FirstBank: The Enhancement of a Corporate Environmental Program

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Submitted by:

Burcu Bora

Amanda Moreno

Eric Weiland

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In Cooperation With
Sr. Dacio Pasarell, First Bank, Executive Vice President
Sra. Amara Mendez, First Bank, In-House Project Manager of Green Initiatives

Professor Karen Lemone, Advisor

Professor Ingrid Shockey, Co-Advisor

Abstract

This project focused on developing a more comprehensive environmental program in FirstBank while raising employees' awareness of environmental issues and encouraging participation in the green initiatives. We analyzed data regarding paper and energy consumption, conducted surveys and interviews about stakeholder attitudes toward sustainability, and developed new green initiatives. The project concluded with recommendations on how to enhance existing green initiatives, and on what new initiatives should be incorporated into FirstBank. Overall, the project aimed to make FirstBank a greener corporation.

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Authorship Page

Each section of this report was written and reviewed with equal contribution from Burcu Bora, Amanda Moreno, and Eric Weiland.

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Executive Summary

Puerto Rico is faced with serious environmental problems, including climate change and resource depletion. FirstBank recognizes the importance of considering the impact of their business decisions on the environment in order to make healthier decisions for themselves and the community. They understand that environmental protection is a fundamental part of doing business and that the health of the environment not only affects the quality of life, but also the economic foundations of their sustainability. In an attempt to lessen their impact on the environment, FirstBank has begun incorporating green initiatives into their internal workings and has developed an environmental policy, which will play an integral part in shaping the corporation's future environmental decisions. In order to further enhance their environmental programs, we worked with FirstBank to develop new ideas and reevaluate existing green initiatives.

The goal of our project was to further develop FirstBank's green initiatives in their environmental program through sustainable operations, while also engaging their stakeholders in the concept of becoming environmentally friendly. To accomplish this, we fulfilled the following objectives:

- To assess FirstBank's environmental procedures.
- To expand their environmental program.

We assessed FirstBank's environmental procedures by analyzing quantitative data, such as invoices. To discover the stakeholders' desires and gauge how employees followed current procedures, we also gathered and analyzed qualitative data through surveys, observations, and interviews.

From an analysis of our data, we determined the following results:

- A majority of FirstBank employees are eager to participate in recycling programs.
- Some non-compliance with current initiatives, such as with using double-sided printing and incorrectly using toner recycling bins, is due to poor communication.
- FirstBank was able to reduce energy consumption by 7% due to the implementation of A/C controllers into their operations.

- Employees are more careful about following procedures when they are given incentives and/or held accountable for their actions. Therefore, offering tangible benefits or holding them responsible to further follow the procedures will be an effective way to encourage participation in green initiatives.
- Financial and performance risks must be considered when evaluating potential programs for FirstBank. It is important to provide evidence that suggested initiatives will reduce costs, in order to get them approved by the Board of Directors and implemented in the bank.
- Our paper consumption analysis revealed that the existing confidential paper-recycling program has over twice the capacity to recycle paper than what FirstBank purchases.

We then used our findings from the environmental procedures assessment to enhance their environmental program. We created a plan for a recycling pilot program and implemented an employee awareness program by preparing fliers, and awareness signs. The awareness program was put in place to publicize green initiatives, ensure employees are familiar with environmental facts, and made suggestions for how they can further contribute to a healthier environment. Additionally, we determined the feasibility of implementing large-scale environmental initiatives for FirstBank, including green landscaping, motion sensors for lights, recycled fabric for refurbishing chairs and cubicle panels, and recycled carpet.

FirstBank has the ability to make a major contribution to their community and to themselves. These new green initiatives can also be implemented into the new building being constructed and help earn FirstBank a LEED certification, a prestigious award able to boost FirstBank's public relations within the community and worldwide in the future.

Chapter 1: Introduction

One's environmental standing can play a huge role in shaping the decisions of individuals and corporations alike. As humanity neglects the earth's resources, issues such as climate change and resource depletion are becoming an increasing concern for the inhabitants of the world, present and future. The process of converting fossil fuels and other natural resources to usable energy is polluting the world's water and air supply. Using renewable energy and new methods of waste disposal are only a few of the steps being taken by communities and corporations around the world to lessen their impact on the environment. Although many corporations are becoming more "green" in their actions, they sometimes lack the influence to motivate their surrounding communities to follow in their footsteps.

Many corporations have expressed concern for environmental problems and have begun taking steps to address these issues. The motives of these corporations are driven not only by the environmental impact on humanity, but also by the fact that assessing these problems may provide financial and public relations benefits. Banks are market makers in the economy and therefore have a substantial impact on the capital market. Encouraging their clients to invest in sustainable businesses, financing green companies, and pursuing actions that promote sustainability in their operations has an important influence on the world's individuals and corporate decisions.

FirstBank feels strongly that it is their responsibility to consider the impact of their business decisions on the environment in order to make healthier decisions for themselves and their community. They recognize that the decisions they make today have the ability to encourage their clients to invest in environmentally-friendly concepts and establish a foundation for future businesses, banks, and manufacturing corporations alike. These impacts are both internal and external to the bank's operations. They had already incorporated several green initiatives into their internal workings, including recycling various materials (e.g. hardware, confidential paper, cardboard, and ink cartridges), reducing consumption (e.g. automatic temperature controls and double-sided printers), and donating their old furniture and office equipment.

In addition to their current green initiatives, FirstBank desired to continue to develop their environmental program and establish new standards for their corporation. One of FirstBank's aspirations was to implement green initiatives that would "influence [the] behavioral patterns" of their community as well as other businesses with whom they interact. These initiatives would help the bank become environmentally friendly internally while engaging the bank's employees and community in a sustainable way.

The goal of this project was to further develop FirstBank's green initiatives in their environmental program through sustainable operations, while also engaging their stakeholders in the concept of becoming environmentally friendly. This was achieved by assessing FirstBank's environmental procedures, and by expanding their environmental program.

Chapter 2: Background and Literature Review

The following sections discuss the notion of social responsibility, as well as the LEED guidelines, which promote these concepts.

2.1 Corporate Responsibility

Figure 1 : Graphic Representation of CSR (n.d.) Source: eolITServices.co.uk

Corporate social responsibility (CSR) is the term used to describe a business's commitment towards enhancing the well-being of their labor force, the local community, and the society in which they live (Moir, 2001). Corporate social responsibility has led private companies to minimize their harmful effects on the environment, while also increasing the positive contributions of their development (Eade & Sayer, 2006). According to Deborah Eade and John Sayer, the editors of the Development in Practice Readers series, "the companies who move towards environmentalism voluntarily will gain first mover advantage as pressure grows for tighter controls over business conduct in developing countries" (2006, p. 260). Reacting to legislations and governmental policies can cause greater costs due to having to react more quickly. Additionally, reacting to forced compliance can lead to poorer reputations for the companies. Companies who are seen as a part of the solution will have greater competitive advantage compared to those who are seen as a part of the problem with regard to environmental concerns (Eade & Sayer, 2006).

2.1.1 CSR & Stakeholders

The underlying theme of CSR is to link society and businesses rather than viewing them as distinct entities (Wood, 1991). Companies now realize the importance of recognizing and addressing the concerns of their stakeholders in order to ensure that their business decisions and activities are socially acceptable (Green & Hunton-Clarke, 2008). The most widely used definition of a stakeholder is from Edward Freeman in 1984, stating that a stakeholder "is any group or any individual [that] affects or is affected by the achievements of the organization's

objectives" (Steven Leslie Wartick, 1998, p. 96). However, as stated in the *Journal of Business Ethics*, Simon Knox's research showed that building stronger stakeholder relationships through CSR programs, other than with customers, is not currently a priority for most companies. The same research also concluded that, "a limited sophistication in managing stakeholders may compromise the impact of CSR upon business and social results" (Knox, Maklan, & French, 2005, pp. 7-28). Stakeholders' participation in CSR programs is one good way to enhance the relationship between the corporation and the stakeholders.

The stakeholders' participation in CSR programs enhances the quality of the decision making process because involving a wide range of interested parties for appropriate project design and commitment to achieve the program's objectives minimize the possibility of failure (Reed, 2008). Additionally, participation of stakeholders contributes to the sustainability of the project because people gain the confidence and skills to carry on the activity after the project ends (Overseas Development Administration, 1995).

2.1.2 Stakeholder Involvement

Efficient involvement of stakeholders in management can be very challenging depending on the situations. Since the goal of this process is inclusiveness, excluding an important stakeholder can damage the efficiency of the process. Therefore, it is crucial to identify the most relevant stakeholder and organize stakeholder groups. Stakeholders may include community, neighborhood leaders and groups, other government agencies, private landowners and developers, and traditionally underrepresented groups (Department of Urban Affairs and Planning, 1999).

The stakeholder involvement process works with a stakeholder group that includes the broadest range of representative parties. The sponsoring company commits to the process, and the assigned issue is informed to the stakeholders with detailed presentations of material and technical assistance for complete understanding of context and subject matter. In order to achieve efficient stakeholder involvement in our project, we regularly presented our findings to our liaisons, involved employees through surveys, and received feedback as well as suggestions from employees and vendors throughout our project.

2.1.3 Examples of Stakeholder Relations

Goldman Sachs used stakeholder participation to improve their environmental policy. Goldman Sachs' environmental strategy group consulted many organizations and experts during the policy development process. Their policy includes enhancing the relationships with the stakeholders so that the company may have a better understanding of environmental issues and their impact, as well as finding new opportunities to better address these situations (Goldman Sachs, 2005).

Goldman Sachs formed the GS SUSTAIN focus list, which has a goal of long-term performance with a low turnover of ideas. GS SUSTAIN bases on a research that integrates the sustainability of corporate performance and traditional fundamental analysis. Their goal is to find the most profitable industries, as well as the leaders of the emerging industries, including alternative energy, environmental energy, and bio-technology. In Goldman Sachs' environmental report it is stated that "in July 2007, Goldman Sachs presented the GS SUSTAIN focus list and research findings at the United Nations Global Compact Leaders Summit in Geneva, Switzerland." In this way, they have reached more stakeholders by sharing their findings with many interested parties (Goldman Sachs, 2008). Furthermore, Goldman Sachs has led Global Alternative Energy Research that includes approximately 70 alternative energy companies and they organized "two-day Annual Alternative Energy conferences [which] 900 investors, regulators, market participants and venture capitalists attended in 2007" (Goldman Sachs, 2008).

As can be seen from the examples, these programs aim to educate the interested parties and encourage them to have more sustainable practices in their lives. Goldman Sachs is a leading corporation in the financial sector and they have quiet enough capital to be used in these programs. The extent of stakeholder involvement programs is usually limited to the economics of the corporation in order to achieve their goals through feasible programs. We designed and recommended green initiatives that will work for the same goals but adapted to the assigned budget of FirstBank's environmental program.

2.2 Going Green & LEED

When a company changes its philosophy towards the environment, it is important that it also takes tangible actions toward going green and becoming eco-friendly. "In order to realistically...go green," businesses should "deploy simple actions and smart methods to run...operations that are repeated many times over" (Phillips, 2009). The U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) is "an [independent] certificate program and is nationally accepted as a benchmark for the design, construction, and operation of high performance green buildings" (U.S. Green Building Council, 2008). Its rating system, which categorizes different levels and extents to which a company may go green, can help businesses, such as FirstBank, understand the changes they can implement to make their businesses more green and to reduce their impact. The USGBC has outlined six categories of the LEED rating system: Site Sustainability, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, and Innovations in Operations. Each category has detailed sub-categories, which may deal with a variety of environment-related issues.

Figure 2 : A LEED Gold Certificate (n.d.). Source: GreenOfficeProject.org

2.2.1 Site Sustainability

One aspect of site sustainability has to do with the concept of heat island reduction. The concept of a "heat island" is that as land is built upon and urbanized, the land will experience higher temperatures than rural areas with similar conditions; this is partly caused by surfaces (i.e., pavements and the roofs of buildings) in these urban regions. There are certain steps that can be taken to reduce the heat island effect; these steps include the development of parks, the use of cool pavements, and the incorporation of green roofs on buildings (U.S. Environmental Protective Agency, 2008).

Another aspect of site sustainability concerns alternative commuting transportation. Alternative commuting transportation is important because it can lessen traffic congestion while also reducing fossil fuel emissions. Companies and organizations have addressed this issue in a variety of ways. Some companies do this by offering incentives for those that carpool, drive hybrid vehicles, and/or use public transportation. Worcester Polytechnic Institute has a number of parking spots specifically for hybrid vehicles. Additionally, on many of the California San Francisco Bay Area highways, there are lanes that may only be used by carpooling vehicles during peak traffic times (Metropolitan Transportation Commission, 2009). The Public Works department of Santa Barbara promoted alternative transportation by providing storage for bikes, improving pedestrian facilities, and overseeing the operations of energy-efficient electric shuttle buses (City of Santa Barbara, 2008).

2.2.2 Water Efficiency

Another important concept addressed by LEED is water conservation. One way in which some companies have reduced water usage is by devising innovative methods to redesign their products. A company can reduce their water usage in the facilities by replacing water-consuming appliances (e.g. faucets and toilets) with more efficient ones. Additionally, incorporating green landscaping to a building site can reduce storm water runoff and improve local water quality.

2.2.3 Energy & Atmosphere

Becoming more energy efficient is important because it can help to reduce greenhouse gas emissions, which are a contributing factor of climate change (Energy Information Administration, 2008). Some businesses have addressed this issue by making smaller changes, such as using energy-efficient lights, installing light dimmers and sensors, as well as insuring that the building has proper insulation on places such as doors and windows. Some long-term changes that companies have made include implementing a green roof, making their processes more efficient, and using alternative energy.

2.2.4 Indoor Environmental Quality

The fourth area of LEED certification involves indoor environmental quality, which "refers to the quality of the air in an office or other building environments" (National Institute for

Occupational Safety and Health , 2008). Good air quality can improve the health of the workers and visitors of the building. A company can do a variety of actions in order to improve indoor environmental quality, including using green cleaning products, increasing ventilation, and regulating humidity.

2.2.5 Materials & Resources

The fifth category of LEED certification addresses its materials and resource consumption. A company can improve in this area by evaluating its waste management policy. When doing this, a company should make sure that it is recycling numerous materials (e.g. aluminum, paper, and plastic materials), as well as donating and reusing old equipment and furniture (U.S. Environmental Protective Agency, 2008). Johnson & Johnson has implemented take back programs into their policies so that they may maintain control over their products through waste management (Johnson & Johnson, 2008).

2.2.6 Innovations in Operations

LEED evaluates a company's innovative actions in its operations. Operation innovations go hand-in-hand with all the categories of the LEED rating system. Parts of these innovations include evaluating and improving a company's processes to maximize the efficiency while minimizing the input. When applied to businesses, many aspects of the LEED rating system can make operations more beneficial to both the company and the environment. It can serve as a benchmark for companies beginning to implement green initiatives as well as those that would like to become greener.

2.3 Conclusion

FirstBank had adopted some environmentally-friendly practices in their operations. The corporation had developed an initiative for recycling confidential paper in offices. It reduced the number of copiers to decrease energy consumption and installed automatic temperature controls to more efficiently regulate the temperature in the building. FirstBank began taking the necessary steps to become more sustainable and to meet the standards of LEED. Chapter 3 describes methods we employed to initiate these green practices.

