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Building a Sustainable Business Community in Cherry Hill, NJ

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Abstract

The planet's ability to provide ecological services will depend on whether sustainable design is integrated into the fabric of how humanity interacts with the natural world. In the business context, companies moving towards sustainability consider their current needs and those of the future when developing their business models. A sustainable business model will ensure the profitability, social, and ecological value of the company. While there is growing interest in developing sustainable business models, small to mid-sized companies have struggled with implementing this operational system due to a lack of resources. As sustainable business practices grow, these companies can look towards several large businesses for models. In addition, there are a growing number of governmental agencies and NGOs that teach sustainable design. One such entity is Sustainable Cherry Hill, an NGO located in Cherry Hill, NJ that engages local business leaders and helps them integrate sustainable design into everyday business practices. This project developed the sustainability template for Sustainable Cherry Hill which will also be incorporated into Cherry Hill Township's efforts to build a sustainable business community. The project analyzes several business models of sustainable design and instructional programs that teach others how to move towards sustainability. The result is a template that will help the South Jersey business community become more energy efficient, conserve water, reduce waste and decrease toxins and pollutants.

Disciplines

Environmental Sciences | Physical Sciences and Mathematics

Comments

Presented to the Faculties of the University of Pennsylvania in Partial Fulfillment of the Requirements for the Degree of Master of Environmental Studies 2010.

Building a Sustainable Business Community in Cherry Hill, NJ

Tony Tancini
May 2010

Capstone Advisor (Primary Reader): Stanley L. Laskowski, Ph.D.
Secondary Capstone Reader: Yvette Bordeaux, Ph.D.

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ABSTRACT

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Tony Tancini

Capstone Advisor (Primary Reader): Stanley L. Laskowski, Ph.D.

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The planet's ability to provide ecological services will depend on whether sustainable design is integrated into the fabric of how humanity interacts with the natural world. In the business context, companies moving towards sustainability consider their current needs and those of the future when developing their business models. A sustainable business model will ensure the profitability, social, and ecological value of the company. While there is growing interest in developing sustainable business models, small to mid-sized companies have struggled with implementing this operational system due to a lack of resources. As sustainable business practices grow, these companies can look towards several large businesses for models. In addition, there are a growing number of governmental agencies and NGOs that teach sustainable design. One such entity is Sustainable Cherry Hill, an NGO located in Cherry Hill, NJ, that engages local business leaders and helps them integrate sustainable design into everyday business practices. This project developed the sustainability template for Sustainable Cherry Hill which will also be incorporated into Cherry Hill Township's efforts to build a sustainable business community. The project analyzed several business models of sustainable design and instructional programs that teach others how to move towards sustainability. The result is a template that will help the South Jersey business community become more energy efficient, conserve water, reduce waste and decrease toxins and pollutants.

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INTRODUCTION

Implementing Sustainable Design in Cherry Hill

Business can play an important role in contributing to a community's sustainability. Even small and mid-sized companies can become community leaders by implementing sound environmental policies that decrease their carbon and water footprints and reduce the amount of waste and toxins that they generate. While there is a growing desire in the business community to adopt green business practices, many do not know where to start (Yeganeh, & Glavas, 2008). In addition, many smaller companies do not have the resources to hire full-time employees to help them become more sustainable organizations (Ibid). These companies need help. This assistance can come from sustainability consultants, government sponsored educational programs, or NGOs that provide information and guidelines for interested businesses.

To bring sustainability to their community, a group of dedicated individuals formed an all volunteer NGO in Cherry Hill, NJ called Sustainable Cherry Hill. The mission of Sustainable Cherry Hill is "to engage and educate the South Jersey community about sustainability from the ground up" (Sustainable Cherry Hill, Website). To assist business owners, especially small to mid-sized ones, the NGO's green business task force intends to develop a sustainability platform that will be the business community's resource of sustainability information. The goal is to provide business owners with information and resources to assist them with their efforts to become more sustainable. Essentially, the platform will provide the tools that businesses can apply to their organizations and operations.

The following project assisted Sustainable Cherry Hill in developing a green business platform. A number of constitutes were considered to develop a platform that would achieve the group's goals and consider available resources. These constitutes included identifying the specific environmental problems that need resolving so that the right measures can be employed to correct these problems. Once these measures are established, an analysis of organizations that have adopted these measures was conducted to determine how effective they are at addressing each environmental concern and still contribute to the welfare of employees and the organization's overall financial health. Also, there was an analysis of the government and NGO sponsored environmental education programs that teach companies and businesses how to be more sustainable.

The project discusses each of the identified constituents and provides information on how Sustainable Cherry Hill's sustainability platform was developed to address each specific environmental concern. In addition, it provides case studies on three businesses in the Cherry Hill area that have either already implemented the sustainability measures identified in the platform or are in the process of doing so. The overriding benefit of the project is that it developed guidelines that local businesses can follow so that they can become more sustainable organizations. In addition, Cherry Hill Township will incorporate the sustainability template into its green business program which will help ensure the success of the program.

