Barahona	9.35%	4,327	500	2	2	2	2
South	Pedernales	15.00%	800	300	2	2	2	2
	TOTAL:	17.01%	61,937	12,000	40	40	40	40

(UERS 2010)

As the chart above shows, there are 12,000 residential solar PV units in the Domincan Republic. Additionally, the UERS works on community projects as a compound, working on the schools, rural clinics and community centers all together. There are 40 solar powered rural schools, clinics, community centers and water pump system. (UERS 2010)

Wind

The current wind energy production is zero megawatts. However, there are currently six wind projects being built. The six projects are the concessions that have been approved, and granted with a definite concession. It is important to note that even though Law 57-07 contains incentives and regulations, it is not mandatory to submit a provisional concession to start a wind energy project in the Dominican Republic (Peña, 2010).

To determine specific companies offering alternative energy products and services, we conducted an interview with Hector Martínez, president of La Associación de Empresa de Energía Renovable (Association of Alternative Energy Enterprises). Mr. Martínez stated that there are approxiamately 17-20 companies that offer alternative energy related products or service in the Dominican Republic. The list of these companies was to be made available to us at a later date. However, as of the writing of this report, we are yet to receive the list. Therefore, we cannot currently provide furthur detail on the specific breakdown of sub-industries and specfic services offered. If the list is facilitated to us at a further date, we will attempt to add it as an attachment to the report.

Planning Stages
Objective 4: What is in the planning stages? (Wind, Solar, Biomass)

The current scenario of alternative energy in the Dominican Republic is one that is in the planning stages. From the research gathered, it has been found that most, if not all, the projects on the island are in the planning stages. The major projects being invested in by larger corporations are currently being inspected by the government as concessions. The process for projects to be approved is very lengthy and faces many bureaucratic restraints. The types of projects that have been successfully implemented are smaller solar installations done by the government and nonprofit organizations. According to data given by the UERS , there are many projects throughout the rural areas of the Dominican Republic that are installing photovoltaic systems in schools. In just 2010 alone, they are planning on installing photovoltaic systems in 22 schools, and investing more than RD$ 72 million for their projects. The UERS has been working diligently on providing electricity to areas that are too remote to connect to the national grid. As mentioned in the previous section, they have played a major role in implementing alternative energy.

Hundreds of concessions are filed with the CNE but only those alternative energy projects that follow the restrictions required are granted permission. Of the current concessions 45 of the 96 concessions are prospective wind energy production, 15 of the 96 are related to solar energy, 18 related to biomass, 4 related to hydroelectric energy, and 4 related to natural gas. (Concessions, 2010)

Consumer Markets
Objective 5: What are the consumer markets? (Wind, Solar, Biomass)

Among the various consumer markets, there are four of particular interest to companies who are interested in expanding their business to the Dominican Republic. First and foremost, there is an opportunity for business with schools in the country as well as hospitals, businesses and rural areas. There are many schools in the Dominican Republic. Due to the daily outages in the country, schools, in particular, could benefit significantly from a reliable source of clean energy such as solar. By putting solar panels in schools, children will no longer be distracted by blackouts and also have the opportunity to learn about renewable energy and how it works. Hospitals are also a great market for renewable energy. Any source of renewable energy would be beneficial to hospitals that rely heavily on a constant source of energy.

An additional market to consider is businesses in the Dominican Republic. It is important to keep in mind that renewable energy is still emerging in the country and therefore creates a need in businesses such as AES who are just starting to learn more about renewable energy potential for the country.

More importantly is the need in rural areas. Although the country has made improvements in the energy sector, there are still many rural areas without electricity. Until this need is fulfilled, the opportunity for alternative energy in these areas is endless.

Commercial Opportunities
Objective 6: Identify commercial opportunities for alternative energy in the Dominican Republic. (Wind, Solar, Biomass)

This section is based primarily on the views of Mr. Peña, the manager of Alternative Energy and Rational Use of Energy in the National Commission of Energy, CNE. He asserts that the Dominican Republic currently has great potential in the alternative energy sector. The country is in the state of need to acquire new and clean energy to satisfy its demand.