Chapter 3: Methodology

The goal of this project was to further develop FirstBank's green initiatives in their environmental program through sustainable operations, while also engaging their stakeholders in the concept of becoming environmentally friendly. This was achieved by assessing FirstBank's environmental procedures, and by expanding their environmental program. We employed a number of methods in order to accomplish our goal and objectives, including data collection from invoices, interviews, surveys, stakeholder engagement initiatives, and budget and data analysis. In what follows, "environmental procedures" refer to the rules and regulations set forth by the corporation regarding the step-by-step actions that employees should use in following the bank's environmental mandates.

3.1 Assessing Environmental Procedures

The success of environmental procedures relies on the employee compliance. Therefore, in order to accurately assess FirstBank's environmental procedures, we considered both the practices laid out by their current procedures and the human factors involved.

3.1.1 Quantitative Information

At the beginning of this project, FirstBank had in place several environmental procedures, such as recycling of confidential papers, recycling of toners, and the use double-sided printers. In order to improve upon and develop new procedures, we assessed the corporation's practices and their impact on the environment. By reviewing the expenditures and consumption of FirstBank, we calculated the efficiency of the branches' use of electricity and other utilities, which allowed us to determine where they could reduce their consumption to improve both the bank's environmental impact and their financial spending. We outlined the steps we took in order to collect and analyze the data.

Step 1: We contacted employees who were responsible for FirstBank's energy, office equipment, and office supply invoices.

Step 2: After gathering the data about the energy consumption (e.g. lighting, air conditioning controllers, and electrical appliances) and office supply purchases (e.g. paper, ink, printer, and office equipment), we analyzed the figures by using spreadsheets.

Step 3: We contacted the current recycling contractors regarding the bank's current waste management procedures and their recycling and disposal of confidential paper, cardboard, and toners.

Step 4: We presented our findings to our liaisons as a means of establishing a baseline for future goals so that FirstBank can improve their environmental procedures.

3.1.2 Qualitative Information

While enhancing the environmental program of FirstBank, we involved the relevant stakeholders in our decision-making processes. In order to determine the relevant stakeholders, we considered who was affected by the project and who had the power to affect it. Ultimately, we realized that the vendors, the personnel, and the upper management of FirstBank were the most relevant stakeholders for our project. To determine how employees followed and understood the bank's current procedures as well as their attitudes toward sustainability, we conducted individual interviews, made observations of recycling behavior around the office, and surveyed FirstBank employees.

We interviewed eight upper management employees because they interact with many employees in their department and often have an understanding of all positions in the corporation. Interviewing upper management from a variety of departments also helped us to better publicize the green initiatives we are working on. The interviews allowed us to understand their perspectives, how they believed employees would react to green programs, and the environmental practices of the inhabitants of the island. Additionally, we interviewed five non-management employees to determine if their attitudes toward sustainability differed from those of the upper management.

In order to receive direct feedback from the employees, we designed a survey, which included likert scale, multiple-choice, and open-ended questions. We used likert scale questions not only to determine whether or not the employees incorporated green practices in their lives, but also the extent to which they did so. We included multiple-choice questions to limit the range of responses and allow for clearer results. Additionally, we incorporated open-ended questions so that we could receive comprehensive feedback about the employees' knowledge, attitudes, and ideas regarding sustainability. In the survey, shown in Appendix E: Survey , we asked what

practices they personally follow in and out of the work environment regarding topics such as waste disposal, fuel consumption, paper use, and existing green initiatives. We also asked about their willingness to participate in green initiatives and for any suggestions to apply to FirstBank.

Finally, we observed the employees in their work environment in order to gain a greater understanding of their current practices. During our observations, we took notes regarding their paper and material consumption, behaviors regarding energy consumption, and their efforts to participate in the environmental programs.

3.2 Expanding the Environmental Program

After analyzing FirstBank's environmental procedures, we were able to establish which areas of the bank's environmental program could be expanded. Basing our evaluation on both qualitative and quantitative data, we were able to establish target goals and measure the benefits of the changes.

3.2.1 Pilot Program

FirstBank wanted us to evaluate the feasibility of specific green initiatives. We therefore developed a plan for the implementation of a pilot program in a couple of branches. FirstBank's main branch is currently located in three different buildings in Santurce. FirstBank is constructing a building, which is scheduled to be completed in 2010, to combine these three buildings. We developed the environmental pilot program for two of the existing buildings in order to determine the viability of applying this program to the new building and all of the branches of FirstBank. The pilot program addressed recycling methods based on what we learned from assessing the existing environmental procedures. When choosing which buildings to use, we considered characteristics, such as:

- The building preferences of the upper management
- The quantity of supply and energy consumption in the buildings
- The feasibility of implementing programs (i.e., space available, size of the building, and working hours of building)

At the beginning of the project, FirstBank only recycled confidential paper, toners, and cardboard. The pilot program for recycling aimed to increase the range of recyclable materials in FirstBank to include all paper products, aluminum, plastic, and glass. We gathered information about potential contractors for a more comprehensive waste management program. After collecting the data and proposals from various waste management companies, we evaluated he costs and services of the companies, as well as which company's ideals best match with FirstBank's environmental philosophy.

Figure 3: Confidential Paper Bin

3.2.2 Awareness Initiatives

A portion of our plan was to engage FirstBank's stakeholders, such as FirstBank staff and the community at large, and include them in the overall process of becoming environmentally friendly. We created signs and fliers to strategically place around the building in order to increase the awareness in FirstBank. Awareness initiatives were aimed at increasing stakeholders' understanding of the importance of green banking, encouraged their pride for being involved with FirstBank, and developed a collective sense of identity with regards to sustainability.

3.2.3 Suggested Long-Term Projects

In addition to the immediate changes, we also evaluated and suggested long-term changes that FirstBank can implement in the future. It is often much easier to apply environmental standards to a new building. Therefore, we have evaluated LEED case studies to offer suggestions for green initiatives that FirstBank can primarily implement in the future building. Many of the projects that we investigated were long-term due to the fact that they were costly, complex to implement, and could affect the working operations of an office. Topics we addressed include motion sensors for lighting, green landscaping, and furnishings.

3.3 Conclusion

By fulfilling the above objectives, our group successfully provided a comprehensive analysis and enhancement of FirstBank's environmental program. Their environmental program was enhanced to meet the current benchmark of competing banks, improve FirstBank's carbon footprint, and serve as a role model for the community.

Chapter 4: Results and Analysis

This section describes the findings and analysis determined for FirstBank as a result of our work. First, we discussed FirstBank's current procedures. The results from data gathering were based on the energy bills and recycled confidential paper bills obtained from the FirstBank purchasing department. We also evaluated the interviews with FirstBank upper management, non-management employees, and vendors in order to gather suggestions and observe their attitudes toward sustainability. Additionally, we analyzed the results of the survey in order to assess how employees complied with environmental procedures and to gather feedback to develop the environmental programs.

Second, we presented our findings about how to improve the environmental program of FirstBank. We created a plan for a recycling pilot program and conducted analyses for the existing environmental programs. With these suggestions and several developed by our team, we presented a list of feasible options and long-term methods to help FirstBank become environmentally friendly.

4.1 Assessing Environmental Procedures

We interacted with many employees to gather information about the environmental procedures of FirstBank. We classified the gathered information into two categories—quantitative and qualitative. In the following section, we present the data collected on the energy and paper consumption of FirstBank in the past year. We used the data to perform cost benefit and efficiency analyses, which were applied to the pilot program. We also conducted interviews, observations, and surveys, which gave us insight on the stakeholders' point-of-view regarding sustainability.

4.1.1 Quantitative Information

Paper

While collecting data, we retrieved FirstBank's 2008 invoices of paper purchases. The invoices included the type and quantity of paper that FirstBank purchased. Our intention was to compare the amount of paper purchased to the amount recycled. When we contacted FirstBank's purchasing manager to receive information regarding the amount of paper that FirstBank

recycled in 2008, we were told that the only available data was the weight of paper recycled. Therefore, to be able to compare the data, we had to convert the quantity of the paper purchased to its weight in pounds. FirstBank's purchasing manager sent us a list that showed the weight of the different types of paper that they purchased. Using the list, we calculated that FirstBank purchased approximately 281,000 lb. of paper in 2008.

Next, we contacted the company that recycles FirstBank's confidential paper to learn how much paper they recycled in 2008. However, they were only able to provide the data from the previous six months. We calculated that FirstBank recycled approximately 336,500 lb. of paper in second half of 2008. We assumed that FirstBank had recycled, on average, the same amount of paper in the first half of 2008, and therefore calculated that FirstBank recycled a total of 673,000 lb. throughout the year. This information showed us that FirstBank had recycled approximately 240% of the paper they purchased. We contacted the recycling company to address this inconsistency. We discovered their calculation was based on the assumption that all the containers were full when upon pick up. This illustrated that FirstBank had the capacity to recycle over twice than what they have purchased.

A/C Consumption

The second aspect of our data collection process was to determine FirstBank's monthly energy consumption. We met with a mechanical engineer at FirstBank, who was working on a project to implement A/C controller units (shown in Figure 4) in FirstBank's buildings. He informed us that the majority of the implementations occurred in December 2008. Using the bank's invoices, we analyzed the data for 2008 to determine their energy consumption before the controllers were in place. We discovered that the consumption varied throughout the year, which the mechanical engineer explained was not the result of any dominant factors in energy consumption. He said it is possible that a number of controllers were

Figure 4: A/C Controller Unit (n.d.). Source: Rakeauae.com

accessible to employees who had the opportunity to adjust the temperature at their discretion.

Figure 5 shows the monthly energy consumption in kilowatt hours (kWh) for all the branches of FirstBank for 2008 and 2009. We did not perform a cost analysis of FirstBank's energy consumption because electric costs vary month to month due to a variety of factors and would not give an accurate representation of the A/C controllers' energy consumption. We determined that analyzing the total energy consumption of all the branches would be the most accurate evaluation of the A/C controller efficiency, considering that the controllers have been implemented in only approximately 60% of the FirstBank branches. Not all of the branches have A/C controllers, so some showed the same energy consumption in 2009 as 2008 and others showed a higher consumption. Additionally, an employee's ability to access the controllers and lower the temperature can also provide spikes in the temperature, which is another possible factor for higher consumptions in several branches.

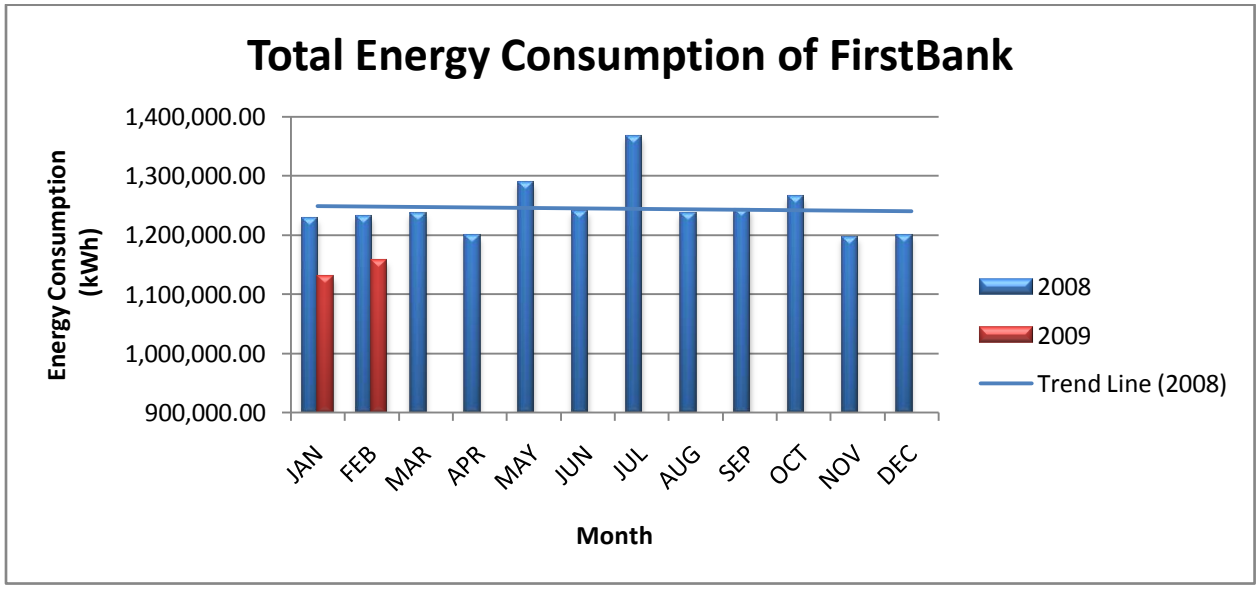

Figure 5: Energy Consumption of All FirstBank Branches

Figure 5 shows that in general, FirstBank has been able to reduce their energy consumption by simply implementing A/C controllers. In 2008, FirstBank maintained an overall consumption of 1,250,000 kWh expressed by the "linear trend line," which represents the average consumption over each respective year. The trend line also shows a small downwards slope which shows that the average consumption decreased with time, especially towards the end

of 2008 when the A/C controllers were implemented. In 2009, it can be shown that FirstBank reduced its consumption by approximately 100,000 kWh. With the given information, we calculated that FirstBank has reduced their overall energy consumption by about 7% from 2008 to 2009 in just the first two months.

Although an individual analysis of each branch would not have been effective since several branches did not install controllers, three main branches had controllers implemented at the start of 2007. Figure 28, Figure 29, and Figure 30 in Appendix G: Energy Consumption in Three Main Branches show the monthly energy consumption of the Santurce, Muñoz Rivera 876, and First Mortgage (Los Pasos) branches in 2007, 2008, and 2009. The linear trend lines in each graph show the rate at which the consumption either climbs or falls, as well as the general average for the year. With these trend lines, we can see that the average consumption at all three branches decreased from 2007 to 2008. The Muñoz Rivera branch shows a trend line starting higher in 2008 than in 2007; however, it quickly slopes down showing a fall in consumption and a lower average in comparison to 2007. For 2009, Muñoz Rivera and First Mortgage experienced a great start to the year with consumptions in January and February less than the totals for these months in previous years. Additionally, these months were lower than the other linear trend lines for these branches. Santurce shows the same response in January, although it experienced a higher consumption rate in February 2009. The data, however, is simply for the beginning of 2009, and does not necessarily reflect the outcome of the rest of the year.

4.1.2 Qualitative Information

Interviews

Interviews became the core of our qualitative data collection. We gathered information on how employees followed and understood the bank's current procedures, as well as their attitudes toward sustainability. FirstBank's Vice President of Corporate Technology defined green as a "level of optimization after performing other optimizations" to make processes more efficient and consolidate resources.

During our interviews, our interviewees emphasized that the green initiatives had to be financially sustainable in order to satisfy the shareholders, a stakeholder of FirstBank. As mentioned in Section 2.1, a corporation needs to satisfy their stakeholders in order to be

successful in their business. FirstBank's furniture vendor mentioned that we would need to show a cost reduction with our changes in order to have them approved by the Board of Directors. Additionally, the Vice President of Quality Management stated that green initiatives, such as using technology to reduce paper consumption, can pay off after implementation. However, she cautioned us to consider extra costs, including employee training and adapting the environment to changes, which could increase the payback period. The increase in cost may potentially cause environmental programs to be rejected. These concerns illustrated that it was essential for our plan to prove that our suggested green initiatives would reduce FirstBank's spending without causing any extra setbacks that would negatively influence the working environment in the bank.

