

# Biehl International Research Fellowship Report

Waste Management, Freshwater Production, and Sustainability  
on the Island of St. Barthélemy

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## **Introduction**

St. Barthélemy (also known as St. Barth) is a small Caribbean island found in the Leeward Islands of the Lesser Antilles and is considered to be a collectivity of France. French colonization first occurred in the mid 1600's before being transferred to the Swedish in 1784 in exchange for trading rights. The island was then given back to France in 1878. Before European colonization, Carib natives knew of the island and referred to it as *Oualanao*, however there were no permanent settlements due to the fact that there are no naturally occurring sources of freshwater on the island. In the first decades of European colonization in St. Barth, the island was considered poor because of its lack of resources. Apart from early salt production and fishing, there were few economic activities on the island. This automatically distinguished St. Barth from other Caribbean islands because agriculture was nearly impossible. Starting in the 1950's and 60's, wealthy American families such as the Rockefellers discovered the paradise that is St. Barthélemy and began building vacation homes on the island. This sparked a massive boom, as luxury tourism has since evolved to become the primary economic industry-- creating jobs, modernization, and ultimately a consumer culture (Fielding 2014). In addition, the French

government played a large hand in the rapid development of the island through tax exemptions. Though this was done in an effort to kickstart the struggling economies of other islands in the French West Indies, this had a strong effect on St. Barth, accelerating growth and fostering a complete economic transformation. Along with this change came a shift in lifestyle and mentality. The island in many ways lost its autonomy as it became necessary to adhere to French laws and, in the words of one resident, to become “more corporate”. It has become easier to live and eat; there is more access to products and life has become alleviated. Twenty years ago, people were happy just to be able to find milk on the island. Today, tourists complain if supermarkets do not carry the vast cornucopia of products they can find at home. In 1980, the island had 3,000 permanent residents. Today, there are 9,500. In the peak tourism season, the island is saturated with 15,000 people. In short, the island has undergone significant change and therefore must address the issues which always come as a result of growth and development. In the words of the president of St. Barth, the island is “*un victime de son succès*”.

At an area of about 23 km<sup>2</sup>, the residents of St. Barth are faced with limited space and resources. This fact becomes especially difficult when tackling environmental issues such as waste management and freshwater production. As a result, St. Barth has created a waste-to-energy (WTE) system in which waste is burned in an incinerator. During incineration, steam is captured and sent to the nearby desalination facility where thermal energy is used to create freshwater from seawater. In order to make this process more efficient, residents have been asked to sort their waste at home into separate bins-- one for combustible waste (organic material, paper products, plastic) and one for glass and metal. Metal must be exported off the island, and glass is typically ground up and repurposed locally (Fielding 2014). This project sought to explore the attitudes of the residents of St. Barth towards matters of waste disposal, freshwater

production, and sustainability. What is working well here, and why? What are the flaws in the system, and what is preventing them from being eliminated? These questions were explored during my time in St. Barth.

## **Methods**

Methodology for this project was primarily interviews. With the help of Dr. Fielding, I was introduced to a few initial contacts on the island. Through these individuals, I was able to find more participants in a sort of “snowball approach”. During interviews, I consistently asked the same base of general questions, which were as follows:

- How long have you lived in St. Barth?
- How has the island changed since your childhood/since you moved here?
- Do you think environmental protection is important? Why or why not?
- Do you participate in the trash sorting regulation at home?
- What is your attitude towards the regulation?
- Is the system practical and convenient for you?
- Is it practical and convenient everywhere (at restaurants, in town, etc)?
- Do you think your attitude is the norm or the minority in your community?
- Do you think the system has any faults?
- Why do you think the system has succeeded here (if you feel that it has)?
- Do you think that the waste-to-energy system is the best system for satisfying the issues of waste management and freshwater production?
- Are you worried that water scarcity may become problem in the future? What would be the source of this problem?
- Do you have a cistern? Do you ever use public water? Do you always drink bottled water?