Preserving Ecological Services

The classic meaning of "sustainability" comes from the Brundtland Report which defined the term as "meeting the needs of the present generation without compromising the ability of future generations to meet their needs" (United Nations Report, 1987; Onisto, 1999; Michaelis, 2003; Steurer, 2005; Petrini & Pozzebon, 2009). This term has been used more frequently in the past several years relating to business practices, agricultural methods, buildings, transportation and just about any other societal need. Despite its different uses, a common thread is that the term is generally linked to environmental or "green" values (Knowles & Espinosa, 2009). These values are tied to the planet's many ecological services that enable companies to do business (Lovins, et al. 2007). However, a large number of companies have been slow to address environmental issues and implement more sustainable business practices (Knowles & Espinosa, 2009).

One reason that sustainability has not been incorporated into traditional business practices is because many companies do not consider the planet's ecosystem services when developing operational plans and costs (Potocan & Mulej, 2003). Ecological services include those that are related to freshwater use, air, forests, oceans, the plains and other land uses (Porter & Van der Linde, 1995). Traditionally, both small and large businesses have focused on increasing shareholder value and profits rather than the environmental harm associated with their operations (Potocan & Mulej, 2003). However, companies of all sizes rely on the planet's ecological services when they perform everyday business activities. For example, water is used for manufacturing and agricultural industries, trees provide the source for paper products, waste is sent to landfills, pollutants are discharged into the air and water, and energy from fossil fuels is used to generate electricity and heat (Porter & Van der Linde, 1995).

Since there is no entity that can outrightly charge for these services, the “value of those services do not appear on the business balance sheet” (Lovins, et al. 2007). It is estimated that the value of Earth’s ecological services is about \$33 trillion a year, an amount that approaches the gross world product (Ibid). It is essential that companies start considering the total value of these ecological services. This pressing concern arises from a growing consensus that humanity’s relationship to the environment is on the verge of the breaking point where the planet’s depleted resources will no longer be able to meet the current demand (Ottman, 1999). In addition, the planet will cease to act as a sink and absorb the pollution that humanity discharges into the environment (Ibid). Life on Earth will be serious danger if the planet is unable to continue providing these valuable and essential ecological services. Depleted and polluted resources will also impede economic efforts.

To account for the planet’s ecological services, government has provided some measures by enacting laws and regulations that require companies to account for some of these natural systems. Government regulation typically comes in the form of issuing permits that limit the amount of pollutants discharged into the environment or requiring companies to pay for the cost of their environmental damage (Speth, 2008). However, governmental programs have not been overwhelmingly effective because some companies have traditionally fought the implementation of environmental standards (Porter & Van der Linde, 1995). The traditional fight between government and business has not resulted in the overriding positive ecological outcome that environmental policy was expected to bring (Speth, 2008). Faced with the prospect of diminishing ecological services, there is a pressing need to broaden environmental politics “so that environmental concern and advocacy extend to the full range of relevant issues” (Ibid). To better protect ecological services, government regulations should be developed that not only require compliance with environmental standards but also provide the necessary education and incentives that will make it more profitable for companies to engage in not necessary but good business practices (Porter & Van der Linde, 1995).

The business community can take advantage of sustainable design and move beyond its role of mere compliance to the recognition that it is necessity to account for ecological services in their operations. Businesses can contribute to sustainable development by adopting practices that pay attention to how their operations affect the environment (Michaelis, 2003). Companies can adopt eco-efficient principles which progressively reduce their ecological effect and resource

consumption to levels that coincide with the Earth's carrying capacity or the biophysical will overwhelm them (Ibid). Companies can achieve this result by paying attention to their overall environmental impact and recognizing that the economy is a subsystem of natural systems (Onisto, 1999). Doing so will reverse the long-standing trend of businesses disconnecting themselves "from the biophysical reality of our dependence on natural systems" (Ibid).

To ensure the health of the planet's natural systems, the foundation of economic activity, companies can adopt a holistic approach to their own operations and understand their relationship with the environment and how they are affecting valuable ecological services (Knowles & Espinosa, 2009). Taking this approach will help "avert irreversible environmental degradation" (Ibid). Companies can do their part by reducing their overuse of the planet's ecosystem services by paying attention to transportation issues, office design and location, water and energy use, waste management and overall pollution reduction (Michaelis, 2003). To become more sustainable, a company should conduct an inventory on how it affects the planet's ecological services and of the amount of water, energy, and other natural resources it consumes (Lovins, et al., 2007). Considering these issues and addressing environmental concerns can be profitable because implementing certain measures can save money (Ibid).