Another common concern emphasized by interviewees was the importance of considering risk during the implementation of green initiatives. Risk can be considered in two different ways—financial risk and performance risk. Financial risk involves the possible increase in cost of implementation of the green initiatives as well as possible increases due to the maintenance cost.

Performance risk was more about the quality of the change that would be implemented. Many upper management were concerned that green initiatives can negatively influence the working environment if the change disturbs the comfort or productivity of employees. For instance, The Vice President of Corporate Technology explained that although "all corporations are looking at energy efficiency" and "already know that [there are products] that reduce energy consumption," the "bottleneck is the implementation [of these changes] without affecting current processes." He continued to explain that lighting has been a topic for a while but that the "biggest challenge is what you find versus what you recommend" as some lights may reduce the productivity of employees if they quality makes them uncomfortable. This can occur by decreasing or obscuring visibility and affecting them psychologically.

During our interviews, upper management stated that they perceived the employees were positive and in support of green initiatives. We confirmed employees' willingness to participate in the bank's environmental program. For example, one employee stated that although she does not practice any green initiatives at home, she would be more than willing to do so at work. Though many employees are enthusiastic about participating in FirstBank's green initiatives, upper management recommended that we award employees for their green ideas or projects with

tangible benefits (e.g. gift cards, bonuses, or free meals), as it is the best way to encourage them. Some suggestions were to reward employees with the best environmental suggestions for FirstBank or to recognize the department that recycled the most material per person.

Survey

The purpose of the survey we administered to the FirstBank employees was to assess their attitudes toward going green, to evaluate the extent of their green initiatives at work and at home, and to collect their suggestions. With a total of 372 completed surveys from over 6 different branches, we were able to statistically say that we collected enough data to reflect the opinions of the corporation as a whole.

We asked the employees how often they recycled and which materials they recycled at work and at home. Figure 6 and Figure 7 show the employees' answers.

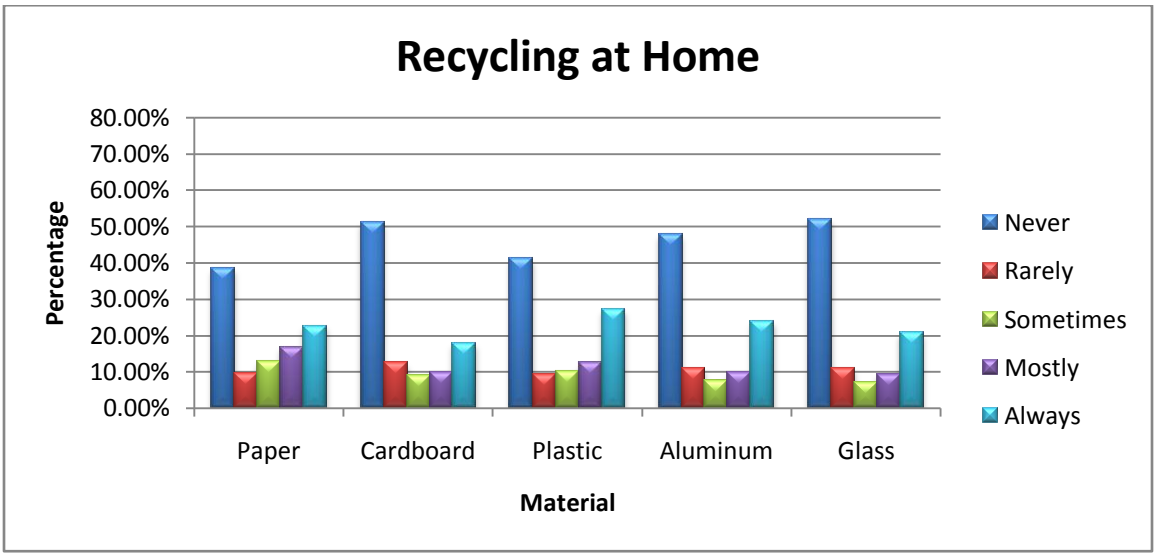

Figure 6: Survey Results for Employees' Recycling Habits at Home

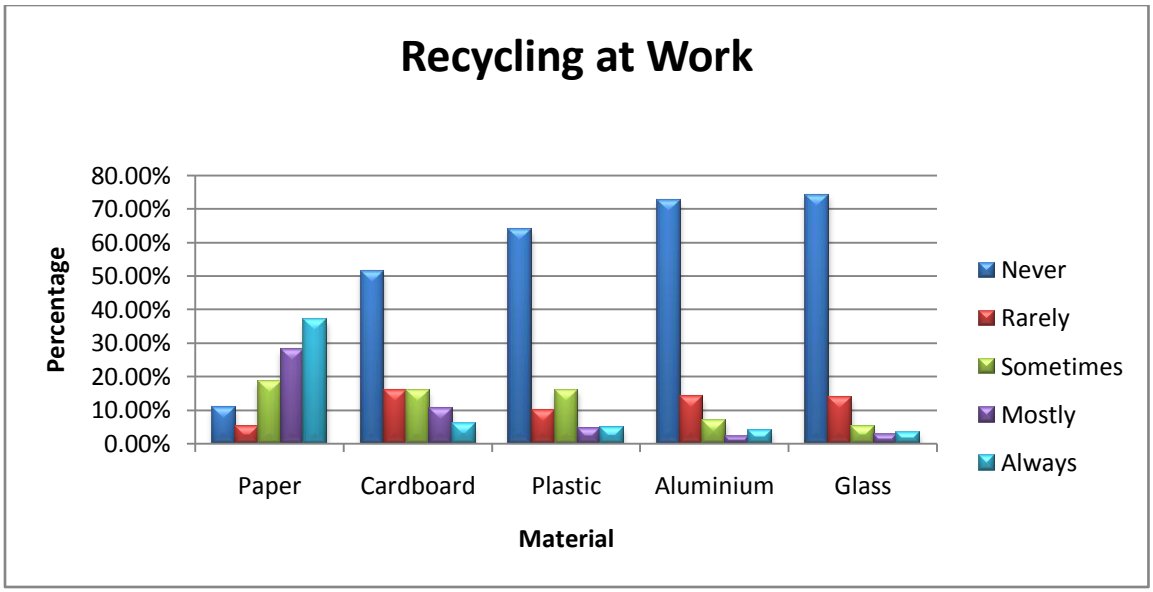

Figure 7: Survey Results for Employees' Recycling Habits at Work

Each figure shows the extent to which employees recycle the given materials at home and at work. Only 57% of the employees lived in a municipality that provided a recycling service. Even so, only 23% of these individuals always took part in the recycling service and approximately 50% of them never recycled. Since more than half of the employees did not usually recycle at home, we concluded that not only must FirstBank implement a new recycling program for aluminum, plastic, and glass, but they also need to implement other initiatives that will change employees' mindsets towards the environment in order to have a greener corporation.

Figure 7 addresses employees' participation in recycling at work. Since FirstBank had a confidential data-recycling program, approximately 65% of the employees recycled paper at work, demonstrating their positive involvement in the recycling program. Since FirstBank did not provide recycling for plastic, glass, or aluminum, many employees did not recycle these materials. However, a number of people said they recycled these materials. It is possible that employees were concerned about repercussions when answering the survey, mistaken with the difference between a trash bin and a recycling bin, or unaware that the recycling bins for toners are just for toners.

The number of people who did not recycle cardboard was less than the respondents for other materials due to the fact that FirstBank had this service. However, FirstBank could only

recycle cardboard through Office Max and it could only be Office Max cardboard. Therefore, the cardboard recycled were the boxes left after Office Max delivered supplies to the bank, and the only employees responsible for recycling this material were the individuals that receive the shipments. This result showed that the cardboard recycling program was not effective.

In addition to questions about recycling habits, we asked the employees about energy consumption. One of the survey questions was, "How often do you turn off lights while exiting a vacant room at work?" and then we repeated the question for the home environment. The graph in Figure 8 shows the comparison of these two questions.

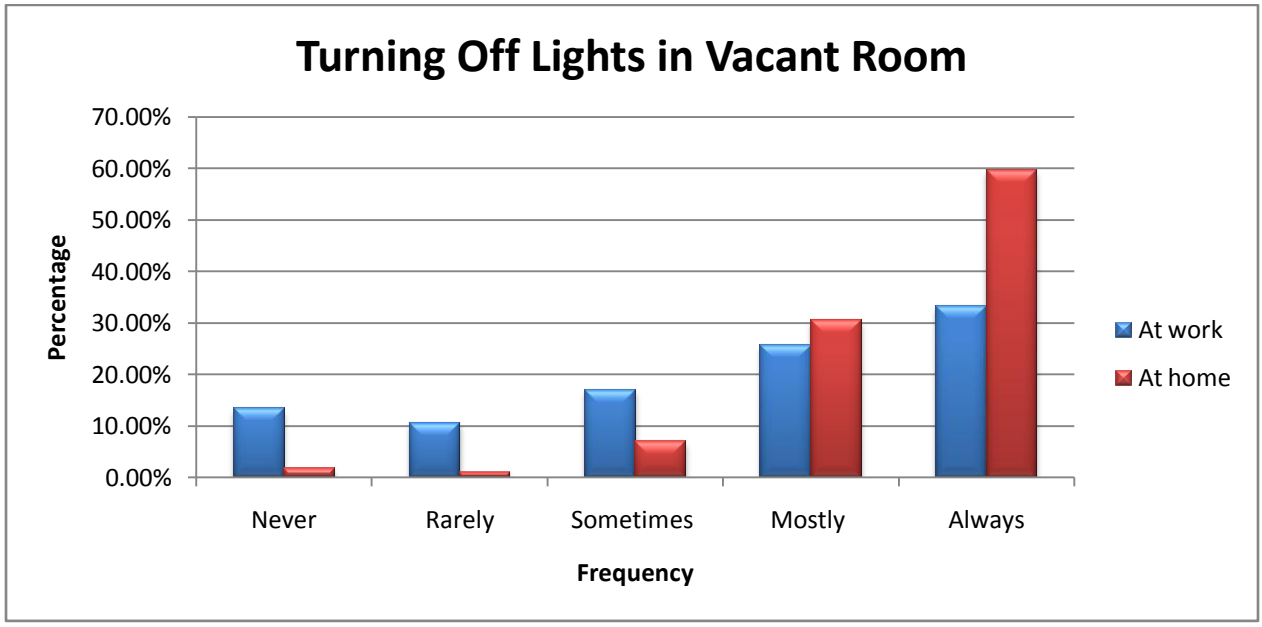

Figure 8: Survey Results for Turning off the Lights in Vacant Room

A majority of respondents admitted to turning off the lights at home significantly more frequently than they admitted to at work. 60% of the employees always turned off the lights at home while only 30% of them did this at work. The difference in employees' habits may be attributed to the financial benefit of reducing their home energy bill. This demonstrated that we needed to encourage employees by providing tangible incentives to departments and individuals with the most environmental practices at work. Additionally, this showed that we needed to emphasize that making changes toward going green was not just about saving money, but also about saving the environment.

In our survey, we also asked how often employees used the double-sided printing option. In order to reduce paper consumption, one of FirstBank's green initiatives was to implement the required software to printers and photocopy machines to make them qualified to utilize double-sided printing. Figure 9 shows the employees' answers.

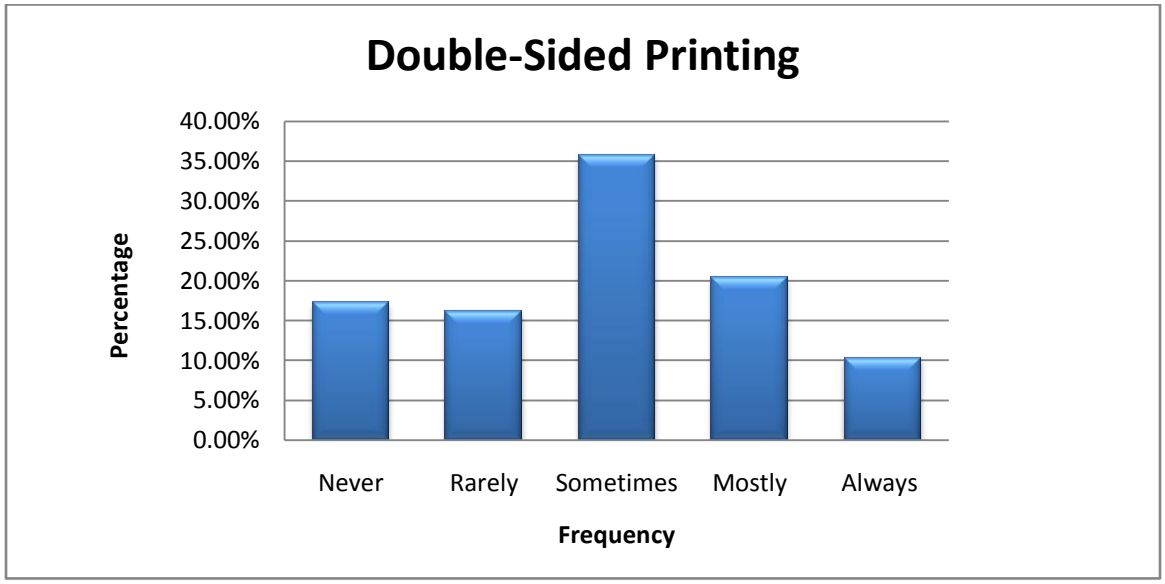

Figure 9: Survey Results about Double-Sided Printing

As you can see, only 31% of the employees answered mostly or always. This indicates that this initiative was not working as efficiently as possible. We asked employees for the reason that they were not using the double-sided printing option. Figure 10 shows the distribution of their answers.

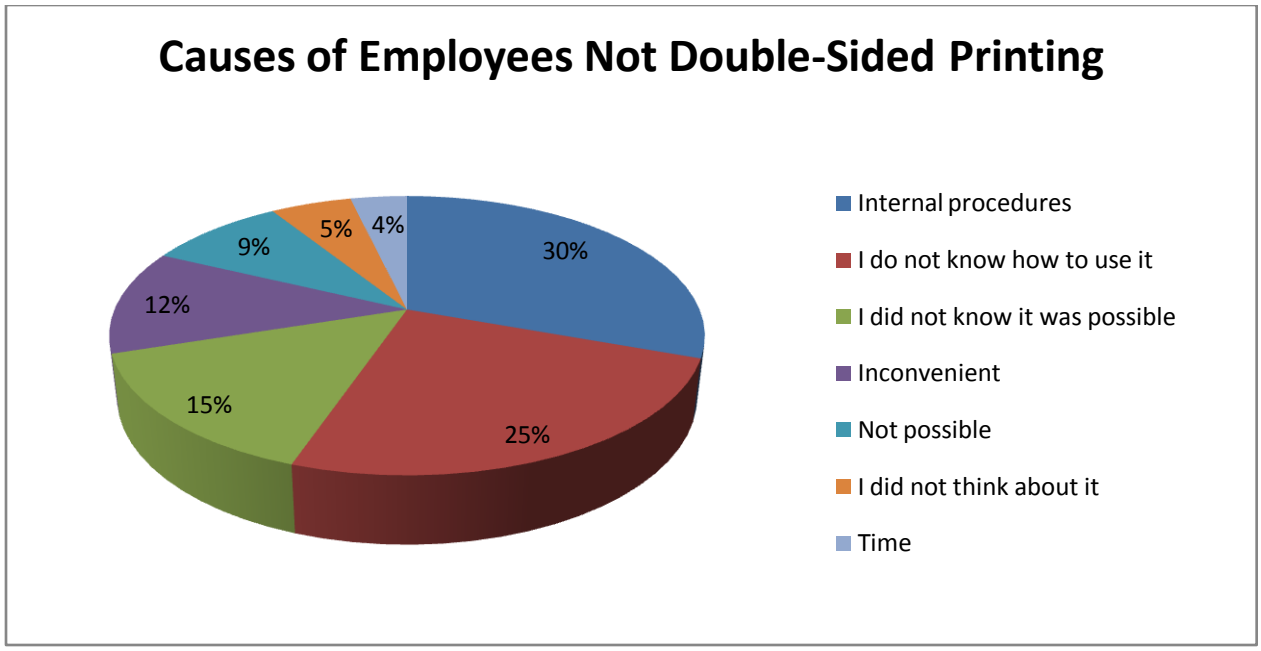

Figure 10: Causes of Employees Not Double-Sided Printing

The most common answer was internal procedures of the bank. Employees stated that certain documents were required to be printed on one side. The second and third most common responses were that employees did not know how to use this function or did not know that it was possible. This miscommunication can be addressed by providing simple step-by-step instructions for employees so that they know how to utilize the double-sided printing option. Some other causes were attributed to inconvenience, not thinking about it, and a lack of time. Publicizing the initiative would be helpful in making the employees more aware.