- How do tourism and tourists have an effect on your life?
- Do you think the government (la collectivité) wants to protect the environment?
- Do you think most residents on the island want to protect the environment?
- How can the government/residents improve their efforts to protect the environment?
- In general, what are your sentiments towards composting? Do you think it should be important for St. Barth? What benefits do you hope to obtain from composting?
- How can St. Barth find a balance between development and sustainability?

If I was speaking with a person that had specific knowledge in a particular area, I added questions to learn more about their experience. There were also times when a participant would not know enough to answer some of the questions listed above, so each interview was modified and geared toward each person's unique knowledge.

Other methods included observation. Whenever possible, I would look in trash cans on the street, at restaurants, by beaches, in hotels, and in public spaces to see if trash appeared to be sorted and if multiple bins were present. I also toured the incinerator and the electricity plant to get a clearer image of where waste goes and where electricity is produced.

### **Waste Management**

In the past, waste on St. Barth was either burned at home, dumped onto the beach, dumped into the ocean, or burned in a large pile near the village of St. Jean. It would not be surprising in those days to be on a boat and see a refrigerator floating by in the water. Clearly, these means of waste management are not ecologically sound, and as the population began to grow and the volume of trash being produced began to increase, it became obvious that a more sustainable method must be adopted. In 2002, the island produced 6,000 tons of trash. In 2015, this figure had reached 11,000 tons. This rapid increase is to be expected with the sharp

population growth and the increase in tourism. The incinerator has been the solution to the waste issue, though even this system is not entirely perfect. It accepts all waste, apart from glass, metal, and objects that clearly cannot be burned such as tires and large appliances (air conditioning units, washing machines, etc). Ashes from the incineration process are put into large bags and exported to Europe. In the process of burning, toxins are released into the air and may have a harmful effect on air quality. They have taken measures to lessen this impact and reduce the amount of toxins that are released during combustion. Glass and metal (which have been sorted together) are then separated using a large magnet. Metal is exported, and glass is ground into a fine sand-like substance that can be used locally for drainage and other purposes. Old cars are compounded and exported. There is the concern that if the population continues to increase and reaches 12,000 permanent residents or more, the incinerator will be overwhelmed to a point that cannot be alleviated. Renovations were already made two years ago to allow room for more trash, but after a certain point it may be impossible to accommodate the sheer volume of waste being produced.

One future solution to lessen this issue is composting. Construction on a composting facility is due to begin in 2017, a project in which the government has invested €16 million. The site has already been selected-- it will be in the *Zone Industrielle* near the incinerator in La Publique. The facility will be primarily for the composting of vegetation (branches, leaves, trimmings, and other plant waste), but the hope is to also accept other compostable household waste. Another potential composting resource could be seaweed-- massive amounts are picked up from beaches around the island and sent to the incinerator. Instead, the nutrients could be used to create something productive. Several interviewees reported that they already participate in a form of composting at home-- organic waste is thrown outside and fed to the turtles that can be

frequently seen meandering around the island, crossing streets at inopportune times. Most residents with whom I spoke thought that compost would be beneficial to St. Barth, however some were skeptical that if it were implemented at the household level, people may be reluctant to sort their garbage into an additional bin. It would be easy, however, for businesses creating large amounts of organic waste to benefit from a composting facility. The island itself produces a staggering amount of *déchets verts* (plant waste). One resident who owns a plant nursery reported that his business produces 10-11 tons of plant waste per month, which he then must send to the incinerator where he pays for its disposal according to the weight. Composting would eliminate this cost, and then consequently he could use the locally produced compost rather than importing it at a high price. The ultimate use for compost would most likely be gardening. Many villas and hotels, in order to keep up aesthetic appearances, require landscaping and would benefit from compost. In addition, one interviewee noted that several years ago after a large hurricane, the entire island resembled a “lunar planet”, that is to say that the vegetation on the island was completely destroyed. Compost may help in recovering vegetation post-hurricane, and may prevent damage in the event that a hurricane does strike. Also, having more waste to burn in the incinerator is simply more expensive. Diverting some waste to a composting facility would reduce costs and save space. Finally, much of the trash people burn at home is plant waste. Implementing a composting system may sway people away from burning at home, which would be beneficial to everyone.