To understand better why sustainable design is important, the following will give a brief summary of the specific environmental concerns relating to water and energy conservation, and pollution and waste reduction. If efforts are achieved in each of these areas, then the overall affect that business has on the planet's ecosystem services will be reduced (Lovins, et al., 2007). Conserving water and eliminating the amount of pollution discharged into our streams will protect this vital resource (Speth, 2008). In addition, fish and other marine life that human populations consume will thrive in cleaner environments and will be safer for human consumption (Ibid). Using cleaner forms of energy will reduce the impact of climate change (Bernstein, et al., 2007). Also, reducing the amount of resources consumed will decrease the destruction of valuable habitat from lumber harvesting and mining for natural resources (Ottman, 1999).

Water Conservation

Water is an essential component of life on this planet. While the vast majority of the Earth's surface is covered in this precious liquid, only a small amount, 2.78%, is freshwater (Christopherson, 2009). Of that freshwater, a large portion is contained in ice sheets and glaciers

(77.15% of all freshwater), leaving a very small amount that is accessible on the surface¹ (Ibid). There is a limited supply of freshwater on this planet and humanity's relationship with this vital resource has resulted in the degradation of natural watercourses and their attendant wetlands resulting in a crisis in supply (Speth, 2008). Compounding the problem is the fact that developed nations consume far more water today than in the past (Girardet, 2008). Water is not used just for drinking and washing, large amounts of it is used for agricultural and industrial production (Ibid).

The crisis in freshwater supply is so pervasive that the United Nations has established access to safe drinking water as part of its Millennium Development Goals². About half of the global population faces a scarcity of water (United Nations, 2008) and about 884 million people do not have access to safe sources of drinking water (United Nations, 2009). An even greater number, about 2.5 billion, do not have access to proper sanitation (United Nations, 2009). Access to safe drinking water and proper sanitation are two issues that often touch upon each other. One cannot have safe drinking water if the water supply is contaminated by human and animal waste. To resolve these two issues, the world community under the leadership of the United Nations have made them part of the Millennium Development Goals (MDG). The established target is "to halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation" (Ibid). Besides global efforts, companies must do their part to reduce the impact they have on freshwater supplies.

Companies can have a large affect ensuring a continuing supply of clean freshwater by reducing the amount of water they consume during their operations and what they discharge back into rivers and streams. Unfortunately, many companies have ignored the ecological devastation that traditional operations have on freshwater supplies. In Camden County, which is where Cherry Hill is located, the Municipal Utilities Authority treats 58 million gallons of wastewater each day, reducing pollution by 95% (Camden County MUA, Website). Another example is seen in energy production where the first life cycle stage of fossil fuel sources such as coal involves the mining process. Not only does coal emit a large amount of greenhouse gases and other

¹ About 22.22% of freshwater is ground water with about 11.02% being deep groundwater and harder to access.

² The eight Millennium Development Goals, which include increasing water access and sanitation, halving poverty, empowering women, increasing global health and education were established in 2000 with a target date of 2015 for completion (<http://www.un.org/millenniumgoals/bkgd.shtml>).

pollutants when burned as fuel, the mining process destroys the surrounding ecosystem and causes severe groundwater and surface water pollution (Goodell, 2006). Drilling for natural gas has similar results. An example of this is seen in the Marcellus Shale which is partially located in Pennsylvania. Drilling for natural gas requires substantial amounts of water for the drilling and stimulation of the gas well (Soeder & Kappel, 2009). This process has the potential to adversely affect local water resources because the effects of drilling can degrade streams and small watersheds, and contaminated fluids may leach into the soil destroying groundwater resources. (Ibid). Another example was seen in the beverage industry in which Coca-Cola was shut down in India over water issues and may be fined \$47 million for groundwater and soil pollution (Kumar, 2010).³

Water contamination is only one source of the problem, efforts must also include reducing the amount of water used for agricultural and industrial purposes. Businesses have an important role in efficiently using “water to meet the social, economic and environmental needs of our communities” (Friend & Coutts, 2006). To do so, companies must take steps to look to ways they can reduce the amount of water that is used during their operations. The amount of water that is used just for agricultural purposes is staggering. It is currently estimated that about “70% of the world’s freshwater is used for growing food, and as much as 95% in parts of the U.S., North Africa and Asia” (Goodell, 2006). The industrial sector has its own relationship with water as well. For example, “it takes 125,000 liters (33,000 gallons) of water to produce one car” (Ibid). Regardless of the size of the company, reducing the amount of water that is used during business operations and ensuring that pollutant discharge is reduced or eliminated will go a long way to preserving this valuable and irreplaceable ecosystem service. Implementing these methods will also ensure that the business community continues to have access to this vital resource.