Observations

During our walkthrough of the buildings, we made observations and took notes about the employees' actions in the workplace and their consideration for the environment. We observed that in some departments, employees were using two monitors (as shown in Figure 11) so that they could easily compare documents side by side, without needing to print out one of the documents. This demonstrated that employees were making an effort to reduce their paper consumption and were, to some extent, being environmentally friendly.

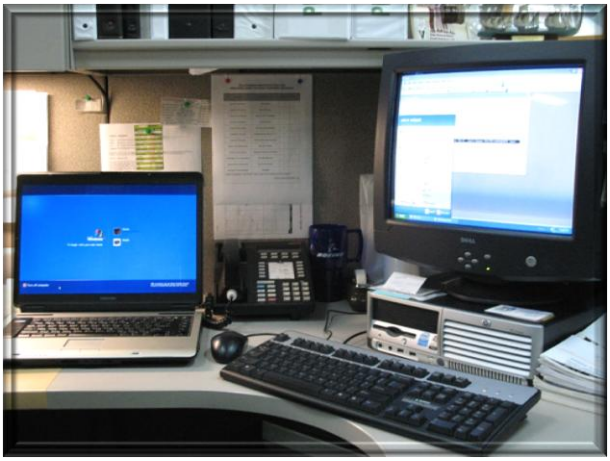

Figure 11: Desk with Two Monitors

FirstBank has a toner recycling program to recycle used toners. During our walkthroughs, we noted the employees' use of the toner recycling bins, as shown in Figure 12.

Figure 12: Inside of Toner Recycling Bin

Some of the bins were filled with incorrect materials, such as paper or cardboard. While the bins were not being correctly used, this illustrated the employees desire to recycle other materials and their efforts to be more environmentally friendly. This also demonstrated the need to effectively communicate green initiatives in FirstBank so that employees use the bins correctly and efficiently participate in future green initiatives.

4.2 Expanding the Environmental Program

We developed the environmental program of FirstBank, which included a pilot program, awareness initiatives, and suggested long-term projects.

4.2.1 Pilot Program

For the pilot program, we analyzed FirstBank's initiation of a more comprehensive recycling program. In order to develop a more comprehensive pilot program, we contacted several recycling companies. FirstBank wanted to modify their recycling program to include plastic, aluminum, and glass. The recycling companies offered to pick up the materials from the dumpsters once a week and recycle the materials in their facilities. We received proposals from four recycling companies and compared the type and price of the services they offered. Table 1: Comparison of Recycling Companies shows our comparison.

Table 1: Comparison of Recycling Companies

	Type of Pickup	Cost of Recycling Containers	Estimated Monthly Payment	Education Program?	Refund Available?
Duarte Waste	Truck (2 yards)	$1000-$1200	$700	No	Yes
GCR	Truck (2 yards)	$1,000	$580	Yes ($300)	Yes
IFCO	Truck (6 yards)	--	Free	No	Yes
Municipality of San Juan	In Person (50 gal)	$125-$225	Free	Yes (Free)	No

Figure 13: Cardboard Recycling Bin from GCReciclaje

IFCO, Duarte Waste and GCReciclaje would have very high implementation costs, because they provided pick up service only for large containers that were 2 and 6 yards long by truck. Since FirstBank would need to buy large containers, the initial cost would be more expensive compared to the smaller containers needed for the recycling service offered by the Municipality of San Juan. The Municipality of San Juan is a government agency and therefore do not charge for their services. Another company that offered charge free service was IFCO. IFCO was FirstBank's current contractor for confidential paper destruction and recycling. Although it would be very convenient to work with the current contractor, FirstBank did not have the sufficient space in Cobian Plaza's dumpster area to place a 6 yard long container. After our evaluation of dumpster area, which is shown in Figure 14, we determined that the Municipality of San Juan would be the most profitable company for FirstBank to work with. Additionally, the Municipality of San Juan and GCReciclaje also offered education seminars for employees, which would be helpful to ensure the correct use of the recycling bins and increase employee participation.

One disadvantage of working with the Municipality of San Juan is that FirstBank would not receive a refund for the material that they would be recycling. On the other hand, the other three companies, Duarte Waste, GCReciclaje and IFCO, offered refunds for the recycled materials in good economic conditions; this can benefit the bank financially.

Figure 14: Dumpster Area at Cobian Plaza

4.2.2 Awareness Initiatives

Based on employee interactions and survey results, we prepared educational fliers that will be posted behind the bathroom stalls to positively influence the employees. These fliers included environmental facts and tips. The facts were on a flier, shown in Figure 31 in Appendix H: Prototype of Environmental Flier , entitled "Did You Know?" and included the following facts:

- If we recycled every plastic bottle we used, we would keep two billion tons of plastic out of landfills.
- Every ton of recycled office paper saves 380 gallons of oil.
- Fossil fuels are depleted at a rate that is 100,000 times faster than they are formed.
- Recycling one aluminum can saves enough energy to run a television for three hours.
- Leaky faucets that drip at the rate of one drip per second can waste more than 3,000 gallons of water each year.

The environmental tips were on a flier entitled "What Can You Do?" and included the following tips:

- Try to use alternative transportation. Walk, carpool, use public transportation, or ride your bike when going to work or the store.
- Recycle!! This includes paper, plastic, aluminum, and glass.
- Turn off the faucet when you are not using it.
- Unplug your electronics (i.e., microwave, iron, and power chargers) even when they are "OFF."
- Think of ways to use 'gray water', from cooking or fish tanks. This water can often be used in the garden and for watering household plants.
- Use daylight through windows instead of turning on lights.
- Take the stairs instead of elevator whenever possible.
- Make the most out of your paper: Use the back of scrap paper for notes. Think twice before throwing out paper. Can you use it again?
- Reduce your usage. Do you really need to print it?

Additionally, we prepared the content for a bulletin board, which will be displayed in the employee cafeterias. The content centered on three topics—environmental tips and concerns to engage the employees, suggestions to reduce their resource consumption and impact on the environment, as well as the green initiatives of FirstBank to publicize them and increase their effectiveness. Prototypes of the bulletin board content are shown in Appendix I: Bulletin Board

4.2.3 Suggested Long-Term Projects

We evaluated the feasibility of long-term projects for FirstBank which could be implemented into their current branches, as well as their new building. We suggested green landscaping, motion sensors for lighting, recycled fabric to refurbish furniture, and recycled material for carpets.

Green Landscaping

FirstBank could apply green landscaping principles to the areas around its new building in order to reduce the negative impact on the environment, lessen the needed time and money required for maintenance, and produce a healthier environment for the community (Environmental Protection Agency, 2008).

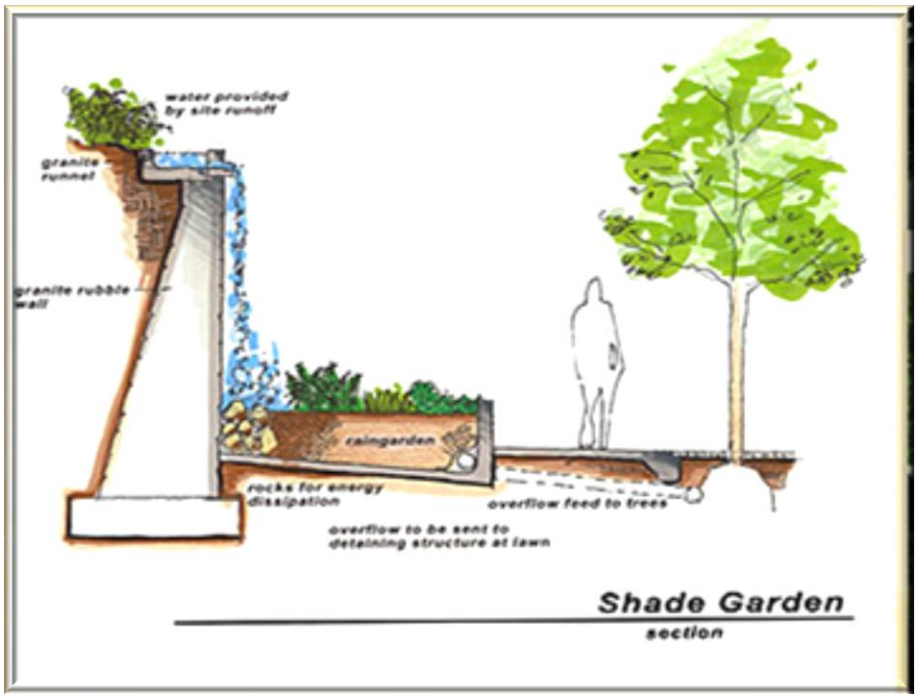

Figure 15: Example of Green Landscaping

By implementing green landscaping around its new building, FirstBank can address portions of LEED's site sustainability, such as reducing storm water runoff, lessening the heat island effect, and preventing the effects of erosion and sedimentation. FirstBank can design the terracing so that it "does not direct runoff into the street or storm drain" in order to reduce storm water runoff (Project Clean Water, 2006). FirstBank can reduce erosion and sedimentation by

designing the terracing to slow the flow of water and "by securing soil with plant roots and covering exposed soil with some form of groundcover," such as mulch (Project Clean Water, 2006).

FirstBank can carefully choose the plants they will include in their landscaping. For example, they can choose hardy plants "that are resistant to pests and diseases… [as they will] require fewer pesticides and fungicides" and are less harmful for the environment (Westerfield & Pulis, 2001). They can also select native plants because they "have adapted to the local conditions" of Puerto Rico, and once planted and established, they will require less maintenance (Environmental Protection Agency, 2008). In doing this, FirstBank can address both water efficiency and site sustainability portions of LEED, by minimizing the amount of water needed to maintain the area which is beneficial for storm water runoff and erosion. Additionally, FirstBank can incorporate shade trees in the landscape to provide shade and reduce the heat island effect around the building.

Motion Sensors for Lighting

In FirstBank, we observed that the lights in restrooms are always on. Additionally, in hot and humid climates, "energy use by the lighting fixtures themselves represents a large fraction of annual energy use, and in addition the lights add an extra burden to the air conditioning loads" (Degelrnan, 2000). Therefore, we determined that implementing motion sensors would be an excellent solution to the excessive energy consumption. We requested a quote for motion sensors from DRC, FirstBank's electrical vendor. They offered to implement motion sensors for each of FirstBank's 14 restrooms and 6 conference rooms. The sensor quoted is a combination of a passive infrared sensor and an ultrasonic sensor. Passive infrared sensors sense the temperature of a human body and ultrasonic sensors senses the motion in the monitored area (Rodriguez, 2009). The offered motion sensor products cover 2000 square feet and sense everything around it. The offered price is based on the assumption that all the restrooms and conference rooms are 2000 square feet. When we contacted the president of DRC, he informed us that this is the maximum price for implementing the sensors. The restrooms and conference rooms might be smaller. If this is the case, sensors that cover less area and are less expensive would be sufficient.

Our investigation showed that the offered prices are less expensive than the market prices, and we believe that implementing motion sensors is an inexpensive investment for the bank. The president of DRC gave us estimates, shown in Appendix J: Estimates for Lighting Motion Sensors, for the payback period for implementing the sensors in FirstBank. The payback period for a conference room with 8 light bulbs was less than a year, and the payback period for the restrooms with 4 luminaries was one and a half year. This initiative will not only reduce FirstBank's electric bill by saving energy but will also reduce FirstBank's impact on the environment.

Recycled Fabric for Furniture

With over four thousand employees, FirstBank is responsible for maintaining a large amount of furniture such as chairs and cubicles. With the high use of furniture, it is necessary to replace them as they are worn down. The simple solution is to refurnish and buy new chairs and cubicles.

Figure 16: Haworth Chair with Recycled Fabric

However, this is very expensive and unnecessary especially the purchase of new cubicles. By purchasing recycled fabric and refurbishing the furniture, FirstBank can help the environment and save money. FirstBank's furniture vendor, Haworth, provides numerous options for design and color of new fabric for chairs and cubicles, as shown in Table 2. Haworth also provides a

free installation service for any amount of purchased fabric. This fabric is made of 100% recycled polyester as opposed to the original seating fabric, which was made of 60% acrylic and 40% polyester. Polyester is made from coal, water, air, and petroleum. By recycling this material, the consumption of petroleum and coal is reduced. This is important as these items are essential resources for providing energy to the world.

Table 2: Recycled Fabric Comparison

Type	Fabric	Grade	Weight (per yard)	Content	Backing	Abrasion Resistance
Seating	Horizon	A	15.36 oz	60% Acrylic/ 40% Polyester	Acrylic	N/A
Seating	Gauge	A	15.65 oz	100% Recycled Polyester	Polyester	90,000 Double Rubs
Seating	Line Up	B	12 oz	100% Recycled Polyester	Polyester	30,000 Double Rubs
Cubicle	Striae	A	12.1 oz	100% Recycled Polyester	N/A	N/A
Cubicle	Iowa	A	10.6 oz	100% Recycled Polyester	Environmentally Sustainable Polyester	N/A

Table 2: Recycled Fabric Comparison shows a breakdown of the seating and cubicle fabric available through Haworth. The first fabric available for seating is called Horizon and is the current non-recycled fabric being used by FirstBank. This is shown to compare against the recycled fabric offered by Haworth. The ideal fabric to purchase is the Gauge fabric displayed in the second row. This fabric has a weight of 15.65 ounces which is slightly greater than the current fabric, therefore providing a thicker and more durable option. Although there is no

Figure 17: Hayworth Vendor, Simon Drury Ltd.

abrasion resistance value available for Horizon fabric, we can compare this factor to the second recycled fabric available for seating, Line Up. Gauge has a rating three times that of Line Up at 90,000 double rubs which is the amount of times that the fabric can be "rubbed" before wear and tear. This further establishes that Gauge is the fabric of choice for chairs. This fabric is also Grade A, the same as Horizon; this shows that the fabric will be relatively the same price as the non-recycled fabric.