Before reaching the incinerator, residents are required to sort their trash at home into two separate bins, with transparent bags being designated for glass and metal and black bags being designated for combustible waste. The more convenient scenario is for trucks to come and pick up trash at home. The truck for combustible waste comes every day, and the truck for glass and

metal comes once per week. If a bag is not properly sorted, it will not be picked up; it will be labeled with a sticker that reads, “Poor Sorting”. Some households do not have the convenience of having a truck come for their trash because trucks do not go on private roads. Because of the mountainous terrain of St. Barth and the steep incline of some roads, trucks often cannot even get to certain residences. If this is the case, people must take their trash directly to the incinerator. Their cars are weighed before and after dropping off trash and they are charged by the weight. Otherwise, residents pay around €110 per year for their trash pick-up service.

Outside of the home, it is common to see multiple bins at restaurants, at beaches, and at public events. Restaurants and other businesses are required to sort their trash, and are held accountable if they fail to comply. However, some participants reported during their interviews that they do not believe there are enough bins on the street to allow for sorting. Overall, the sorting system seems well-implemented and widely accepted by residents. I did not speak with anyone who blatantly opposed the regulation or who claimed not to participate in sorting at all. It was common, however, for people to say that there are some who simply do not care to participate. This may be true for some tourists, who are only there for a short time and who do not feel that it is their responsibility to comply. In other cases, people who do not pay attention to sorting may simply lack the education to understand its importance, or lack a sense of civic-duty that is required to understand how small, personal action can affect the entire community. Perhaps they think it is not important to sort because all trash is sent to the same place in *La Publique*. In addition, many people on the island have grown up being accustomed to simply throwing waste into the ocean or burning it. With the island’s rapid evolution and modernization, it is possible that there has not been enough time for some people to become accustomed to the new standards for waste management. Some “old-timers” still burn trash at home, and

regulations to prevent this are extremely relaxed. The general consensus is that trash burning is acceptable if it does not bother your neighbors. Of course, this is a very ambiguous rule and does not allow for any real enforcement. Others may throw an empty bottle into the ocean without a thought. If you have grown up with this sort of behavior as the norm, it is unlikely that you would change at the drop of a hat. However, this mentality is changing quickly with a new generation of residents who have grown up learning about the importance of the environment in school; environmental education programs are common on the island and are conducted by organizations such as *St. Barth Essentiel*.

Overall, the trash-sorting regulation is working here for several reasons. First, St. Barth is a small, close-knit island. Communication is easy and efficient, therefore the regulation was easier to implement. There is a strong sense of community among residents, which creates a sense of ownership to the land and a duty to be a positive participant in the community. People are extremely proud to live there and appreciate of the natural beauty of the island. There seems to be an intrinsic need to protect such a rare, special place. Residents also understand that the incinerator is unique and if they do not sort, it will have to be sorted later down the line by someone at the incinerator (and they probably know the person who has to do it!). In addition, because it is a small island, problems come quickly and cannot be avoided. Interviewees often said that they sort their trash out of necessity. With limited space and limited resources, acting sustainably and with the entire community in mind is the only option. Even if they do not view sorting as a sustainable decision, they do it simply to be a good citizen. Next, the entire system is relatively convenient and easy. Participants who have lived elsewhere, such as France, Belgium, and Martinique, report that these countries require sorting into 3 or 4 bins rather than just 2. The system is simple, and the government has been consistent in placing bins in various locations

around the island. Communication and education have also been paramount to the system's effectiveness. Residents have been well-informed, and this is often the first step to implementing a new regulation into a community. When sorting first began, it was not widely established and it was often ignored. Shortly after its inception, the government launched a publicity campaign, showing advertisements to explain how to properly sort and why it is important. Ads still continue to run in the newspaper from time to time. Another factor is the stickers which are placed on poorly sorted bags; this negative feedback makes it difficult not to participate. Finally, the island itself possesses an almost unusual amount of social stability. The population is well-educated and socioeconomically sound. If this were not true, it may be more difficult to encourage such a widespread lifestyle change and, put simply, to make people care about something like trash sorting. St. Barth has never been in debt, and therefore the government can afford to invest in solutions such as an incinerator to handle waste-management issues.