Energy Conservation

Energy conservation and efficiency is not just about reducing the amount of electricity and heat that we use, it is also tied into taking the necessary steps to avoid the most serious effects that climate change poses. The Intergovernmental Panel on climate change (IPCC)

³ On March 23, 2010, an Indian government panel recommended that Coca-Cola’s Indian subsidiary be fined \$47 million for discharging sludge that contained toxic chemicals and heavy metals such as lead and cadmium (Kumar, 2010). In addition, Coca-Cola’s operating license was not renewed because it caused the water table to drop resulting in less drinking water and less productive agriculture (Ibid).

defines climate change as “a change in the state of the climate over time, whether due to natural variability or as a result of human activity ... that alters the composition of the global atmosphere” (Bernstein, et al., 2007). The global community now accepts the fact that the warming of the climate system is apparent based on empirical evidence showing an increase in average global air and ocean temperatures (Ibid). The IPCC studied a twelve year period of temperature (1995 and 2006) and found that eleven out of twelve years were the warmest years in instrumental record going back to 1850 (Ibid). In addition, a 100-year trend of temperature recordings shows an increase of 0.74 (0.56 to 0.92)°C (Ibid).

Since the dawn of the industrial revolution, humans have significantly “contributed to emission of four long-lived greenhouse gasses: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and halocarbons (a group of gases containing fluorine, chlorine or bromine)” (Baumert, et al., 2005). Global emissions of carbon dioxide is the largest contributor of greenhouse gases and the amount of carbon dioxide released into the atmosphere during the past 200 years have exceeded 2.3 trillion tons (Ibid). In its recent report, the Environmental Protection Agency (EPA) acknowledged that the “primary greenhouse gas emitted by human activities in the U.S. was carbon dioxide, representing approximately 85.4% of total greenhouse gas emissions (EPA Report, 2009). However, a stark point to consider is that half of those emissions have been released during a thirty-year period (1974 to 2004) and were due to fossil fuel consumption and land use changes (Ibid). Even more striking, is that although the U.S. has about 5% of the world population and accounted for about 20% of the global greenhouse emissions with most of those emissions being from carbon dioxide (Baumert, et al., 2005).

With the emerging economies of India and China, the global demand for energy will exponentially increase as will the use of fossil fuels resulting in an increased amount of greenhouse gases (Speth, 2008). A distinctive environmental theme seen in many European cities is the attention and priority it gives to global climate change and the development of local policy to decrease and greenhouse gases (Beatley, 2000). Businesses also need to make energy reduction a priority to do their part in reducing global greenhouse gas emissions. Otherwise, they will be subject to regulation, rising energy costs and carbon taxes. In addition, the most serious effects of climate change will not be avoided. These effects may include hot extremes which would lead to severe droughts and heat waves resulting in a reduced water supply, greater

amount of glacier melt, more severe tropical storms, loss of coastlines and coastal wetlands, food shortages, and increases in infectious diseases (Bernstein et al., 2007).

Toxin and Pollution Reduction

Reducing the amount of toxins and pollutants that are discharged into the environment is a critical step for all companies. Manufacturing many of the consumer goods we use today results in the creation of persistent organic pollutants (POPs) which include dioxins and dioxin-like polychlorinated biphenyls (PCBs) which are of particular concern because they are a severe health risk to all living organisms, including humans, and they have a “resistance to environmental degradation and metabolism” (Someya, et al. 2010). POPs, certain pesticides, and other toxins “can cause cancer and birth defects as well as interfere with hormonal and immune systems functioning” (Speth, 2008). Unfortunately, these substances are present in many parts of the world. For example, the results of a recent study conducted in Asia found POPs and dioxin-like PCBs in all human breast milk samples and fish samples taken in Kolkata, India (Someya, et al. 2010). During early months of 2006 in South Korea, air samples taken near one of the largest steel making plants revealed elevated levels of dioxin-like toxins (Choi, Baek, & Chang, 2008).

Exposure to POPs is not just restricted to oversea countries or those that have weak environmental protections for its citizens. “Child health experts at Mount Sinai School of Medicine in New York report that today virtually every person on Earth can be shown to harbor detectible levels of dozens of POPs and other toxic substances” (Speth, 2008). Air samples in Toronto, Canada revealed high levels of polychlorinated naphthalenes (PCNs), dioxin-like chemicals which are used for the electrical industry as flame resistance insulation, lubricants, wood preservatives, plasticizers and binding agents (Helm & Bidleman, 2003). In some instances, the presence of these substances in the U.S. has caused local advisories. For example, the State of New Jersey Department of Environmental Protection (NJDEP) prohibits “eating, selling or taking (harvesting) blue crabs from Newark Bay Complex⁴ and the tidal Passaic River” because of high levels of contaminants including mercury, PCBs, dioxins, and other organic chemicals (New Jersey Department of Environmental Protection, Website). While the NJDEP provides techniques for cooking fish to reduce PCB levels, it cautions that nothing will “reduce or remove unsafe levels of mercury” (Ibid).