The commercial opportunities are divided into three sectors solar, wind, and biomass. The solar sector includes solar water heaters, isolated photovoltaic systems, battery/power storage systems, and submergible solar water pumps, all of which already exist in the company and face potential increases in demand. The

need to reduce the dependency on expensive fossil fuels imported is growing stronger as the price of oil keeps increasing.

Solar

The Dominican Republic's prime geographic location in the Caribbean gives it a special competitive advantage to generate a more than substantial amount of energy from the sun. Research conducted by Mr. Rodríguez shows that the solar radiation in the D.R. is more than enough to create sustainable energy. Specifically, based on the solar radiation, there is the potential for the DR to create 5.0-6.0 kWh/m²/day, when the global average for desert and high isolated areas is 6.0-6.5 kWh/m²/day.

The first type of technology that could be implemented is solar water heaters. Water heaters are a staple of energy usage in most residential sectors as well as businesses that demand a lot of hot water. In the Dominican Republic, the National Energy Savings Plan and Energy Efficiency Program developed a replacement program and spread solar heaters to the residential sector. The PROFER program estimates a total of 15,000 solar water heaters already in use and projects a potential of 90,000 in the next 5 years.

Table 2 : Characteristics of solar water heaters and its costs :

Characteristic	Unit	System 1	System 2	System 3
Tank Capacity	gal	50	100	150
Number of Collectors	N/A	1	2	3
Area of Collectors	meters squared	1.8	3.6	5.4
System Cost	RD$	33,000	53,000	73,000
System Cost	US$	1,065	1710	2355

(CNE = Humberto Rodríguez, Diagnostico Fuentes Renovables. October 2007)

The specifics on solar water heaters depend on the size. There are 50, 100, or 150 gallon containers for consumption of 3, 6, 9 person families respectively. The prices are RD $ 33,000/ $53,000/ $73,000 respectively.

Table 3: Economic evaluation of the solar systems:

Characteristic	Unit	System 1	System 2	System 3
Saved Electrical Energy	kWh/year	1232	2464	3696
Saved Electrical Energy	kwh/month	103	205	308
Leveled Cost	US$/kWh	0.144	0.116	0.106
Avoided EE Value	RD$/year	8623	17246	25869
Repayment Period	Months	46	37	34
	Years	3.8	3.1	2.8

(CNE = Humberto Rodríguez, Diagnostico Fuentes Renovables. October 2007)

The solar water heaters substitute between 1232 and 3696 kWh/year and its annual value is between $8,623 and $25,869, which calculates a simple payback period between 2.8 and 3.8 years. The cost of generation would be between US$0.14 and $0.11 kWh, dependent on the capacity of the system compared with the electricity tariff of $0.23 US/kWh.

Another type of solar technology to use is the Isolated Solar Photovoltaic System. With the entry of the new law on renewable energy incentives, the import costs have been reduced for thermal and photovoltaic equipment, which provides an incentive of a shorter payback period for solar installation. It seems that the upfront costs for the solar modules which contain the solar cells are the biggest expense. Based on the household model 50 SFV 1_2, which has been used in several Latin American countries, the base investment would be between US$800-$1200 in the international market, and fixed costs would be 5% per annum of initial cost. It would also require a fund for replacement batteries although they have a long life. With the recent increase of the demand for solar panels, it is realistic to say the costs for SFV systems will decrease. This will make the investment more financially feasible. The benefits of the SFV system make it worth the investment when it is used for rural electrification. Examples of this would be for schools, water pumping and irrigation, telecommunication and remote monitoring systems, as well as for refrigerators for storage of vaccines and blood in rural areas. With more energy in rural areas, there is the potential for more productivity, commerce, and power for agricultural development. It also offers more efficient ways to electrify schools and hospitals. Subsequently, rural communities are integrated around the SFV and have a sense of ownership of the system. Another benefit would be that it would offer a safer environment for cooking. Most homes in rural areas utilize small wood fired stoves which are poisonous and release large amounts of carbon dioxide.