St. Barth has also begun to address another form of waste: wastewater. Until recently, there were no sewers or wastewater treatment plants on the island. All wastewater was sent directly into the ocean, the effects of which are environmentally detrimental. Marine habitats are becoming increasingly polluted due to acidification from wastewater, which is not only harmful to marine species but is also harmful to the local economy which relies on intact marine ecosystems for activities such as snorkeling and scuba diving. In recent years, sewers have been built in Gustavia, and a brand new wastewater treatment plant is now functioning in Gustavia as well. There are still other neighborhoods, such as St. Jean, whose wastewater still goes directly into the ocean. As with any other issue, it will become more pressing to find solutions as the population grows and the number of tourists continues to climb. Investing in wastewater solutions now may prevent even greater issues down the road.

A final topic in waste management is liquid waste, which is produced by small businesses on the island in sectors such as construction and auto-repair. There are occasionally reports of these companies disposing of toxic liquid waste into channels, natural areas, or in the ocean. Regulations for this type of waste are virtually nonexistent, and there is no incentive for companies behaving this way to change. If this behavior continues unabated, it may pose a serious threat not only to the environment, but to human health.

### **Freshwater Production**

In St. Barthélemy, one cannot speak about waste management without also discussing freshwater production, for the two are very closely connected and co-dependent. In the past, residents relied on the catchment of rainwater (Fielding 2014). The island receives about 1,000 millimeters of rainfall annually, however the island is still extremely dry because the soil is porous and cannot store much water. It also will often rain for only several minutes at a time, after which the water will immediately evaporate in the hot climate. Traditionally, homes are designed to catch rainwater, with roofs and gutters that direct water into a cistern (Stening 2008). This has worked well in the past, as long as there is consistent rainfall. One resident who grew up on the island (and is approaching his seventies) reported that as a child, there was never a problem finding enough water or food.

Similar to the trash issue, another system had to be adopted as the population grew and demand for freshwater increased. Tourism also became the primary economic activity, an industry which requires vast amounts of water for swimming pools, hotels, and the like. The desalination facility relies on thermal energy produced by the incinerator to create freshwater. As long as there is a constant supply of trash, the process will continue unabated. Also similar to the waste management system, however, it will not work if this period of unbridled population

growth continues and the demand for water surpasses what the facility can supply. In other cases, high end villas and hotels may have their own personal desalinators, which provide freshwater to that particular building to be used by its inhabitants.

Interestingly, public water from the desalinator is still not the primary source of water for many residents. Most people still have a cistern in their home which is replenished by rainwater. Many people have personal filters to clean this water, while some still use the water directly from the source. Some people pride themselves on never having to rely on public water at all-- water from the cistern is sufficient for all of their needs. Others will use public water up to a certain point while it is cost effective, and after that point they resort to the cistern, and some only resort to public water if their cistern runs dry. The rule of thumb is to always ensure that there is water in the cistern, in case of a power outage or other issue that would prevent the desalinator from operating.

The residents of St. Barth depend heavily on bottled water. Almost everyone I spoke with did not directly drink water from the desalinator or from a cistern-- bottled mineral water is bought at the supermarket. All restaurants serve bottled water instead of tap water. Therefore, all drinking water must be imported in plastic or glass bottles, which contributes significantly to the waste being produced. Much of the plastic from empty bottles ends up in the ocean, where micro-particles become a toxin to marine species and to humans. In addition, it leaves the residents of St. Barth vulnerable; if a ship importing drinking water does not arrive, it could create a serious problem. If the island were going to address an issue regarding water security, it is in their best interest to try to curb its dependence on bottled water. Moreover, bottled water is often imported great distances, from places like Italy, France, Norway, and even Fiji. The carbon footprint solely created by providing residents with drinking water is enormous. This seems