⁴ “The Newark Bay Complex is located in northeastern New Jersey and includes the Newark Bay, tidal Hackensack River, Arthur Kill, Kill Van Kull and tidal tributaries” (New Jersey Department of Environmental Protection, Website.)

Pollution from industrial agriculture has had its negative affect on the environment as well. The disastrous effects resulting from agricultural and urban runoff that flow into the Gulf basin are well documented and provide a good example of the devastating effects that this industry can have on the planet's ecological services. Since the 1950s, the "dead zone" in the Gulf of Mexico has expanded in size, chiefly related to the excess nutrient load that flow down into the Gulf (Costello, et al., 2009). This nutrient load which is composed of mostly nitrogen and phosphorus creates large algae blooms which results in the depletion of dissolved oxygen as plants die off and their decomposition takes the oxygen out of the water (Dodds, 2006). The result is a hypoxic zone where the dissolved oxygen content of the water falls far below the level necessary to support marine life. Research have shown that "about 90% of the total freshwater-derived nutrient load to the Gulf comes from the Mississippi (about 70%) and the Atchafalaya Rivers" (Ibid). A recent study revealed that the largest yields of nitrogen flowing into the Gulf "closely coincide with intense agriculture in Indiana, Illinois and Iowa" (Robertson, et. al., 2009). Phosphorus loads were seen over a much broader area and were largely associated with urban runoff (Ibid).

The toxins and pollutants mentioned herein are just some of the examples that companies discharge into the environment. There are many others that are just as detrimental to the environment and human health. For example, mercury and air pollution from coal-fired power plants can create ecological harm and affect human health causing cancer, asthma and other diseases (Goodell, 2006). In addition to mercury, "hazardous and radioactive wastes and other heavy metals, including lead and arsenic" are other pollutants generated by businesses across the U.S. that diminish natural systems (Speth, 2008). Together with "insecticides, herbicides, fungicides, rodenticides, and other biocides" the planet is absorbing a number of hazardous substances at an alarming rate jeopardizing Earth's ability to provide its ecological services (Ibid). The good news is that there is an emerging mindset in the business community to eliminate toxins from their products knowing that there is a growing customer base that will reward companies for doing so (Lovins, et al., 2007).

Waste Reduction

Even if applicable measures are developed and implemented to address environmental concerns relating to water, air, toxins and pollutants, companies will not be sustainable if the issues associated with waste are not properly addressed (Ottman, 1999). While sustainability can

be addressed by increasing operational efficiency and adopting environment-friendlier technology and products, steps must be taken to reduce the amount of material that is consumed (Rothenberg, 2007). A key concept of sustainable development is the understanding that humanity's current use of the planet's resources is severely damaging its ability to sustain life (Knowles & Espinosa, 2009). It is estimated that 80% of the world's resources are consumed by 20% of the population (Ottman, 1999). The need to reduce the amount of materials that are consumed becomes more pressing when one considers that the 20% figure does not account for China and India's emerging economies; two nations who alone equal half of the world's population (Ibid). Reducing the amount of materials consumed becomes an essential step in preserving resources for the future.

As land resources become scarce, the need to find alternative ways of disposing large amounts of consumer and industrial waste is apparent (Girardet, 2008). Waste disposal has become an important issue in the U.S. when one considers that New York City alone produces a large amount of waste, 36,000 tones per day (Ibid). Compounding the waste problem in the U.S. is that there is no effective federal plan established to maximize recycling and minimize waste (Ibid). Even established federal law has not been much help in this area. For example, while the federal government enacted the Solid Waste Disposal Act of 1976, which requires states to develop and implement plans to reduce waste, the Act has not been widely enforced (Ibid). Resource inefficiencies within a company add to the growing waste problem because a large amount of industrial waste is created because of "poor process controls, which result in unnecessary waste, defects, and stored material" (Porter & Van der Linde, 1995). Companies who take the initiative to reduce the amount of material and resources they consume and incorporate effective measures to eliminate as much waste as possible will take steps closer to becoming more sustainable organizations and have more efficient and profitable enterprises.

MATERIALS AND METHODS

Sustainability is a new field. Sustainable development had its roots in the 1987 Brundtland Report and has continued to grow since then (Steurer, et al., 2005; United Nations Report, 1987). While there are no set standards, much has been written about what sustainable design is and how it can be accomplished (Roberts & Cohen, 2002). Despite the wealth of information, the implications of what sustainable design is and can do for environmental and social well-being it is not fully understood and many have misapplied the term (Ibid). One

reason for this confusion is that there are many examples of what companies have accomplished to become more sustainable, but no universal design that can be applied to a variety of different businesses (Potocan & Mulej, 2003; Berns, 2009). Moreover, companies may need assistance to determine what sustainable practices will best fit their needs (Yeganeh, & Glavas, 2008).