Biomass

Biomass is the third most important energy sector in terms of alternative energy in the Dominican Republic. The country has an incredible potential to stimulate the energy production with biomass from agriculture. The biomass used as fuel for electricity generation is an option already known and handled successfully in the sugar mills. No doubt the efficiency of conversion processes can be improved through the adaptation of equipment or facilities. The commercial opportunities are great in this area due to the lack of technology and great demand for clean and renewable energy as it is in the case of biomass.

Wind

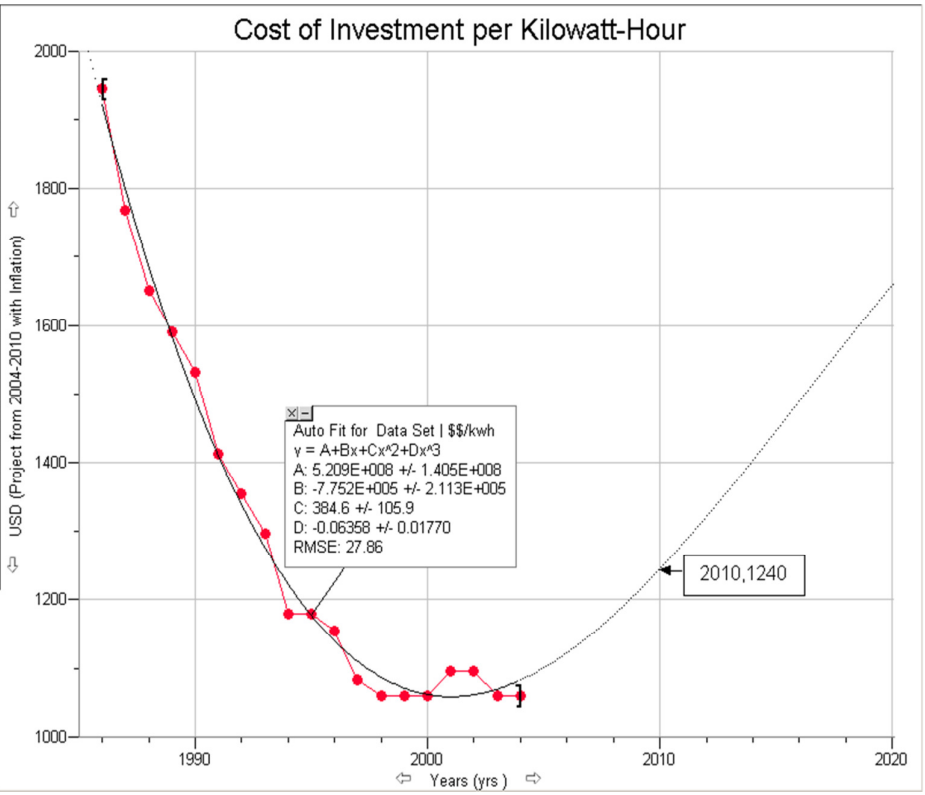
The potential for wind energy in the Dominican Republic is very high. Taking into account the geographic locations, population density, transmission line location, restricted zones, and concession locations there are great opportunities ahead. Law 57-07 states that a wind energy project cannot exceed 50 MW of Electrical Capacity. In order to build a project with an Electrical Capacity greater than 50MW, the project has to be financed at 50% of its investment, and have 50% of the project built. The regulations state by law the pay per kilowatt-hour will be 12.52 c$/ kwh, until the Law is revised. In the National Commission of Energy it has been demonstrated that even though the application fees are RD$150,000, in reality, the fees are much higher. Enforcing the laws for renewable energy projects has not be perfect either. Furthermore, the advisory body has given approvals for concessions that should not have been approved (Peña, 2010). The law has developed a bureaucratic method that prolongs the advancement of the Dominican Republic, approximately 2 years for approval by the CNE. However, the new faculty is revising, correcting, and enforcing laws, regulations and approvals that were performed in the past to verify the concessions approved in the past and present.