especially unnecessary when considering that other Caribbean islands, such as Guadeloupe, have freshwater that could be bottled and imported with much less environmental impact and could benefit the local economy. When questioned about why bottled water is preferred for drinking, residents responded that they want the minerals that are found in bottled water, especially because of the warm climate which, put simply, makes you sweat. Overall, however, it seems to be a cultural decision rather than a health decision-- you will not become sick if you drink tap water or use it to brush your teeth. Bottled water is the norm and does not seem to be questioned in their society as a potential issue. One participant offered a solution, however- he recalled seeing a machine used in Spain which took public water and treated it to make drinking and sparkling water. Somewhat like a beer pump, glass bottles were filled up with this water in restaurants and served to customers. These bottles were purchased by the restaurant and reused. Installation is estimated at about €2,000. In short, there are potential solutions to satisfying the demand of high-quality drinking water without importing and disposing of bottled water at the expense of the environment.

Another water-related issue is runoff, which tends to accumulate during peak rain events. This water goes directly into the ocean where it harms reef and other marine ecosystems. Rather than letting this happen, this water could be captured and cleaned to be used either for gardening purposes or for other household uses. Increasing vegetation and planting trees in flat areas could also ameliorate this issue while also providing other benefits.

Permanent residents of St. Barth tend to be water-conscious. They pay attention to the length of their showers because water is expensive and because they recognize that it is not an infinite resource, especially on such a small island. Tourists and other non-permanent visitors, however, may be less aware and more wasteful. When questioned about water security, there

were those who worried that drinking water (bottled water) would become more expensive in the future. There were also some concerns that if construction continues at its current pace, there could be a problem because more houses require more water, especially in high-end villas and hotels that have large swimming pools and water-intensive gardens. Not to mention that much of the landscaping for these properties focuses on imported, non-native plants which are not adapted to local conditions and are consequently very water-intensive. Otherwise, most people with whom I spoke were not worried about future water scarcity. However, cisterns will only continue to be a reliable resource if rainfall remains consistent. In light of climate change, it is likely that rainfall patterns will change everywhere. Especially because there are no natural streams or reservoirs on St. Barth, a decline in yearly rainfall could pose future threats. Compounded with future population growth, the desalinator could potentially become overwhelmed. In short, the current system that it is place seems to be working for now, but could be threatened in the future by climate change and a growing population.

### **Sustainability**

In general, the residents of St. Barth with whom I spoke place significant importance on environmental protection-- the island's extreme natural beauty makes it an easy place to want to protect. As mentioned before, the people are proud of where they live and have a sense of duty to the community and their physical surroundings. For example, Saline Beach is one of the island's most pristine, undeveloped beaches. Several years ago, there were plans in place to build a hotel, but the plans were eventually discarded after an overwhelming public outcry. People are protective, and there is a clear voice from permanent residents (especially those who have grown up on the island) to decelerate growth and prevent excessive development. Everyone is connected there, therefore everyone feels like they are stakeholders in the community's well-

being. Every year, many residents participate in an event called St. Barth Clean-Up, where people gather and are sent to various neighborhoods around the island to pick up trash. They have even sent divers to clean up underwater areas. The event is always very well attended, and last year they were able to pick up 9.5 tons of trash. This sort of event is bound to be successful in a place like St. Barth due to the fact that the community is close-knit and the people believe it is their civic duty to preserve the beauty of the island. For others, environmental protection is a matter of health. Like everyone, residents are connected to their natural environment-- they eat from the ocean and breathe the air. In addition, there was much emphasis on the importance of preserving the island's beauty, ambiance, originality, and way of life for future generations. For instance, one resident spoke of how important fishing was for him growing up, and he thought that strict fishing regulations were important not only to maintain a healthy fishing industry, but also to keep the tradition alive for his children and the generations to come.