The cubicle fabrics available are displayed in the last two rows of Table 2. Both are Grade A and 100% recycled polyester. The first of the two, Striae, has a weight of 12.1 ounces while the second one, Iowa, has a weight of 10.6 ounces. With no abrasion resistance available, it can be assumed that Striae will be the better choice as it is a heavier fabric and should provide a longer life compared to Iowa.

Recycled Carpet

Finally, with the construction of FirstBank's new building, there are many topics to consider for green construction, including the implementation of recycled carpet. When selecting a suitable carpet, many specifications, such as the option for using modular carpets at either 24 or 36 square inches, need to be analyzed. We chose to investigate the vendor Antilles Carpet, as they have worked with FirstBank in the past and have many environmentally-friendly options. Antilles offers two types of recycled carpet—one that is made from recycled plastic bottles and another that is made from used carpets. The used carpet is reformulated through a series of chemical processes to recycle and renew the carpet.

Antilles offers 24-square-inch modular carpets ranging from $20 to $30 per yard. The carpet price varies depending on the design and weight of the carpet. Therefore, FirstBank will need to contact the Antilles sales representative in order to discuss the cost, design pattern, and durability of each carpet. Antilles offers discounts or price breaks when purchasing 100 yards, 1000 yards, and 5000 yards. Furthermore, Antilles offers their installation service at $3.90 per yard of purchased carpet, which includes the service, tools, and extra material, as well as the adhesive material for applying the carpet. The adhesion for the carpet is also a recycled material approved by LEED which will further promote the green initiatives of FirstBank.

Chapter 5: Conclusion and Recommendations

The purpose of this project was to help FirstBank become a greener corporation. FirstBank had few initiatives to address the environmental problems that affect the world, including the community they live in. Therefore, we set out to evaluate their environmental program and create a number of green initiatives for FirstBank to incorporate in their existing branches and the new building. In order to accomplish this, we involved the employees in this process as we believed that any initiative in the corporation would be successful only with the employees' awareness, participation, and cooperation.

Figure 18: Digitally-Designed Version of New Building

We conducted interviews with FirstBank employees and vendors during our project. In these interviews, many employees declared their eagerness to participate in the green initiatives of FirstBank's environmental program. We also administered a survey to their employees, and the responses confirmed that approximately 70% of the 372 employees surveyed were willing and anxious to participate in the initiatives. The survey results demonstrated that many employees were not aware of the existing initiatives, such as doubled-sided printers and ink toner recycling. This brought forth the need for more effective communication to ensure that all employees are fully aware of FirstBank's initiatives. In order to address the issue of communication, we developed fliers to remind employees about environmental concerns and the environmental program of FirstBank.

In the survey, many employees expressed the need for more recycling bins, both in the offices for paper and in the cafeteria for aluminum, plastic, and glass. FirstBank originally only had services for recycling confidential paper and toner cartridges. These programs were able to get the employees' in the right mindset to recycle and participate in the given initiatives. This

coincided with the project wonderfully as establishing a recycling program at FirstBank was part of our objective to enhance FirstBank's environmental program. With the group's efforts, FirstBank was able to select a waste management service to use for all of their branches.

5.1 Recommendations

Following our analysis of FirstBank's paper consumption and recycling, we would like to recommend that FirstBank use the confidential paper destroyers to recycle non-confidential paper, as this would add more value to this service. FirstBank should also reevaluate the number of containers, size of the containers, and frequency of pickups. This evaluation might reduce FirstBank's spending. Additionally, they can relocate the containers to make them more accessible for employees, thereby increasing the efficiency of recycling program. These recommendations will improve the sustainability of FirstBank's operations.

After evaluating four different recycling companies, we recommend that FirstBank work with the Municipality of San Juan when developing their comprehensive recycling program. In today's poor economic conditions, recycling companies are not providing any refund for the recycled material, so the Municipality of San Juan is currently the most profitable company. However, we recommend another evaluation of recycling companies when the economy improves.

In our survey, many employees suggested that FirstBank should provide and encourage alternative transportation. We developed a comprehensive alternative transportation plan for FirstBank that would encourage walking, riding bicycles, carpooling, and public transportation. We recommend that FirstBank create designated parking spots for employees and visitors who carpool and/or use hybrid vehicles. Additionally, providing a shuttle that would bring employees from nearby train stations, such as Sagrado Corazon, to their FirstBank branch could encourage the use of public transportation. FirstBank should also encourage employees to ride their bikes by providing bike racks near the building and providing a shower and changing area. Lastly, FirstBank should collaborate with Puerto Rico's transportation authority to develop a program to encourage employees, such as offering bus and train passes at a discounted price.

Following the suggestions that we received from employees through surveys, we investigated the feasibility of some long term projects. Implementation of motion sensors for

lighting was one of the most common suggestions. Our analysis of implementing motion sensors for lighting showed that this green initiative will be both beneficial for FirstBank and for the environment. This initiative for FirstBank is feasible because it has a short payback period and will decrease FirstBank's impact on the environment. FirstBank should consider implementing motion sensors for lighting in restrooms and conference rooms to reduce their excessive energy consumption and save money.

We recommend that FirstBank use green landscaping techniques around their new and existing buildings. When doing this, FirstBank collaborate with a local botanical garden, such as Doña Parque Ines or the San Juan Botanical Garden of University of Puerto Rico. Additionally, FirstBank should carefully design the terracing of the landscaping, use hardy local plants, and incorporate shade trees in the landscaping.

FirstBank should use 100% recycled polyester fabric provided from Haworth for their chairs and cubicles, as well as a recycled carpet provided by Antilles Carpet. For seating, we recommend that FirstBank use Gauge fabric because it is in the same price category as FirstBank's existing fabric and is slightly heavier, thereby providing a more durable and longer lasting fabric. For cubicle panels, FirstBank should choose either Striae or Iowa because both are made of 100% recycled polyester and are in the same price group. Therefore, FirstBank can base their decision on the style and appeal of the fabric. For recycled fabric, FirstBank must contact Antilles sales representative Jose Soto at 787-398-4805 and request samples of carpet.

We made some additional recommendations for FirstBank based on our experience there during our project. We recommend that FirstBank create an environmental department or team that would monitor employees to ensure that they are complying with environmental initiatives in the bank and develop new green initiatives for the corporation. In order to do this, FirstBank must create a budget for the environmental department and green initiatives. We also recommend that the green initiatives be constantly evaluated and modified for improvements in efficiency. Moreover, we suggest that FirstBank work closely with LEED Accredited Professionals in the future when developing and constructing new buildings.

5.2 Future Work

Although a number of initiatives have been suggested, FirstBank still has opportunities for improvement and many options to consider. Some suggestions for future projects include analyzing the effectiveness of the recycling program that the current team is initiating. Another consideration for an environmental project would be the installation of solar panels and the use of alternative energy. Additionally, we suggest that future studies be conducted regarding the use of green roofs and skylights. Lastly, we recommend that FirstBank implement some initiatives that may not have tangible financial benefits, but that could benefit the environment and further advance their public image. These would include initiatives, such as using recycled paper in their offices instead of paper made of 100% virgin trees or initiatives that would improve the employees' mental and physical health.

These initiatives are only the first steps in the green direction for any corporation. By ensuring that they are environmentally friendly and that these initiatives are financially sustainable, FirstBank will succeed in becoming a role model for their community and fellow banks and corporations worldwide.

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Glossary of Terms

- **Benchmark:** In the business world, a standard used to measure reference and compare.
- **Carbon offset: "**an emission reduction credit from another organization's project that results in less carbon dioxide or other greenhouse gases in the atmosphere than would otherwise occur" (David Suzuki Foundation, 2008).
- **Climate change:** "a regional change in temperature and weather patterns. Current science indicates a link between climate change over the last century and human activity, specifically the burning of fossil fuels" (National Geographic Television & Film, 2009).
- **Co-generation:** "A production of electricity and useful thermal energy simultaneously from a common fuel source. The rejected heat from industrial processes can be used to power an electric generator. Surplus heat from an electric generator can be used for industrial processes, or for heating purposes" (SPG Media Limited, 2009).
- **Corporate social responsibility:** A business's commitment towards enhancing the well being of their labor force, the local community and the society they live in (Moir, 2001).
- **Environmental Protective Agency (EPA):** A government agency that "leads the nation's environmental science, research, education and assessment efforts" with the aim "to protect human health and the environment" (Jeucken, Sustainability in Finance, 2004).
- **Global warming:** An archaic term for climate change.
- **Greenhouse gases:** numerous gases, including carbon dioxide, methane, water vapor and nitrous oxide, that causes the Earth's atmosphere to hold solar radiation by absorbing heat radiated back from Earth's surface (National Geographic Television & Film, 2009).
- **LEED (Leadership in Energy & Environmental Design):** The U.S. Green Building Council's rating system for green buildings.
- **Take-back program:** "Take-back programs give manufacturers the physical responsibility for products or packaging at the end of their useful lives. By accepting used products, manufacturers can acquire low-cost feedstock for new manufacturing or remanufacturing activities, and offer a value-added service to the buyer" (Pacific Northwest Pollution Prevention Resource Center, 2004).

Appendix A: Mission of FirstBank

English: To provide solutions and financial services to our clients in order for them to obtain their goals.

Español: Proveer soluciones y servicios financieros a nuestros clientes para el logro de sus metas.

Appendix B: Background Supplement

Below is addition information to supplement the background.

B.1 Sustainable Development

Sustainable development is the concept of environmental conservation while also meeting the needs of humans today and of the future. In 1983, the Brundtland Commission, also known as the World Commission on Environment and Development, was founded by the United Nations in order to establish the consequences on the economy and social development produced by the degradation on the world's environment and natural resources. Marcel Jeucken, head of institutional relations at the Dutch Sustainability Research, reviewed the Brundtland Commission report, which was published in 1987. In his 2005 book *Sustainability in Finance,* he explains that the world is economically naïve in considering the environment. He agrees with The Brundtland Commission when it states that "sustainable development is a development that meets the needs of the present while compromising the ability of future generations to meet their own needs" (Jeucken, Sustainability in Finance, 2005).

The environment is the life support of humanity as it provides natural resources essential to producing energy and food. Environmental issues begin to surface with the increase in demand of usable energy, food, and water. To deal with this issue, the economy looks for shortcuts and attempts to speed up production and profits. This haste has led to unsafe practices and accidents that are detrimental to the environment. An example of this type of environmental accident is shown most publicly in the Exxon Valdez oil spill in 1989. The spill had negative effects on a wide range of plants and sea mammals, which weren't remedied until 2003 (Peterson, et al., 2003). Situations such as these, and the steady increase in demand, created the need for the environmental policies and programs around the world.

The issues from high demand in Puerto Rico are evident in waste management, water quality, and vehicle emissions. One issue Puerto Rico faces concerning waste management is the lack of storage space. Many landfills are quickly filling up and becoming unusable, and in many cases have begun to contaminate the drinking water of nearby communities. This contamination has become critical especially considering 80% of Puerto Rico's drinking supply comes from surface water. With water systems in place to purify the water, concerns are less mindful.

However, the water safety is questionable since many locations do not meet the requirements of the Safe Drinking Water Act. In addition to the waste management issues, Puerto Rico also suffers from increased vehicle emissions. With a high volume of diesel-powered trucks, exhaust can reach a dangerous level in air pollution. This becomes problematic as a number of residents are afflicted with asthma, and the air pollution only serves to make their condition worse (PR Engineers and Surveyors, 2007)..

As the relation between economy and the environment becomes more apparent, the role of financial institutions can be established. Banks in general have four tasks in finance—"transforming money by size, duration, place and/or time, and risk" (Jeucken, Sustainability in Finance, 2005). Marcel Jeucken explains that the task of considering risk is the most important and relevant position a bank can take to become environmentally friendly. As a bank makes loans and transactions between corporations and the market, their actions can be judged from an environmental point-of-view. Clients can be approved or denied certain privileges depending on their own environmental actions, and even rewarded for their considerations. Tax incentives are an example of extending privileges to corporations that improve their procedures in order to acquire financing for their operations.

By gaining an insight of sustainable development, institutions worldwide can recognize their personal role in the economy and ergo their environment. Developing environmental procedures, creating community outreach programs, and investing in environmental projects are a few of the responsibilities of global corporations.

B.2 Stakeholder Involvement

The sponsoring institution is also responsible for creating opportunities for stakeholders' involvement and providing the most appropriate form for input (Department of Urban Affairs and Planning, 1999). Public hearings that generate comments from the community get collected and the results published as a public report. The workshops that interested stakeholders attend are taught by professional instructors, who share their opinions during discussion. These are two different ways to create the chance for stakeholders' involvement. During the stakeholder involvement process, brainstorming is a very common method to obtain a variety of ideas. If the aim of the process is to solve a problem, then establishing more focused discussion groups,

called a charette, is more appropriate because participants discuss the problem deeply and concentrate on the exact solution. The host institution should be extremely careful to ensure that everyone agrees on decisions made during meetings.

B.3 Going Green & LEED

In addition, a company can "go green" by incorporating renewable energy options in its operations. Examples of renewable energy are hydrogen power, biomass power, geothermal power, solar power, and wind energy (National Renewable Energy Laboratory , 2008). Hydrogen power, or fuel cells, is less expensive and could improve air quality while reducing greenhouse gas emissions (U.S. Department of Energy, 2009). Biomass power, or bio-energy, creates energy from plants and plant-derived objects; wood is the most widely used biomass material, and while crops such as corn and soybean can also be used for biomass power. Biomass power is beneficial because it reduces our use of petroleum, as well as uses materials that are easy to obtain and large in quantity. The National Renewable Energy Laboratory describes the concept of geothermal energy as using the earth's heat for energy, from places such as water or steam reservoirs. According to U.S. Department of Energy, solar energies "diversify the energy supply, reduce the country's dependence on imported fuels, improve air quality, and offset greenhouse gas emissions" (U.S. Department of Energy, 2008).

Some large companies have begun taking steps toward utilizing solar energy. New Jersey's Public Service Electric and Gas recently announced its unique five-year plan to install "solar panels on 200,000 utility poles in its service territory" (Belson, 2009). Johnson & Johnson, a global manufacturer in the health care industry, is a company that has incorporated both aspects of energy and atmosphere. Johnson & Johnson reduced carbon dioxide emissions by 12.7 percent by improving energy efficiency in their operations, installing on-site co-generation and renewable energy projects, purchasing green power and purchasing carbon offsets (Johnson & Johnson, 2008). First Bank can incorporate actions like these into their operations.

Appendix C: Projected & Actual Timelines

Below is the projected timeline and explanation, from our original proposal:

During the first two weeks of our project, we planned on familiarizing ourselves with the bank's customs and traditions, as well as collecting bills regarding the bank's resource and material consumption. With this knowledge, we aimed to implement the pilot programs reduce the corporation's carbon footprint and prepare these concepts to be adapted into the new building. We intended to later perform cost analyses on the energy use of various appliances as well as the final implementation of extra pilot programs and community involvement programs. During the last week, we were supposed to assess the productivity of the initiatives used and the feasibility of their implementation into the corporation's environmental program (see Table 3).