When determining the commercial opportunity, there are two points of views, the large scale and small scale. The parameters for large scale to determine where to build were project area, wind speeds higher than six meters per second, and high capacity factors. For small scale, the commercial opportunity is directly related to the size of project. The law has incentives for small community projects that can help pay for installations for these projects. The only obstacle is that the funding is being redirected to pay the national debt (Peña, 2010). After all these variables have been taken into account, suppliers have to be contacted to be given a project cost. Windmill suppliers, for example, sometimes only export certain models to specific locations in the world.

Table 4: Cost of Investment per Kilowatt-Hour

	Data Set		
	Years (yrs)	$$/kwh	CC
1	1986	1945	1921.092
2	1987	1768	1797.582
3	1988	1650	1685.159
4	1989	1591	1583.441
5	1990	1532	1492.047
6	1991	1414	1410.595
7	1992	1355	1338.704
8	1993	1296	1275.992
9	1994	1179	1222.078
10	1995	1179	1176.581
11	1996	1155	1139.119
12	1997	1084	1109.310
13	1998	1061	1086.773
14	1999	1061	1071.126
15	2000	1061	1061.989
16	2001	1096	1058.979
17	2002	1096	1061.715
18	2003	1061	1069.816
19	2004	1061	1082.901
20			
21			
22			

User: Kedwin Dominguez
Source: (Fabian, 2010)
Date: June 14,2010
Project Value for 2010:
$1240 USD/ kwhNotes:



The purpose of research for AES was to narrow down the locations of potential opportunities in a large scale scope. Using variables such as geographic locations, population density, transmission line location, restricted zones, and concession locations, AES created maps to demonstrate locations with the highest potential for generating wind energy. The results of this analysis are presented in Map 1 and Table 5, below. (Further details on this analysis are available from Kedwin Dominguez)