Part of the process to develop the sustainability template for Sustainable Cherry Hill's Green Business Task Force was to research the information that has been published in academic journals, books, reports and other sources concerning this topic. In addition, the project involved meeting with the group to discuss the template as it was being developed. The project conducted case studies of organizations that have adopted sustainable measures to determine how effective they are at addressing each environmental concern and still contribute to the welfare of employees and the organization's overall financial health. The project also included an analysis of environmental education programs that teach companies and businesses how to be more sustainable. The information was used to gather ideas and to generate the best possible template for the group and the business community it serves. The sustainability template also considers the group's initial goals, focus and resources.

RESULTS

Defining Sustainable Business Practices

Sustainable development has gained more public attention over the past few years from increased media coverage and an expanding number of federal, state and local governmental policies designed to encourage its growth (Berns, et al., 2009). Despite this attention, there has been much debate, confusion and misconception concerning the definition and implementation of sustainable business practices (Davidson, 2000; Stubbs & Cocklin, 2008). A review of the literature reveals many different applications of sustainable development that link the discipline to corporate responsibility, health, social justice, environmental stewardship, resource conservation, social values, and green construction (Potocan & Mulej, 2003; Stubbs & Cocklin, 2008). The term has been used as a reference for the process of incorporating environmental and ecological values with other important considerations such as employee well-being, profitability of an organization, and an altruistic spirit (Simola, 2007). Despite the different applications of sustainable design, a prevailing theme is the "triple bottom line" which is focused on economic, social, and ecological value (Roberts & Cohen, 2002; Potocan & Mulej, 2003; Yeganeh & Glavas, 2008; Berns, et al., 2009).

The number of U.S. companies that have made an investment in addressing environmental concerns has grown from just 34 in 1996 to 1,042 in 2000. (Fields, 2002). However, full sustainable development in many of those corporations has not been achieved (Berns, 2009). While many may want to move towards sustainability, companies have not integrated ecological and social policy as part of their operations and practices (Petrini & Pozzebon, 2009). To achieve a successful triple bottom line, a company needs to adopt a holistic approach when developing its business plan that incorporates a balance between its operations and its relationship with the planet's ecosystem services (Potocan & Mulej, 2003). In other words, sustainability must be embedded in a company's business plan as a core part of its overall mission and operational functioning (Roberts & Cohen, 2002). The business plan should adopt a holistic outlook for implementing procedures and systems that will ensure profitability and protect ecological services (Potocan & Mulej, 2003). Such an approach should also be applied to evaluating and measuring the success of those procedures and systems (Kanji, 2005).

Several models, such as ISO 14000 and Environmental Management Systems (EMS), exist for a company to use as a guide, when developing its business plan (Davidson, 2000; Potocan & Mulej, 2003; Steurer, et al., 2005; Knowles & Espinosa, 2009). However, a business that wants to truly move towards sustainability should be cautioned not to rely only on these models (Ibid). While they provide a useful tool for gaining environmental compliance with governmental regulations, they are not holistic enough to achieve real and measured sustainable design (Ibid). These models do not account for the stress that companies have placed on environmental systems (Onisto, 1999). Mere compliance with governmental regulations does not always mean that the planet's ecosystem services are adequately being protected (Ibid). An additional danger of only relying on these management systems is that they may forestall business leaders from implementing additional procedures that may move them closer to sustainability because they may think that their compliance with government regulations is enough (Ibid). For example, ISO 14000 provides a structure for implementing procedures that address local and perhaps regional environmental concerns, but it does not consider the ecosystems of the entire planet and the global implications that a company's operations has on those systems (Potocan & Mulej, 2003). Another weakness in contemporary environmental compliance/modeling systems is that many companies apply a top-down approach and do not integrate their employees and staff in the process of implementing environmental controls

(Knowles & Espinosa, 2009). The end-result is an inherently weak plan because the company fails to take advantage of its own institutional knowledge and seek answers from the very people who are performing the daily operations and who may have innovative ways of improving the company's ecological performance (Ibid). Companies can build a culture of sustainability by engaging its employees when developing and implementing sustainable design within the organization (Michaelis, 2003). An inclusive approach to implementing sustainable design that includes employee participation will result in a motivated team that embraces the operational changes that will reduce the company's impact on the natural environment (Ibid).

Companies moving towards sustainability are those that build the ecological value of their businesses by considering environmental issues and resource productivity when designing and implementing improvements to their operations (Porter & Van der Linde, 1995). Companies can increase their ecological value by using natural processes to achieve a production system that is free of pollution (Ottman, 1999). Building system efficiencies that mimic and incorporate natural processes in material and energy flows will help to preserve precious ecological services (Ibid). It is an efficient system that uses what would have been originally regarded as waste or pollution as energy or material for additional production purposes (Ibid). Not only will applying sustainable measures increase the ecological value of a company, many initiatives will also enhance its economic performance. By adopting a flexible and holistic approach to problem solving and integrating sustainable design, companies will add value to their core business functions (Roberts & Cohen, 2002). However, there is fear and speculation that adopting sustainable practices will limit economic growth (Ibid).