In addition, maintaining environmental quality on the island is essential to its economy. In recent decades, a market for luxury tourism has boomed in St. Barth. With the start of tourism, the island underwent a transformation that continues to this day. The most marked changes would be a drastic increase in construction. Each year, 200-300 new homes are built. Large villas, luxury hotels, expensive restaurants, and boutiques are myriad. The population has grown, traffic has increased, and a consumer culture has developed. To satisfy the demands of this culture, imports have also increased dramatically. When tourists from France and the United States visit St. Barth, they want the same comforts, food, and brands that they can receive at home. As a result, people are consuming products from abroad, but the trash being created must be dealt with locally. In addition, the particular demographic of tourists coming to St. Barth demand a certain lifestyle when they visit, and because they have the money to pay for it, it is

supplied to them. For instance, rental car companies have no choice but to bring large, expensive cars to island if a tourist wants it. There are few incentives to prevent this from happening.

The dilemma faced by St. Barth in the coming years to maintain a sustainable community will be to find a balance between economic growth and development and environmental protection. The island's small size makes it imperative to plan-- if not, there will be huge consequences to overcome down the line. If protecting the environment for its own sake is not enough of an incentive, then let economic incentives prevail. If development continues unbridled, the island will be transformed into a place that may no longer be appealing to high-end tourists. In truth, the main reason people began coming to St. Barth was for an "escape", to feel like they were getting away from the noise of their lives. Continued development will eventually destroy this ambiance and may deter tourists from returning, thus creating a conflict between an expansion in tourism and the desire to preserve the environment to maintain a favorable tourist destination. To hinder development, they currently use a zone system, with different parts of the island designated for residential, commercial, and natural areas.

Approximately 75% of the island is considered a *zone verte* or "green zone". However, it appears that there are few restrictions to keep these areas "green" in perpetuity. If a person owning a green zone sells their property, there do not seem to be any restrictions to keep the new owner from building on the land. Under the table deals are often made to allow for construction in green zones, which tend to happen without objection from the government. Rules for obtaining construction permits are also vague; they exist, but it does not seem like there are solidified restrictions to protect natural areas. It is also true that many areas are green zones merely because they fall on mountainous terrain that is not suitable for building in the first place.

Almost every interviewee believed that the government either did not care to protect the environment or did not do enough. Most people believe that there are not enough restrictions for construction, population growth, tourism, and cars. When asked, the president of the collectivity agreed that it was difficult to regulate these things. He believes that the island is a democracy, therefore anyone has the right to move there if they wish. The same goes for property: people have the right to build what they want on their own land. His intention is to pursue tourism in a “quality over quantity” approach by continuing luxury tourism in smaller numbers, thus preventing environmental impacts and preserving the island’s ambiance. Maintaining the island’s quality of life is important, and he recognizes that allowing too much development would be detrimental; improving what already exists is their main development goal. To regulate a growing number of cars, he said he would like to limit the number of car companies that are allowed to be on the island (though the rest of the government is not yet on board with this idea). He also suggested creating a tax for large cars to incentivize people to have smaller, more efficient vehicles. His environmental philosophy can be summed up in the phrase, “Cut a tree only if you have the obligation to”. Overall, there seem to be some intentions to plan for sustainable development, but there is progress to be made. Right now, many people believe that the government is pursuing sustainability only out of necessity. Their main goal is to keep the island economically productive, and will only consider the environment as an afterthought or if it is economically beneficial. They do not yet seem to recognize the value of ecosystem services, and do not see that protecting the island’s ecology may in fact be economically favorable in the long-term. It was observed by one resident that the government is concerned only with problems that have already happened; they are less concerned with looking to the future to prevent problems that have yet to occur.

There are independent agencies and nonprofits that strive for sustainability and environmental protection. *L'Agence Territoriale de L'Environnement*, though founded and partly funded by the government, is an independent team of seven individuals that protect marine and terrestrial ecosystems, provide educational programs to local schools, and promote alternative energy. There is also a nonprofit, *St. Barth Essentiel*, which has two primary objectives: heritage and environment. They want to protect the island's history, culture, historic buildings, traditions, and language, while also conducting projects to protect the environment. Through educational programs in local schools, free public events, fundraising, species inventory, and analysis studies, this organization is a prominent force for positive change on the island.