Map 1- Top 7 Projects with Highest Electrical Capacity and Capacity Factor

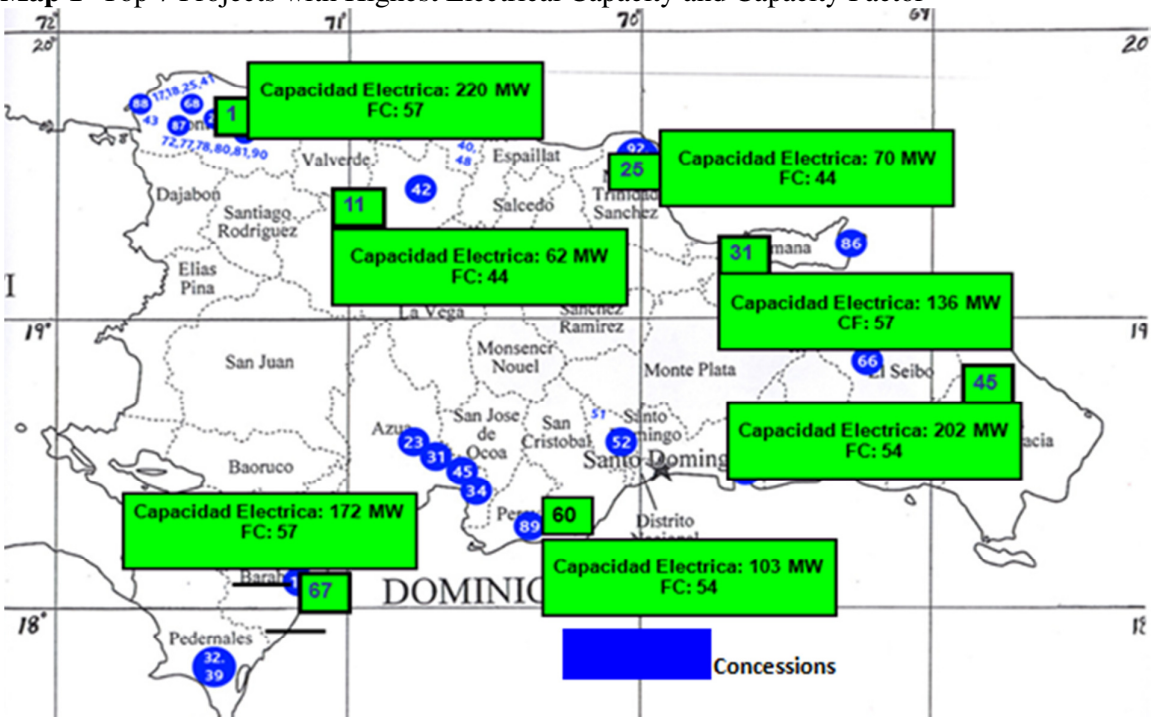


Table 5: Economic Analysis for Top 7 Projects (Numbers Correspond To Map Labels in Map 1)

1)Project Monte Cristi **Description:** Located Northeast of Monte Cristi. **Electrical Capacity:** 220 MW **Energy Generated Per Year**: 1,093 GWh **Capacity Factor:** 57% **Investment:** 286 MM USD **NPV:** 603 MM USD **IRR:** 47% **Risks:** Located near a restricted zone with various concessions nearby with UTM coordinates, which can cause noncompliance with Law 57-07.	11)Projec Valverde **Description:** Located Southeast of the Province Valverde. **Electrical Capacity:** 62 MW **Energy Generated Per Year:** 238 GWh **Capacity Factor**: 44% **Investment:** 80.6 MM USD **NPV:** 115,448,633 MM USD **IRR:** 36% **Risks:** Risk Free
25)Project Maria Trinidad Sanchez **Description:** Located North of the Province Maria Trinidad Sanchez. **Electrical Capacity :** 70 MW **Energy Generated Per Year**: 272 GWh **Capacity Factor:** 44% **Investment**: 91 MM USD **NPV:** 131,950,926 MM USD **IRR:** 36% **Risks:** Two nearby concessions with no UTM coordinates, which can cause noncompliance with Law 57-07.	31) Project Samana **Description:** Located near the center of Samana. **Electrical Capacity:** 136 MW **Energy Generated Per Year:** 678 GWh **Capacity Factor:** 57% **Investment:** 176.8 MM USD **NPV:** 373,666,024 MM USD **IRR:** 47% **Risks:** One nearby concession with no UTM coordinates, which can cause noncompliance with Law 57-07. Also, located nearby a restricted zone.
67) Project Barahona **Description:** Located South of Barahona. **Electrical Capacity:** 172 MW **Energy Generated Per Year:** 853 GWh **Capacity Factor**: 57% **Investment:** 223.6 MM USD **NPV:** 470,113,364 MM USD **IRR:** 47% **Risks:** Near dos restricted zones, and nearby two concession with no UTM coordinates that can cause Noncompliance with Law 57-07.	

Potential Investment Opportunities
Objective 7: Who are potential investment opportunities in alternative energy? (Wind, Solar, Biomass)

In this section, we have listed potential investors who would have an interest in providing funding for alternative energy projects in the Dominican Republic. The list is based on the institutions mission statements and objectives, which pertain to administering aid to developing countries, in hopes of building their economic infrastructure. The organizations were mentioned in the report done by Dr. Humberto Rodríguez and the information about the institutions was obtained from their respective websites.

When addressing who the potential investors for the Dominican Republic Alternative Energy sector would be, one would have to look at multiple public and private institutions worldwide. These include development banks, Multilateral Funding Institutions, and Private Sector entities. The list that follows contains possible entities that aim for the development of the Alternative Energy sector in developing countries.

The World Bank Group
This group consists of 5 different institutions including:

- IBRD (International Bank for Reconstruction and Development)
- IDA (International Development Association)
- IFC (International Finance Cooperation)
- MIGA (Multilateral Investment Guarantee Agency)
- ICSID (International Centre for Settlement of Investment Disputes)

These five institutions play a distinct role in the mission to fight poverty and improve living standards for people in the developing world. They make leveraged loans and grants to poor developing countries. It is also an implementing agency of the Global Environment Facility, which will be described later. Their goal is to help developing countries identify, prepare and implement projects that simultaneously reduce poverty, improve the local environment and the world.
"For the years of 1990-2004, the World Bank/GEF have committed 1.8 billion to renewable sources, which along with co-financing of $450 million from the GEF, resulting in a combined funding of 2.3 billion for renewable energy." (Rodríguez, 2007) In order to receive funds from The World Bank Group, one must apply through one of the grant programs provided on their website.