The economic implications on a company's bottom-line by incorporating sustainable design should not be overlooked. As companies of all sizes seek to be better environmental stewards, they still must ensure that they stay in business by maximizing profits and for the larger enterprises increase in shareholder value (Stubbs & Cocklin, 2008). Businesses are more apt to invest in green technology if they are going to get something in return (Lovins, et al. 2007). While the initial products that labeled themselves "green" were not affordable and achieving any return on the investment was remote, those that are being marketed today reduce operational costs (Peattie, 1999; Lovins, et al. 2007). As effective green products continue to grow in number, companies will have more ways to increase their profits (Lovins, et al. 2007). The new green products are effective at reducing the use of the planet's ecological services

(Peattie, 1999). For example, companies can reap large savings in energy costs by installing highly efficient motors, energy saving lighting, and better insulated windows all of which enable the business to use less electricity (Lovins, et al., 2007). Lovins, et al. (2007) estimated that if all residential and commercial electricity customers implemented effective energy efficiency into their homes and operations, the nation's electric use could be halved at a savings of \$220 billion.

Case Studies of Established Sustainability Programs

Businesses Who are Working Towards Sustainability

The following case studies will provide examples of companies who have implemented changes to their operations to become more sustainable organizations. Larger companies have been able to establish “new, higher-value markets for environmentally friendly goods such as organic foods and home cleaning products” (Michaelis, 2003). Some have taken this a step further, “such as the Body Shop and Ben & Jerry’s who have developed a brand image that is linked to strong corporate ethics” (Ibid). The following will illustrate the measures that companies implemented to conserve water and energy, and reduce pollution and waste from their operations. While the measures have not created fully sustainable organizations, they are examples of what companies are doing to preserve our planet’s ecological services.

Interface

Carpet and flooring manufacturers are notorious for having a large ecological footprint because of the energy and water used doing manufacturing, the waste generated during production and installation of new carpets, and the pollutants and toxins used during the manufacturing process (Lovins, et al., 2007; Rothenberg, 2007; Stubbs & Cocklin, 2008). Billions of pounds of old flooring are sent to landfills each year by companies who typically replace carpets and flooring on a ten year cycle (Lovins, et al., 2007). One would think that such a company may find it difficult to move towards sustainability. However, one such company has already moved in this direction. Interface, a global carpet company based out Atlanta, Georgia, has adopted sustainable practices after examining the entire life cycle of its product and its operational effect on the natural environment (Rothenberg, 2007; Stubbs & Cocklin, 2008). The sustainability platform that Interface adopted includes seven elements that enable the company to become a better environmental steward (Ibid). In recognition of the work and resources that the company invested to develop its sustainability model, Interface aptly entitled its platform, “The

Seven Fronts of Mount Sustainability” (See, Table 1, for a list of the elements included in Interface’s sustainability platform) (Interface, Website).

Table 1. Interface’s Sustainability Platform

“The Seven Fronts of Mount Sustainability”
Eliminate waste from operations, not simply reduce it
Eliminate emissions and waste streams that have an adverse effect on natural systems
Implementing energy efficiency and use of renewable energy
Closing the production loop by using natural and recovered/recycled materials
Resource-efficient transportation and packaging
Building a community of stakeholders who understand the importance of adopting sustainability
Redesign the market by servicizing its products rather than selling them

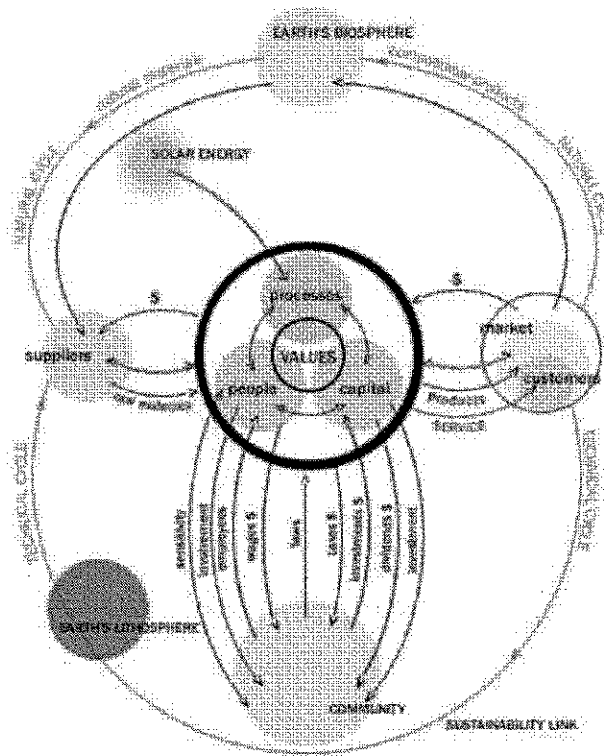
(Interface, Website; Stubbs & Cocklin, 2008)