Of course, as with any community, not everyone on the island is thinking sustainably. There will always be people who do not care or who do not see past short-term profits to see the importance of long-term viability. For instance, one participant spoke of a certain hotel that was built in a location which makes the building extremely vulnerable to hurricanes, and he contended that in ten years, it would be likely that the hotel itself would not even exist. Still, the business is profitable in the short term. Currently, the economy of St. Barth is highly successful. Everything seems to be working well, but it is vital that sights are set more to the long term. Though the current system is working now, will it continue to work in 50 years in light of climate change, population growth, increasing pollution levels, and unbridled development? St. Barth distinguishes itself from other Caribbean islands for many reasons, one of which being that it has the financial means to be proactive. In the words of one interviewee "*l'environnement est pour les riches*"; the island can afford to build an incinerator and desalination facility, let it also choose to invest in alternative energy, for example. After a recent study done by the company *Carbon Quatre*, it was estimated that the carbon footprint of the average St. Barth resident was

indeed higher than that of the average American citizen. This statistic is largely due to the fact that the island's current energy resources are emitting vast amounts of carbon, both through transportation and electricity generation. Moreover, large rental villas and hotels are extremely energy consumptive, especially when their inhabitants are not energy-conscious. This seemed to be a major point of frustration for permanent residents-- tourists will heat their swimming pools when it is not necessary, leave the windows open when the air conditioning is on, and install windows that must be opened electrically. Combined, this "luxurious" lifestyle pursued by the visitors of St. Barth creates a huge impact.

Currently, the island relies almost completely on fossil fuels to provide electricity. At the electricity plant, six motors use gas imported on boats from Martinique. Scrubbers are put in place to minimize impacts on air quality. The demand for energy has sharply increased in recent years; in 2008, there were only two motors in use, and there are plans to build three more in coming years. They are also replacing all current motors to allow for more efficiency. All waste from electricity generation is treated on-site and sent directly into the ocean. However, despite the drawbacks of this system, installing alternative energy infrastructure is still considered to be more expensive.

There are some who claim that St. Barth should be one of the world's leaders in solar energy. An additional study has already been conducted which has analyzed alternative energy potential on the island. It is currently being considered by the local government, although after speaking with the president of the collectivity, there are no plans to pursue solar or wind energy in large, government-run operations. Development of solar potential at the individual, household level is encouraged. In the past, residents have been hesitant to make these investments due to high costs, aesthetic concerns, and the possibility that any solar panels or wind turbines may be

destroyed by hurricanes. The promise of better, cheaper technology may change these concerns. One resident commented that there are some solar cells that can even be incorporated into the roofing itself, which would eliminate some concerns. One interviewee remarked that St. Barth is on the brink of a total transformation, and that the only thing holding the island back is political will. An energy transformation could be possible within 3 years, however this will only happen if the government commits to the project. Many residents seemed frustrated that their leaders are “dragging their feet” on this issue, especially when they have the financial means to create real change. One additional issue could be the fact that there is a tax on all imported petroleum, making it profitable for the government and perhaps swaying them away from the possibility of eliminating fossil fuel dependence.

St. Barth has already succeeded in abating several environmental issues, but one can always do better. In this particular case, it only requires the will of the government, residents, and even tourists to create an even more sustainable community. It will become increasingly important to continue to protect marine and terrestrial biodiversity, preserve green zones, rein in dependence on bottled water, pursue alternative energy, consider public transportation, create affordable housing, address wastewater issues, and restrict construction. I believe that solutions to each of these issues are in reach for St. Barthélemy,