Multilateral Investment Fund (MIF) of InterAmerican Development Bank
The MIF is a fund that promotes economic growth through developing the private sector. They dispense both loans and grants to microenterprises and small businesses in Latin America and the Caribbean.
They strive to:

- Improve the business framework, or the environment in which the private sector develops.
- Enhance enterprise development, or building capacity to help both workers and smaller businesses thrive
- Promote financial democracy, or greater access to the global financial system.

In order to receive funding from the MIF, one must apply through their website and fulfill all requirements for prospective projects.
(MIF, 2010)

United Nations Development Programme (UNDP)
The UNDP is a program of the United Nations. Their small grants program is has the most potential for investment in the Dominican Republic. The program functions by giving small financial grants to NGOs and community organizations operating to create solutions to global and national development challenges. They also provide technical support and ensure the aid is effectively utilized.
The principle objectives of the Small Grants Programme are to:

- Develop community-level strategies and implement technologies that could reduce threats to the global environment if they are replicated over time.
- Gather lessons from community-level experience and initiate the sharing of successful community-level strategies and innovations among CBOs and NGOs, host governments, development aid agencies, GEF and others working on a regional or global scale.
- Build partnerships and networks of stakeholders to support and strengthen community, NGO and national capacities to address global environmental problems and promote sustainable development.
- Ensure that conservation and sustainable development strategies and projects that protect the global environment are understood and practiced by communities and other key stakeholders.

The UNDP provides funds to global organizations wanting to facilitate growth in developing nations. Organizations would have to apply for funding through their Small Grants program website, and would have to fulfill all program prerequisites to be considered.
(UNDP, 2010)

The European Commission (EC)
The EC that has committed 100 million Euros for Clean Energy projects through their Global Energy Efficiency and Renewable Energy Fund (GEERF). The GEEREF is both a sustainable development tool and a strong support for global efforts to combat climate change. It is sponsored by the European Union, Germany and Norway and is advised by the European Investment Bank Group. The GEERF aims to accelerate the transfer, development, use and enforcement of environmentally sound technologies for the world's poorer regions, helping to bring secure, clean and affordable energy to local people. The GEERF provides risk capital, 25-50% for medium to high risk and up to 15% for low risk renewable energy projects in developing regions. The funding would be facilitated by an international financial institution that could assist in public-private funding partnerships.
(EC, 2010)

Global Environment Facility (GEF)
The Small Grants Programme is a program of the Global Environment Facility as stated earlier. They provide financial support, in the form of small grants, to projects that conserve and restore nature while improving the welfare and livelihoods. By empowering people locally, they believe they can spur community action to find the solution to global problems and maintain the balance between human needs and environmental protection. Grants are awarded directly to NGOs and community organizations. Their mandate is to help generate global environment benefits in the areas of biodiversity, climate change, international waters, pollutants and land degradation. It is committed to the Millennium Development Goals created by the United Nations. Organizations would have to apply for funding through the GEF website, and fulfill all the requirements for the project to be considered.
(GEF, 2010)

Development Assistance Committee (DAC)
The DAC of the Organization for Economic Co-Operation and Development is an international forum where donor governments and multilateral organizations come together to aid developing countries to reduce poverty and work toward achieving the Millennium Development Goals. They coordinate the donors to have the most effective impact.
The Development Assistance Committee concentrates on the following two areas:

- Cooperation to facilitate the ability of developing countries to participate in the global economy.
- Ability of people to overcome poverty and participate fully in their societies.