Table 3: Projected Timeline

TASK	Week						
	3/16 -3/20	3/22-3/26	3/29-4/3	4/6-4/10	4/13-4/17	4/20-4/24	4/27-5/1
Interviews of Upper Management	**Interviews**						
Collect & Analyze Data About Resource Usage	**Data Collection & Analysis**						
Implement Pilot Programs			**Pilot Programs**				
Survey Employees				**Surveys**			
Apply Community Outreach Programs				**Community Outreach**			
Analyze Budget & Costs/Savings (Projected vs. Actual)					**Budget Analysis**		
Assess Success of Pilot Programs and Success of Methods						**Pilot Program Assessment**	
Finish Project/ Tying Up Loose Ends							**Finish Project**

Below is the actual timeline and explanation from our project:

After our arrival to Puerto Rico, our time schedule changed due to the desires of our liaisons and the time constraints of our project. During the first week, we prepared the content of fliers and awareness signs to send to the marketing department, performed walkthroughs inside the buildings to familiarize ourselves with the bank's customs and observe the employees' considerations for the environment in their workplace, and began collecting invoices about the bank's resource and materials consumption. During the first three weeks of our project, we also conducted interviews with many upper management, staff, and vendors to hear their concerns and suggestions about implementing green initiatives. Next, we developed the recycling pilot program through interviews with potential recycling companies and evaluating the floor plans and dumpster areas of each building. During the fourth week, FirstBank employees completed our survey, and in the fifth week, we analyzed the results. During the final weeks of the project, we investigated the feasibility of long-term environmental project, analyzed the efficiency of the A/C controllers, and designed the content for the bulletin board.

Table 4: Actual Timeline

TASK	Week						
	3/16 -3/20	3/22-3/26	3/29-4/3	4/6-4/10	4/13-4/17	4/20-4/24	4/27-5/1
Perform Walkthroughs to Observe Employees	**Walkthroughs/ Observations**						
Design Fliers & Submit to Marketing	**Fliers**						
Collect Data About Resource & Energy Consumption	**Quantitative Data Collection**						
Interviews of Upper Management, Employees, Vendors	**Interviews**						
Investigate, Analyze. & Plan Recycling Pilot Program		**Recycling Pilot Program**					
Implement Survey to Employees				**Surveys**			
Investigate Long-Term Projects				**Long-Term Projects**			
Analyze A/C Consumption					**A/C Consumption**		
Design Bulletin Board for Cafeteria						**Design Bulletin Board**	
Finish Project/ Tying Up Loose Ends							**Finish Project**

Appendix D: Interview Chart

Table 5: Interview Chart

Date	Company	Job Title/Position
Monday, March 16th, 2009	FirstBank	Executive Vice President
Monday, March 16th, 2009	FirstBank	Non-Management, Facilities
Wednesday, March 18th, 2009	FirstBank	Non-Management, Marketing
Wednesday, March 18th, 2009	FirstBank	Vice President, Marketing and Public Relations Department
Wednesday, March 18th, 2009	GCReciclaje	Sales Representative
Thursday, March 19th, 2009	FirstBank	Non-Management, CTG
Thursday, March 19th, 2009	FirstBank	Maintenance Supervisor
Friday, March 20th, 2009	FirstBank	Senior Vice President, Corporate Technology Officer
Wednesday, March 25th, 2009	FirstBank	Vice President, Service Quality Department
Wednesday, March 25th, 2009	FirstBank	Vice President, Quality Management Department
Thursday, March 26th, 2009	IFCO	Sales Representative
Thursday, March 26th, 2009	DCR	President
Friday, March 27th, 2009	Simon Drury Limited, Inc.	President & Haworth Representative
Monday, March 30th, 2009	Glenn International	Sales Representative
Wednesday, April 1st, 2009	FirstBank	Non-Management, Facilities
Wednesday, April 1st, 2009	FirstBank	Non-Management, Purchasing
Wednesday, April 1st, 2009	FirstBank	Vice President, Purchasing Department
Wednesday, April 1st, 2009	Office Max	Sales Representative
Friday, April 3rd, 2009	FirstBank	Senior Vice President, General Services Department
Friday, April 3rd, 2009	Duarte Waste	Sales Representative
Tuesday, April 7th, 2009	Municipality of San Juan	Sales Representative

Appendix E: Survey

Interoffice Environmental Survey

1. Logistics

The purpose of this survey is to aid in developing FirstBank's environmental programs. FirstBank is currently working with a group of students from Worcester Polytechnic Institute in Massachusetts. We hope to establish environmental standards and projects throughout the corporation. Please answer the questions truthfully and to the best of your ability. You have been selected randomly and participation in the Survey is voluntary. The survey will not record any personal information. Thank you very much for your time!

1. What is your gender?

- ◯ Male
- ◯ Female

2. What is your age?

- ◯ Under 21
- ◯ 21-30
- ◯ 31-40
- ◯ 41-50
- ◯ 51-60
- ◯ 61-70
- ◯ 70+

3. What building do you currently work in?

Building

Page 1

Interoffice Environmental Survey

2. Please answer the following questions in regards to your workplace.

4. How far do you live from work? (in miles)

- ◯ less than 3
- ◯ 3-10 (e.g. Bayamon)
- ◯ 11-20 (e.g. Trujillo Alto or Canóvanas)
- ◯ 21-30 (e.g. Vega Baja, San Lorenzo, Cidra, or Cayey)
- ◯ 31-40 (e.g. Manatí)
- ◯ Other (please specify)

5. How do you get to work? (Select all that apply)

- ☐ Car
- ☐ Motorcycle/Scooter
- ☐ Public Transportation
- ☐ Walking
- ☐ Carpooling
- ☐ Bicycle
- ☐ Other (please specify)

6. How often do you turn off the lights when exiting a vacant room at work?

	Never	Rarely	Sometimes	Mostly	Always
Turn off	◯	◯	◯	◯	◯

7. At work, how often do you recycle the following materials?

	Never	Rarely	Sometimes	Mostly	Always
Paper	◯	◯	◯	◯	◯
Cardboard	◯	◯	◯	◯	◯
Plastic	◯	◯	◯	◯	◯
Aluminum	◯	◯	◯	◯	◯
Glass	◯	◯	◯	◯	◯

8. Do you use both sides of the paper when you are copying or printing documents?

	Never	Rarely	Sometimes	Mostly	Always
Print on both sides	◯	◯	◯	◯	◯

Interoffice Environmental Survey

9. If you do not use both sides of the paper, what is the reason?

- ◯ N/A (I currently print and/or copy on both sides.)
- ◯ I didn't know it was possible.
- ◯ I don't know how to use it.
- ◯ Other (please specify) _____

10. If there was a recycling program at FirstBank for the following, would you participate in it?

	Never	Rarely	Sometimes	Mostly	Always
Non-Confidential Paper	◯	◯	◯	◯	◯
Plastic	◯	◯	◯	◯	◯
Glass	◯	◯	◯	◯	◯
Aluminum	◯	◯	◯	◯	◯

11. Are you familiar with FirstBank's toner recycling program?

- ◯ Not at all
- ◯ Somewhat familiar
- ◯ Completely familiar

12. Do you have any suggestions for environmental initiatives that FirstBank could consider for implementation?

13. What do you do at work to be more environmentally friendly besides recycling?

Interoffice Environmental Survey

3. Please answer the following questions in regard to your home.

14. How often do you turn off the lights when exiting a vacant room or your home?

	Never	Rarely	Sometimes	Mostly	Always
Turn off	◯	◯	◯	◯	◯

15. Do you have an air conditioning unit in your home?

◯ Yes

◯ No

16. If yes, how many hours does the air conditioner run in a 24-hour period? If no, please answer N/A.

17. At home, how often do you recycle the following materials?

	Never	Rarely	Sometimes	Mostly	Always
Paper	◯	◯	◯	◯	◯
Cardboard	◯	◯	◯	◯	◯
Plastic	◯	◯	◯	◯	◯
Aluminum	◯	◯	◯	◯	◯
Glass	◯	◯	◯	◯	◯

18. At home, do you unplug electronic equipment (e.g. power cords, tv, and iron) when they are not in use?

	Never	Rarely	Sometimes	Mostly	Always
Unplug appliances	◯	◯	◯	◯	◯

19. What do you do at home to be more environmentally friendly besides the above mentioned?

20. Are you living in a municipality that has a recycling program?

◯ Yes

◯ No

21. How do you participate in this program? If there is no recycling program in your area, please answer N/A.

22. What practices, if any, do you participate in to reduce electric bills? If none, please answer N/A.

Appendix F: Supplementary Survey Results

Figure 19 shows that approximately 240 females and 130 males attended in our survey.

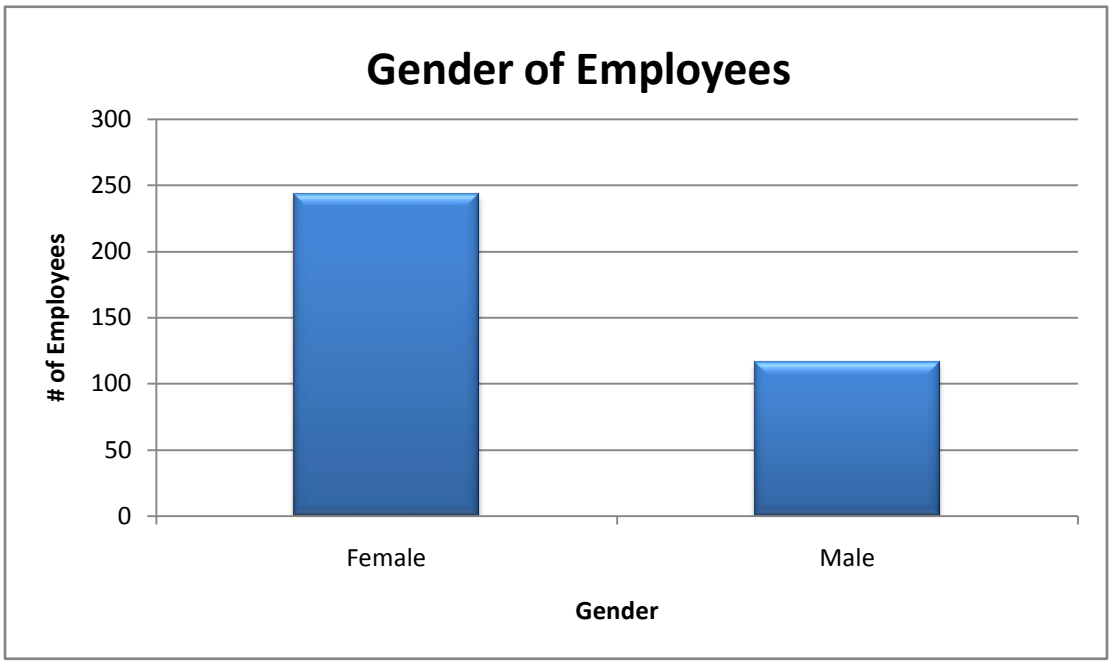

Figure 19: Gender Distribution of Employees Surveyed

The age distribution of employees surveyed is shown below. Figure 20 demonstrated that most of the employees are between 21 and 50 years old.

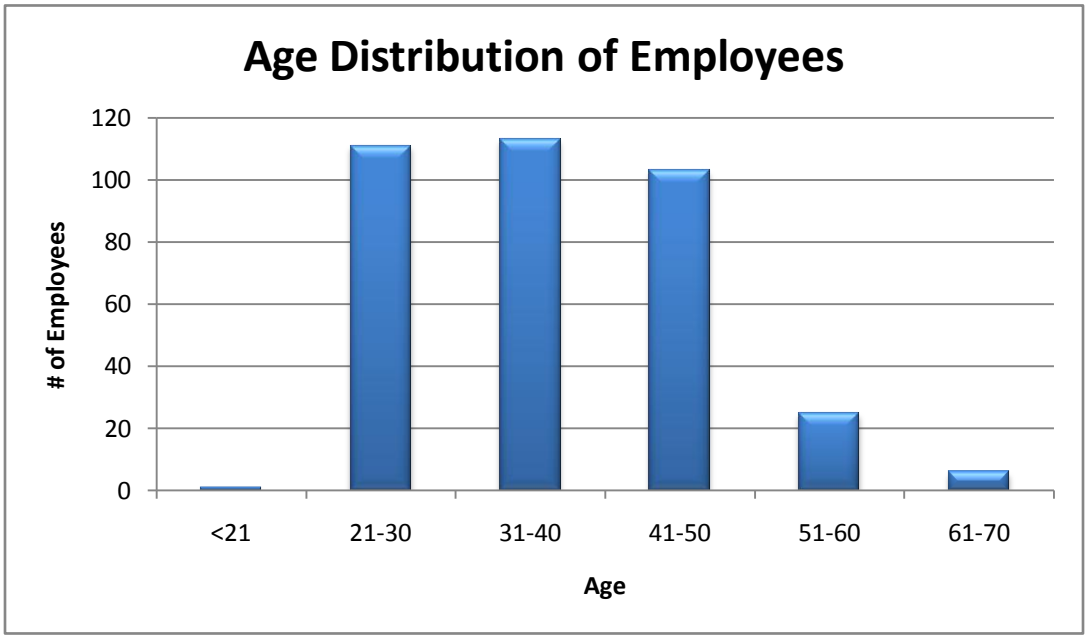

Figure 20: Age Distribution of Employees Surveyed

Figure 21 shows the analysis of employees' transportation choices to get to work. The results illustrated that the majority of employees use individual cars for transportation. There are very few people who use public transportation, carpooling, and walking to travel to work.

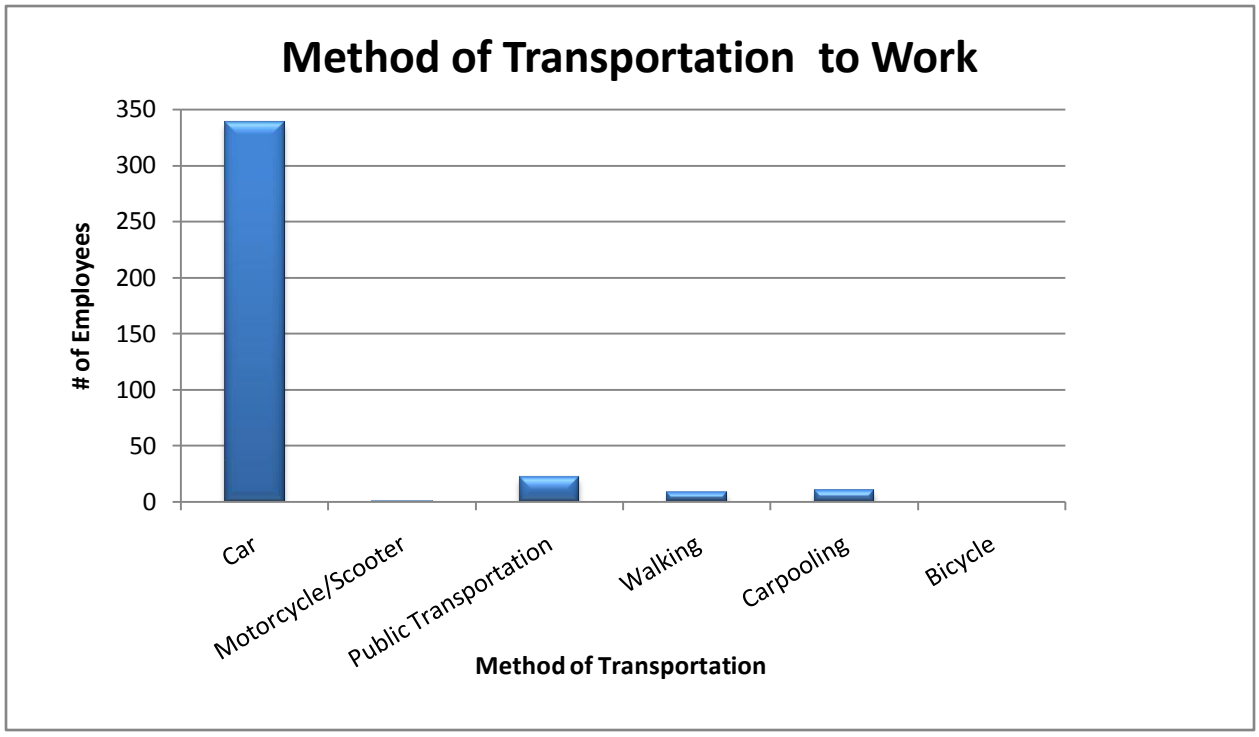

Figure 21: Employees' Method of Transportation to Work

Additionally, our survey questioned the employees' willingness to participate in potential recycling program in future. We specified the materials that can be recycled and evaluated their willingness for each material. Figure 22 represents our analysis.