## **Conclusions**

The residents of St. Barthélemy are motivated to act sustainably for several reasons. The island is small, therefore it lacks the resources and space to ignore environmental problems. Civic-duty is a word often used by residents because they know if even a single person fails to act responsibly, the whole community could potentially suffer. In short, small actions make a large impact. For example, everyone typically participates in the waste-sorting regulation

because it is necessary for the functioning of society and they feel an obligation to contribute to the well-being of the community. The residents are protective of their land and feel the need to preserve its beauty. The small number of residents makes it easy to communicate and spread the word about environmental issues, events, and new regulations. The entire island is socioeconomically stable-- there are no poor areas, there is no debt. People have the luxury of being able to care about things beyond basic needs and the government has the means to solve environmental issues. The incinerator, the desalinator, the wastewater treatment plant, the composting facility, projects to restore coral reefs, and community-wide clean-ups are all examples of this in action. And finally, the economy relies on a clean, beautiful environment to thrive. Tourists are drawn to St. Barth for its pristine beaches, snorkeling and scuba diving opportunities, and generally clean surroundings. Protecting the environment is important not only for its own sake, but for the sake of the economy.

There is still progress to be made in St. Barth. The single largest factor hindering change is willingness of local leaders to execute plans. The government is beginning to see the importance of sustainable development and environmental protection, however it does not extend beyond the scope of economic benefits. The environment is prioritized by the government when it is in the best interest of the economy. There is immense progress to be made in the fields of alternative energy, sustainable architecture, and transportation. Because each of these topics would require high short-term costs, it is currently difficult for the government to justify their long-term benefits. However, I think this mindset is evolving and may change in light of environmental changes and a new generation of leaders who are more environmentally aware.

I believe that the situation in St. Barth can be related to the larger picture of sustainability. Environmental regulations tend to become better implemented at a small scale. A person may be

more likely to act sustainably if they are considering themselves to be part of a community, rather than a state or nation because they feel that sense of civic-duty and a connection to the people and places around them. Education and economic stability are also key-- sustainability may be difficult to consider in a place where its citizens are struggling to find food or obtain an education. Basic needs must be met first. Next, though it would be ideal for everyone to just simply care about the environment for its own sake, its protection is much more likely if a well-preserved environment is providing the community with economic benefits. In some cases, it is impossible to put a price tag on the environment, however pointing out that the environment can generate benefits through ecotourism and ecosystems services is a good first step. And finally, I learned that local leaders really do hold the key to many environmental obstacles. Putting leaders in place who value the environment, as well as economic productivity, is paramount. It is therefore up to every citizen to vote for environmentally conscious leaders, because in the end the fate of our environment will also be the fate of all of us.

### **Personal Reflections**

This project went much more smoothly than expected because the residents of St. Barthélemy were so willing to participate. They were quick to give up their time to speak with me, and often very interested in the topic of my research. The major challenge was that my research quickly evolved within my first hours on the island. My initial question was, “what motivates the resistance of the residents of Saint Barthélemy to the island’s waste-sorting regulations?”. After some initial conversations with residents, it became clear that sorting was actually well-established on the island, with the large majority of residents participating without hesitation. This led me to change my focus to be more concerned with why the regulation was working and what led it to be so well-implemented. My hope was to weave each of these topics

to create a larger picture of sustainability in hopes of answering my revised research question-- what motivates the residents of Saint Barthélemy to act sustainably, and what areas still require improvement, and why? Through the conversations I had with residents of all different backgrounds, I believe I have obtained a clear picture of sustainability on the island and hope to use this particular island community as a microcosm for the environmental crisis at large. How can this small island of 9,500 residents be related to the world? What can we learn from Saint Barthélemy?

To conclude this report, I would like to relay my sincere gratitude to the Biehl International Research Fellowship program for giving me the opportunity to do this project. It was eye-opening, challenging, and gratifying. It was truly the opportunity of a lifetime-- thank you.

## **Works Cited**

Fielding, Russell. 2014. "The Good Garbage": Waste to Water in the Small Island Environment of St. Barthélemy. *Focus on Geography*. 57(1): 1-13.

Stening, Jenny. 2008. *Gustavia, Saint Barthélemy: Architectural historic walk*. Berghede arkitektur och design förlag. 55.