According to a report, Rodríguez found that from 1999 to 2003, development assistance of the DAC countries averaged about $130 million per year for renewable energy.
In order to receive funding from the DAC, one would have to apply and receive the funds from the governing nation that the project would be located. In this case, the funds would have to come from the Dominican Republic government.
(DAC, 2010)

KfW Bankengruppe
KfW Bankengruppe is a German government-owned development bank based in Frankfurt. They provide funds to catalyze economic, social, and ecological development worldwide. They also aid in the support of small and medium sized enterprises, entrepreneurship, environmental protection, housing, infrastructure, education, finance, project and export finance, and development cooperation. In 2004, they approved nearly €151 million for renewable energy. (Rodríguez, 2007)

The KfW Bankengruppe provides financing in the form of "global loans to partner banks throughout Europe, enabling them to extend medium and long-term investment loans to small and medium-sized enterprises and to finance private residential building projects that target environmental and climate protection." One would apply for the funds through an international financial institution.
(KfW Bankengruppe, 2010)

Japan International Cooperation Agency (JICA)
JICA is an independent governmental agency of the nation of Japan. As an organization they offer Official Development Assistance (ODA) to assist economic and social development and promote international cooperation. JICA is the entity that administers aid in the form of grants and funds given by the nation of Japan to projects all over the world. They believe in fighting poverty through equitable growth. This is done by providing human resources development, capacity building, policy and institutional improvements, and provision of social and economic infrastructure. Although JICA does not direct their funds specifically to alternative energy, any alternative energy projects that inherently contribute to the economic development of the nation would be applicable. Funding from JICA would have to come through the governing nation where the prospective project would be located. In this case, the Dominican Republic would need to facilitate the funding. There are already projects currently in the Dominican Republic that were aided by the Japan International Cooperation Agency. (JICA, 2010)

The Inter-American Foundation (IAF)
The IAF is an independent agency of the United States government that provides grants to non-governmental organizations and community-based organizations in Latin America and the Caribbean. Their efforts are directed toward improving the quality of life of poor people and strengthening participation, accountability and democratic practices. The purpose of the IAF is to:

- "Strengthen the bonds of friendship and understanding among the peoples of this hemisphere;
- Support self-help efforts designed to enlarge the opportunities for individual development;
- Stimulate and assist effective and ever wider participation of the people in the development process;
- Encourage the establishment and growth of democratic institutions, private and governmental, appropriate to the requirements of the individual sovereign nations of this hemisphere."

They choose projects after a submission and screening process that assesses each proposal's value. One would have to apply through their organization. (IAF, 2010)

E+Co
E+Co is a private company that invests in services and capital in clean energy businesses in developing countries. By supporting business development in the alternative energy sector they believe they can mitigate climate change and reduce poverty while generating financial returns. E+Co believes that problems plaguing developing nations lie with:

- The ability of the poor to afford modern energy.
- Unavailability of technologies or business models for payable energy.
- The unwillingness of policy makers

To alleviate the problems, E+Co creates opportunities for small energy businesses to expand and solve the enormous energy need in developing countries and at the same time empower entrepreneurship. They provide seed and growth capital to projects that fulfill the requirements listed on their website. (E+Co, 2010)

Component Parts
Objective 8: What component parts for alternative energy could be imported from Florida? (Wind, Solar, Biomass)

The internship in the Dominican Republic was funded through a grant from the US Department of Education and one purpose of the grant was to identify markets in the country for export opportunities to small businesses producing alternative energy services and goods in Florida. There is a large influx of companies selling wind and solar products from Florida that have a great opportunity to contribute to the alternative energy industry in the Dominican Republic. The Dominican Republic is just starting to grow within the industry and now is the perfect time for businesses to develop in this sector. Companies in Florida are able to offer the country a variety of solar panels that the country will need. Wind also has an immense potential in the country. Although studies have been done, there has yet to be a wind turbine set into place in the country. The country has great wind speeds throughout the country and it is just a matter of time before projects are set in place. The key in this, as in any business, will be the price of the product. Due to the fact that there are already companies in the Dominican Republic that offer different solar panels, companies will need to be aware of the pricing already put in place and what other company's products entail. As in most countries, the main concern for Dominican consumers is to get the best deals. With this industry still in the early stages, opportunities are endless at this point in time. The Dominican Republic has a continuous shortage in energy and constant blackouts due to the effects of inefficiency in energy supply.