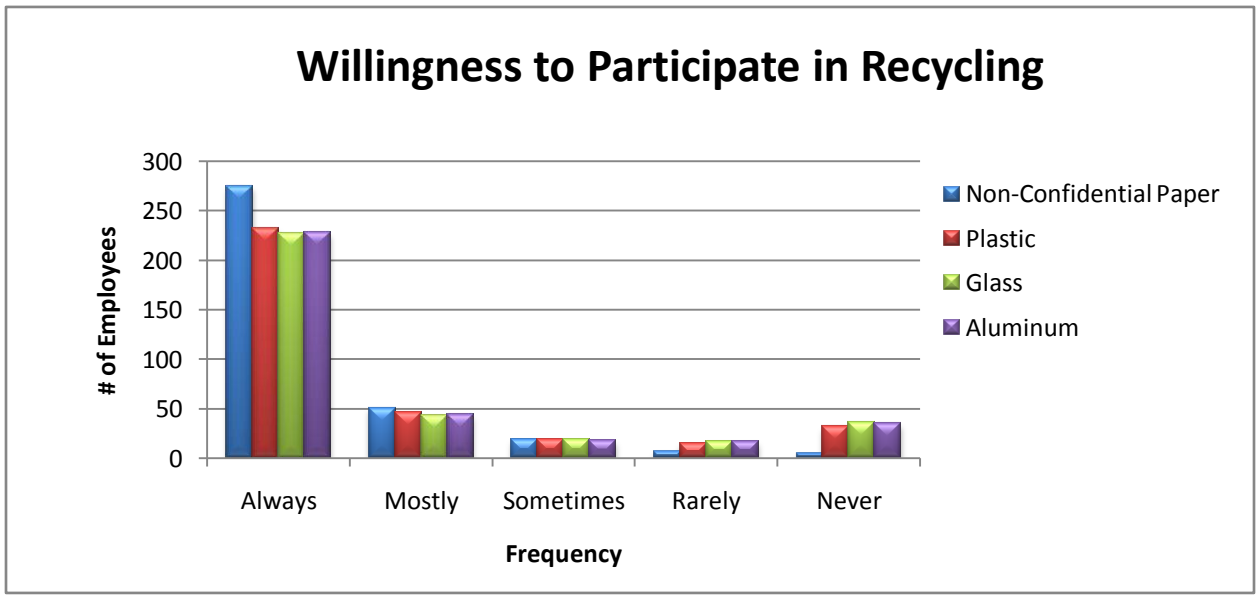

Figure 22: Employees' Willingness to Participate in Recycling at FirstBank

One of our survey questions aimed to reveal how familiar employees were with current green initiatives. Toner recycling was one of the green initiatives and Figure 23 illustrates employees' answers on how familiar they were with this program. Approximately 47% of employees were completely familiar and the other 53% were either somewhat familiar or not familiar at all. FirstBank can easily address these employees by effective communication.

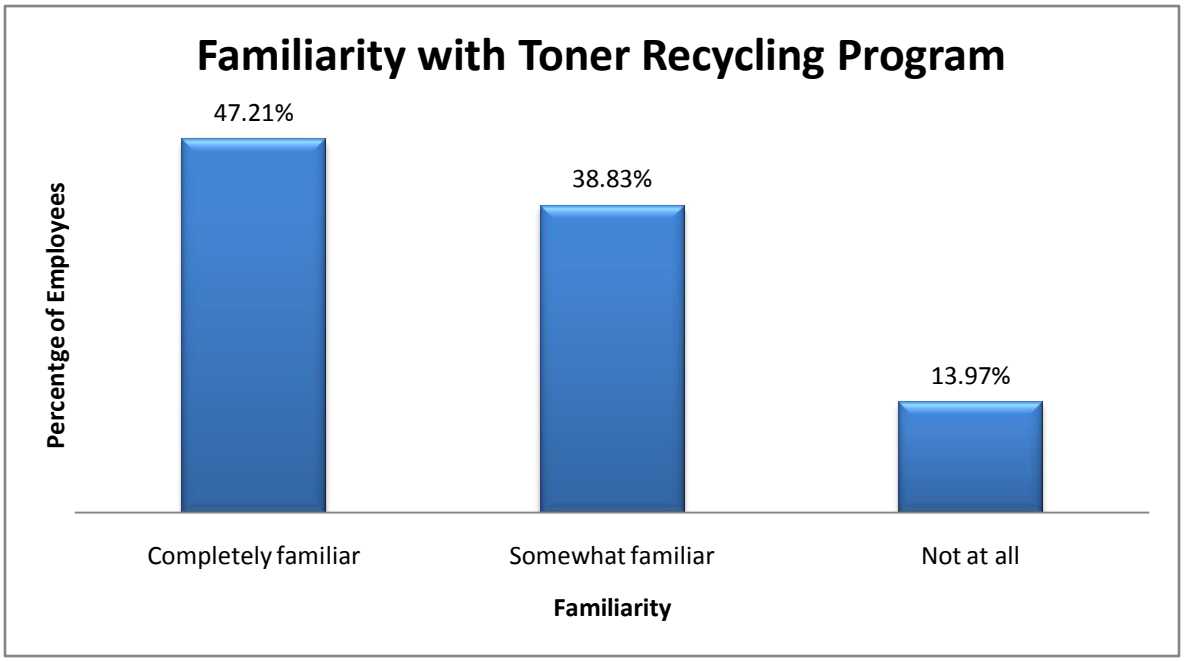

Figure 23: Employees' Familiarity with Toner Recycling Program

We asked questions about air conditioning units at the employees' homes to gauge their home energy consumption because air conditioning units often comprise a large amount of an energy bill. This also helped us to create the content for the bulletin boards. First we asked if the employees had an A/C unit at their home, and Figure 24 shows their responses.

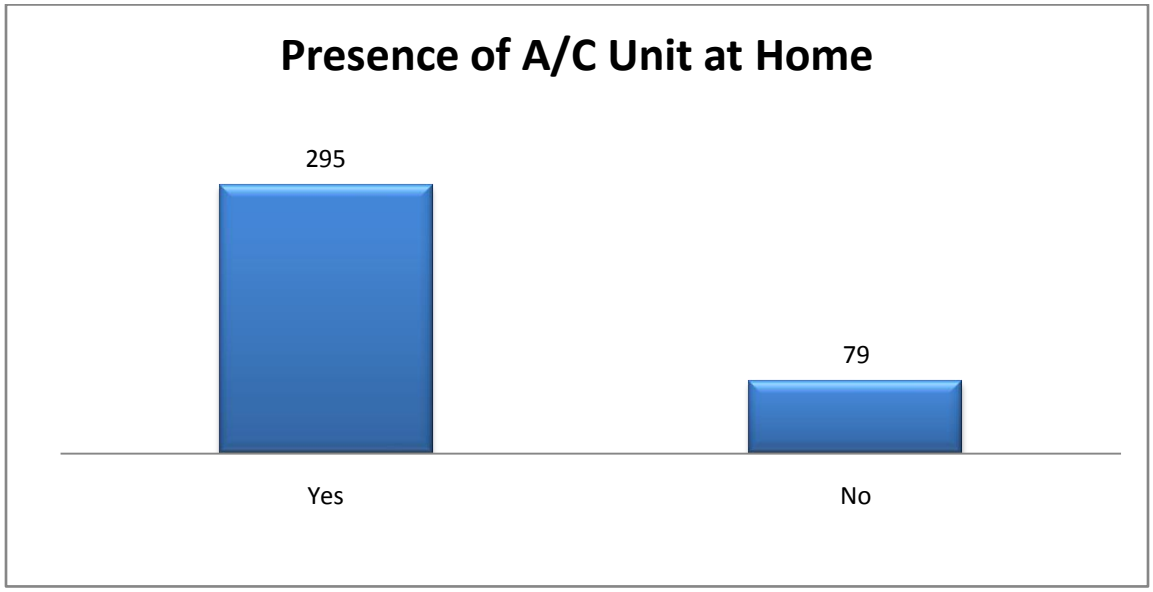

Figure 24: Presence of Air Conditioning Unit at Employees' Homes

A large majority of the employees surveyed had A/C units in their homes.

We then asked the employees' how often they used their air conditioners on an average day to better understand their consumption. Figure 25 shows their responses.

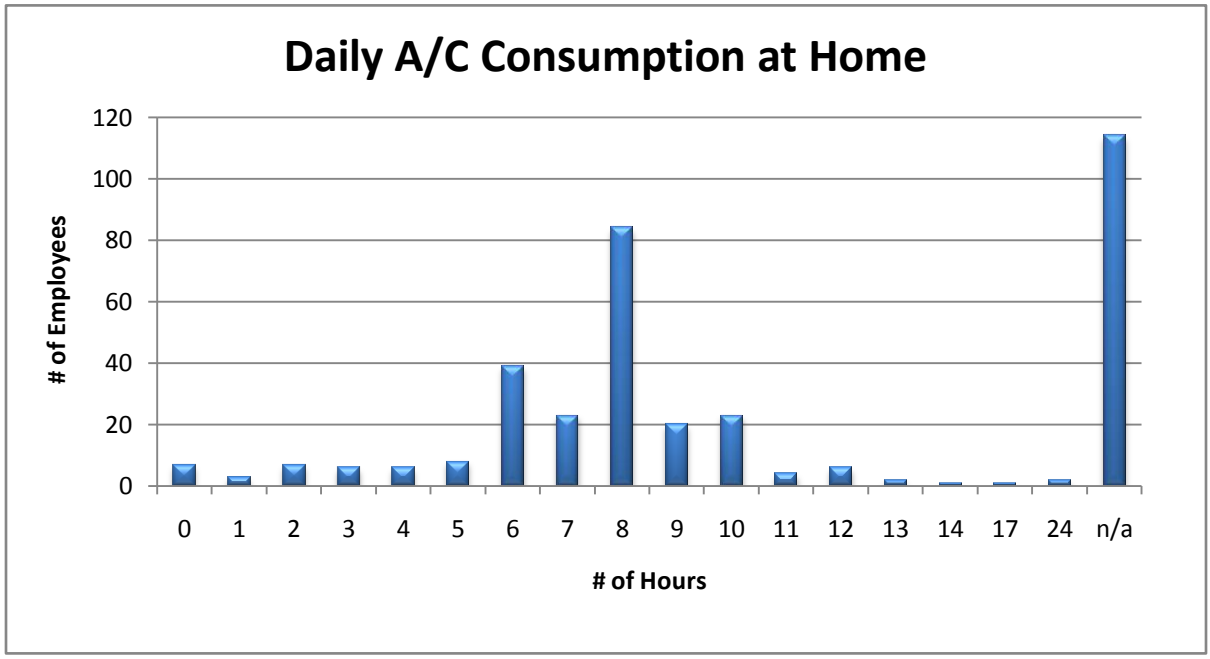

Figure 25: Employees' Daily Home A/C Consumption

.About a third of the respondents said that they either did not have an A/C unit or did not use theirs. Additionally, next most common response was that they their A/C unit was on for about 8 hours each day. The average of the other responses was 8 hours, as well.

Our survey included a question about how often employees unplugged their electrical appliances to reduce energy consumption. Figure 26 represents the distribution of employees' answers. This analysis illustrated that an average employee sometimes unplug his electrical appliances.

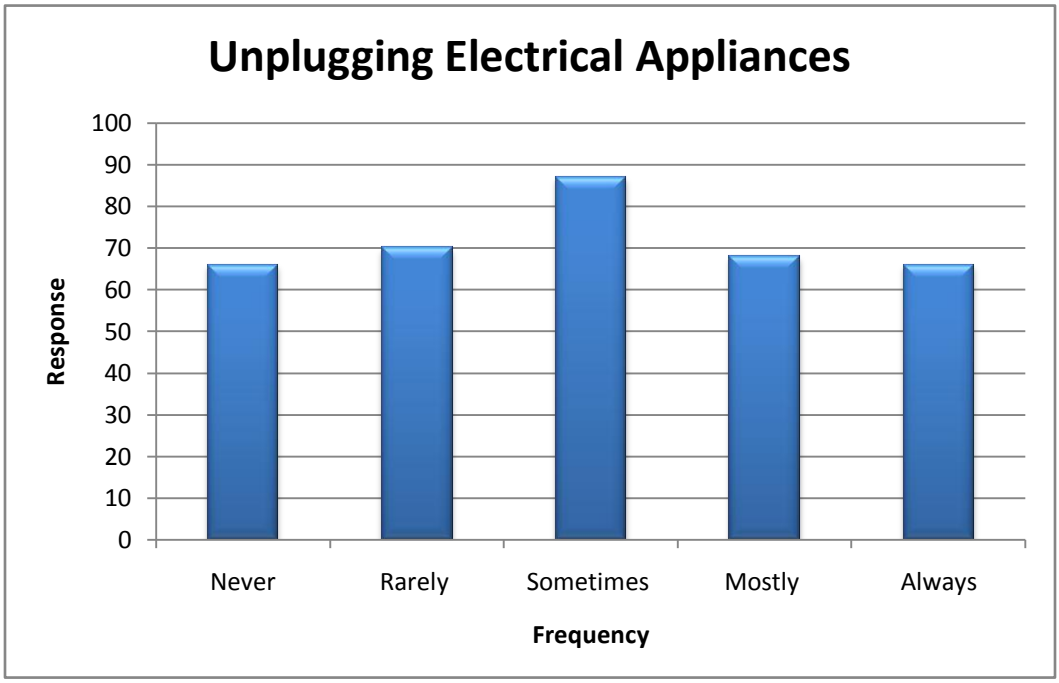

Figure 26: Unplugging Electrical Appliances

We also asked employees if their municipalities have a recycling program. Figure 27 shows their answers.