Conclusion

Our research in Dominican Republic confirmed a number of our assumptions but also surprised us in many ways. The Dominican Republic presents a number of opportunities for those interested in investing in its alternative energy markets. However, with these opportunities come challenges that, if managed correctly, can become competitive advantages to those doing business in the country.

Law 57-07 is a prime example of this. Law 57-07 is the alternative energy law of the Dominican Republic. It contains all the laws, regulations and incentives that apply to alternative energy production, products and services. However, unlike most laws, Law 57-07 is not a mandatory law. If a business wishes to receive the incentives, special regimes and exemptions the Dominican government offers businesses in the alternative energy market, then they need to follow the law. However, if a business does not wish to receive the benefits of the law, they do not have to comply with it. Because the law is not mandatory, a number of alternative energy investors and businesses are foregoing law 57-07 and completing their projects apart from the law. Mr. Martínez stated that their investors do this in order to avoid the bureaucratic process in the Dominican Republic. This way the projects are completed faster and, therefore, in operation more quickly.

Research and development in the Dominican Republic is still in the nascent stages. Most of the research comes from sources outside the government like the NREL. Also, most of the research available is outdated and even the most recent research referred to in this report, completed in 2007, references maps and studies released in the 1990s and early 2000s.

The potential for investment in the Dominican alternative energy market can be noted by observing the number of alternative energy projects that are currently in the planning phases. These projects are a demonstration of the potential for the market but are also a demonstration of some of its most critical problems. Two of the main reasons why there are so many projects still in the planning phase (1) government bureaucracy and lack of transparency; and (2) private prospecting. The process for getting a project from initial approval to its final approval for operations should take anywhere from three months to two years, depending on the type of project, scale, funding, etc. However, a number of projects are being delayed beyond five years. This delay is due to the number of governmental institutions and officials that need to approve of the project. Within that approval process there is a lack of transparency. This lack of transparency has created a situation where a project can be stopped for illegitimate reasons like political benefits, bribery, etc. These long approval processes have also created an opening for illegal prospecting.

Prospectors buy land that is thought to have high development potential for alternative energy projects, complete the minimal paperwork and then sit on the land as they search for a legitimate investor to buy the land from them. Because the legal process takes so much time, it has allowed for individuals with no real intention in developing the land to go unnoticed, only serving as an additional barrier to those that are truly interested in developing the land.

The Dominican Republic is currently producing energy from alternative sources. However, in order to meet its goals from the Kyoto Protocol, the Dominican Republic will need to substantially increase this type of production. To incentivize the production of alternative energies in the Dominican Republic, Law 57-07 stipulates that the government guarantees to buy the energy produced by means of alternative sources that comply with Law 57-07. However, there are also problems collecting consumer payments for energy consumption. This makes it difficult for the government to keep its promise of paying for all of the energy produced by alternative energy companies.

The unreliability of energy from the grid has created a market of people who are willing to pay, sometimes at premiums, for reliable energy. Hospitals, schools, hotels, business and higher income individuals, as a majority, already own backup power generation systems. If offered competitively priced alternative energy systems that are as reliable as their current backup generator, this is a market with purchasing power to buy alternative energy products. The current alternative energy product and service companies are selling to this market. However, most of their supplies are not produced in the Dominican Republic but instead imported from abroad. Solar panels, solar water heaters and pumps, wind turbines and biomass generators are all being imported as finished products or partial manufactured from abroad. Most of these imports are coming from European and Asian countries. This can become an opportunity for Florida business. Mr. Martínez emphasized that Florida needs to be able to compete with prices. If the prices are competitive with those of other countries, Dominican business owners in the alternative energy arena may even prefer to buy from Florida because of its proximate location.

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