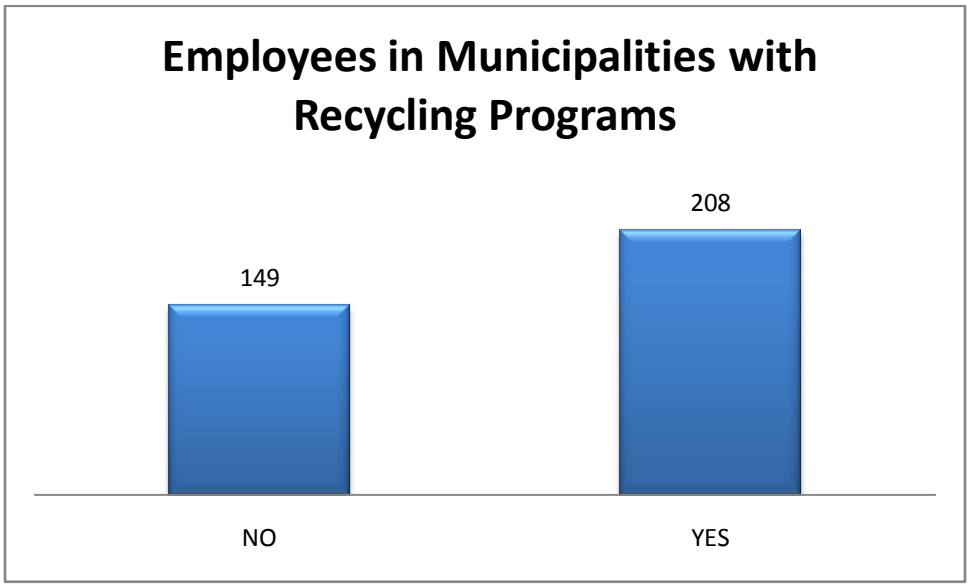

Figure 27: Employees in Municipalities with Recycling Programs.

Appendix G: Energy Consumption in Three Main Branches

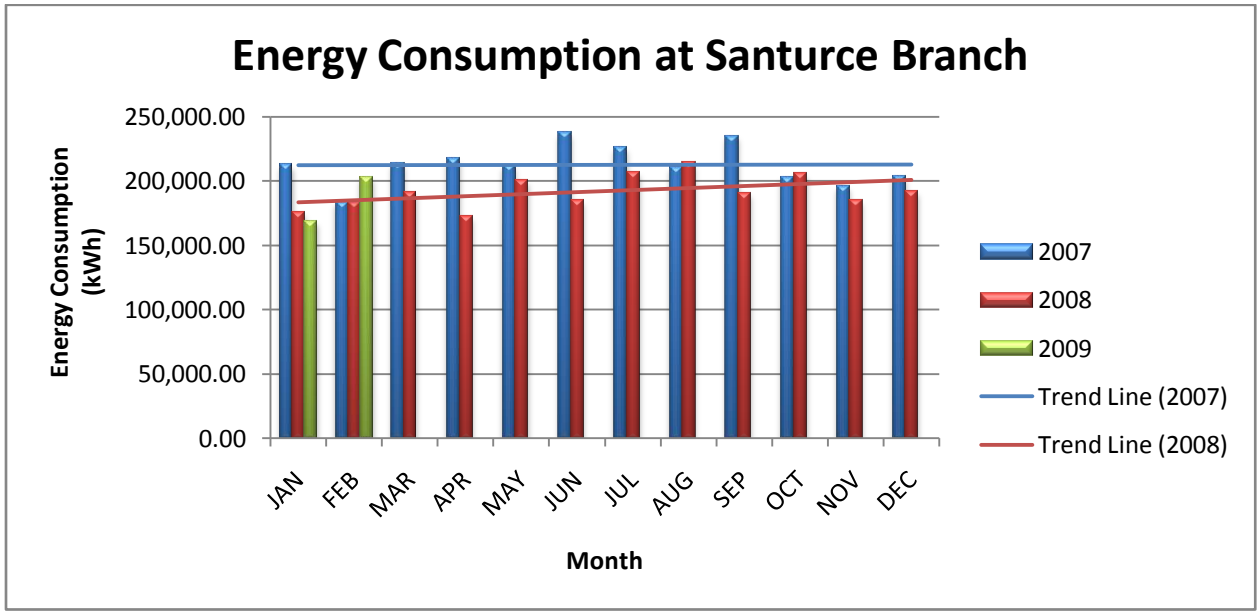

Figure 28: Energy Consumption at Santurce Branch

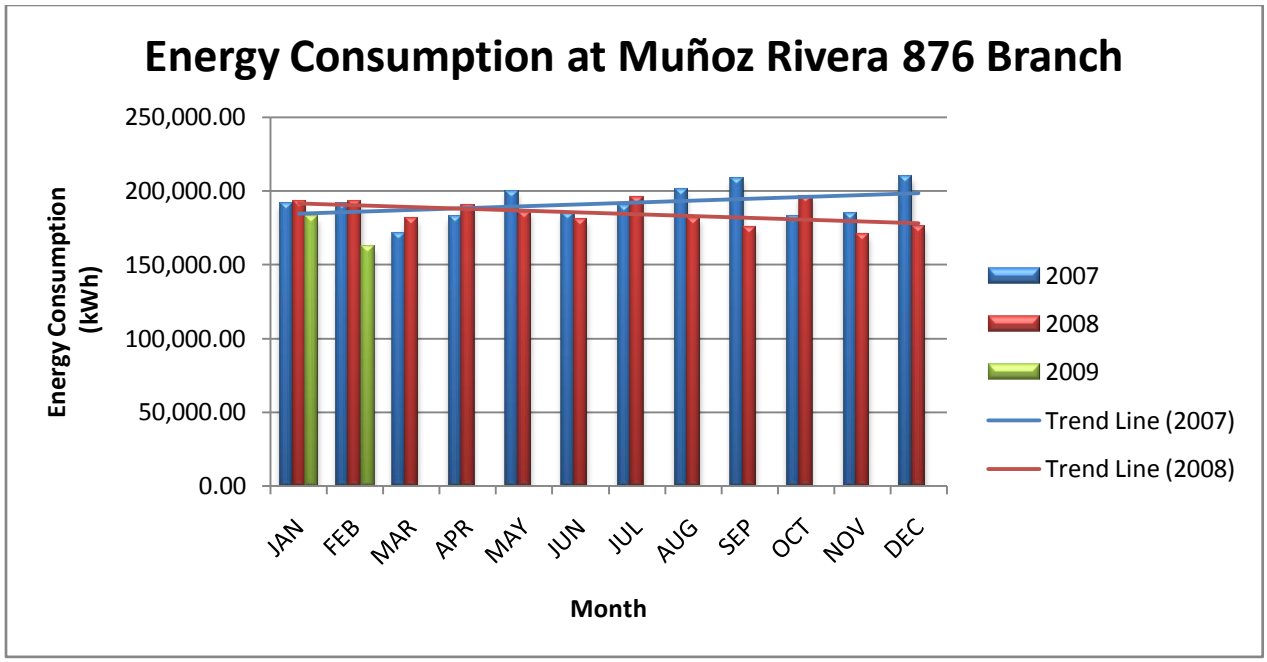

Figure 29: Energy Consumption at Muñoz Rivera 876 Branch

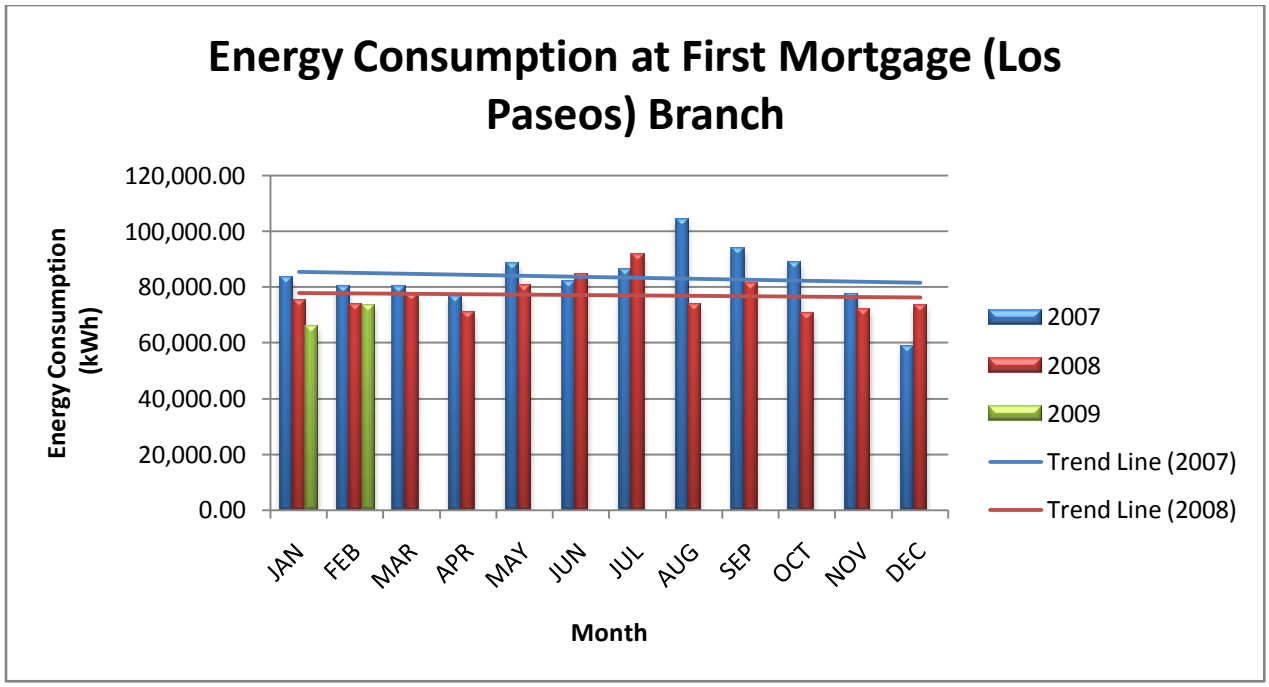

Figure 30: Energy Consumption at First Mortgage (Los Paseos) Branch

Appendix H: Prototype of Environmental Fliers

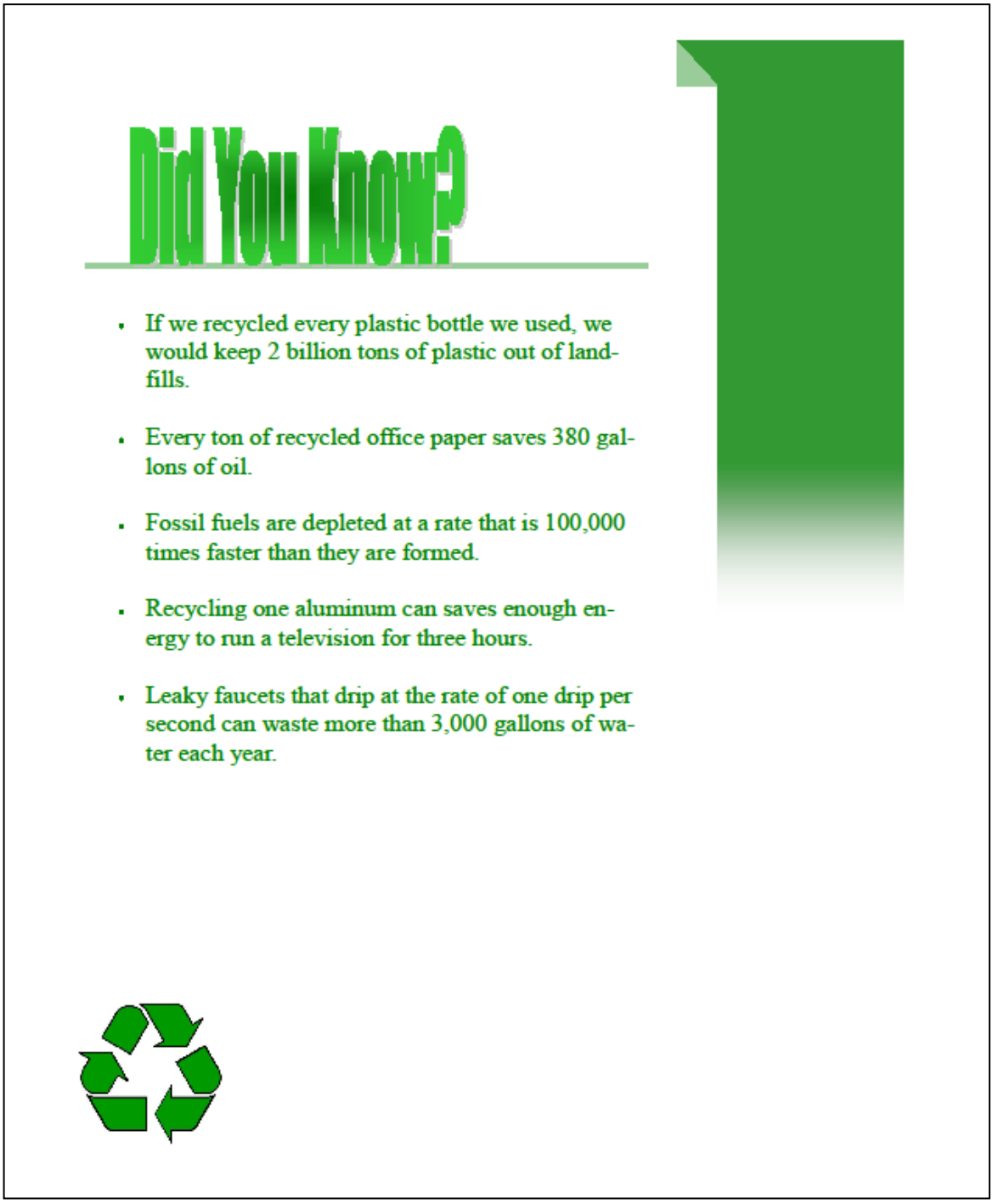

Figure 31: Prototype of "Did You Know?"

Appendix I: Bulletin Board

Figure 32: "Did You Know?" Flier for Bulletin Board

Figure 33: "What Can You Do?" Flier for Bulletin Board

What is FirstBank Doing?

PRESENT

- Paper Recycling
- Toner Recycling
- Cardboard Recycling
- Double-Sided Printers/Copiers
- Donating Old Computers (Not Disposing)
- A/C Controllers

FUTURE

- Bottles/Cans Recycling in Cafeteria
- Green Landscaping
- Shuttle from Sagrado Corazon
- Motion Sensors for Lighting
- Refurbishing Fabric on Furniture
- Bike Racks and Showers

Figure 34: "What is FirstBank Doing?" Flier for Bulletin Board

Appendix J: Estimates for Lighting Motion Sensors

Table 6: Payback Period Estimate for Sensors in Room with Eight Bulbs

	Hours of Operation	# of Light Bulbs	Total Energy Consumption (kWh)	Total Cost (Daily)	Total Cost (Yearly)
Light Bulb with 4-F32 T-12	24	**8**	6.4512	1.225728	447.39072
With Sensors	8	**8**	2.1504	0.408576	149.13024
				Saving	298.26048
				Diversity Factor (0.6)	178.956288
				Cost of control	126.1666667
				Payback period	**0.71 Year**
Assumptions:	Electric price= $0.19/kWh				
	Energy consumption= hours of operation*32*1.05/1000				

Table 7: Payback Period Estimate for Sensors in Room with Four Bulbs

	Hours of Operation	# of Light Bulbs	Total Energy Consumption (kWh)	Total Cost (Daily)	Total Cost (Yearly)
Light Bulb with 4-F32 T-12	24	**4**	3.2256	0.612864	223.69536
With Sensors	8	**4**	1.0752	0.204288	74.56512
				Saving	149.13024
				Diversity Factor (0.6)	89.478144
				Cost of control	126.1666667
				Payback period	**1.41 Year**
Assumptions:	Electric price= $0.19/kWh				
	Energy consumption= hours of operation*32*1.05/1000				