Since 1995, Interface eliminated 50% of its waste costs at a cumulative savings of \$372 million (Interface, Website). A way that Interface achieved significant waste reductions was by redesigning the way its products were marketed (Stubbs & Cocklin, 2008). Instead of selling disposable materials, Interface offers a servicizing contract which provides the services their products deliver rather than product itself (Rothenberg, 2007). For a monthly fee, the servicizing contract provides a floor-covering service which includes the installation of an Interface product, the maintenance of the floor, and replaces worn or damaged flooring material (Lovins, et al., 2007). Interface also redesigned its product and offers them in carpet and flooring tiles which reduces waste because the tiles can be removed to replace only the worn or damaged areas of the floor (Ibid). The company realized replacing only the worn parts results in an 80% reduction of carpeting and flooring material because typically only 20% of the floor needs to be replaced from excessive wear (Ibid). At the end of the entire life cycle use of the flooring, Interface removes its produce for recycling and reuse in future products. Interface’s customers add to the sustainability of their operations by choosing a product manufactured in a sustainable company and for less money than buying the product.

Interface’s efficient use of energy and its commitment to the use of renewable energy is a way the company is moving towards a zero carbon emissions (Interface, Website). Renewable

energy accounts for over a quarter of the company’s energy source and seven of the company’s facilities operate on 100% renewable energy (Ibid). Interface’s new Shanghai facility provides a good example of the way the company used innovated design and techniques to reduce the energy needed for its operations (Lovins, et al., 2007). Interface reduced the amount of energy needed to circulate a liquid through a pumping loop by using bigger pipes that were straight and shorter than the smaller pipes conventionally used (Ibid). The bigger pipes reduced the amount of friction which meant that 92% less energy was needed to pump the liquid (Ibid). The result was the need for a seven horse power motor as opposed to a 95 horse power one (Ibid). As an additional bonus, Interface saved money because the combination of purchasing bigger pipes and a smaller motor was less expensive than buying smaller pipes and a larger motor (Ibid).

Figure 1. “The Next Industrial Revolution: Model for the Prototypical Company of the 21st Century”



(Interface, Website).

Interface is an example of a company that is evolving towards being a model of sustainable operations (See, Figure 1, Interface founder and Chairman Ray Anderson’s “Model for the Prototypical Company of the 21st Century.”) (Interface, Website). However, the path to

sustainability did not happen overnight. Interface began with an environmental approach in 1994 and then six years later included social sustainability to its emerging platform (Stubbs & Cocklin, 2008). The company's seven point platform addresses the problems associated with the traditional industrial approach of taking the planet's ecological services for granted (Speth, 2008). The driving force behind Interface's sustainability platform is the use of nature's fundamental principles that support the planet's ecological services (Interface, Website). The natural world provides many examples of materials that nature manufactures through an ordered hierarchy of biological process (Benyus, 1997). This efficient processes relies on sunlight, recycles material through the entire system, and supports cooperation within the various ecological systems (Interface, Website). As more companies strive to incorporate sustainability into their operations, the adverse impact of traditional business operations on the planet's ecological services will be greatly reduced (Speth, 2008).

Sierra Nevada Brewing Company

Sierra Nevada Brewing Company is a business that has strived to live by its founding principles of making exceptional ales and lagers while keeping in mind its ecological footprint (Sierra Nevada, Website). In 1979, Sierra Nevada began as a small brewery in the town of Chico, California using recycled beer equipment for its brewing operations (Herrera, 2008). Since its foundation, the brewery has grown into a successful company that has adopted additional sustainable practices across its manufacturing and transportation processes (Peltier, 2006). Sierra Nevada has implemented programs that conserve water, reduce its carbon emissions and reduce waste through its expansive recycling and reuse program (Sierra Nevada, Website).

Sierra Nevada conserves and protects water in two ways. First, the company has decreased its water consumption to about half of what breweries its size typically use (Sierra Nevada, Website). In addition, the company built a wastewater treatment plant because its production of wastewater increased as the brewery grew in size (Sierra Nevada, Website; Peltier, 2006; Herrera, 2008). The company was face with rising costs because the increase in wastewater resulted in the need to purchase additional wastewater discharge permits (Herrera, 2008). Rather than spend the money on buying more permits, Sierra Nevada decided to invest in both its company and the natural environment (Ibid). To do so, the brewery built its own onsite wastewater treatment plant (Peltier, 2006). Sierra Nevada deigned the treatment plant to purify

all the company's wastewater which is about 100,000 gallons of per day (Sierra Nevada; Website; Peltier, 2006; Herrera, 2008). Over time, the cost to build the wastewater treatment plant was eventually recovered by saving money from not having to purchase any wastewater discharge permits which now has become an annual cost saving item in its capital portfolio (Herrera, 2008).

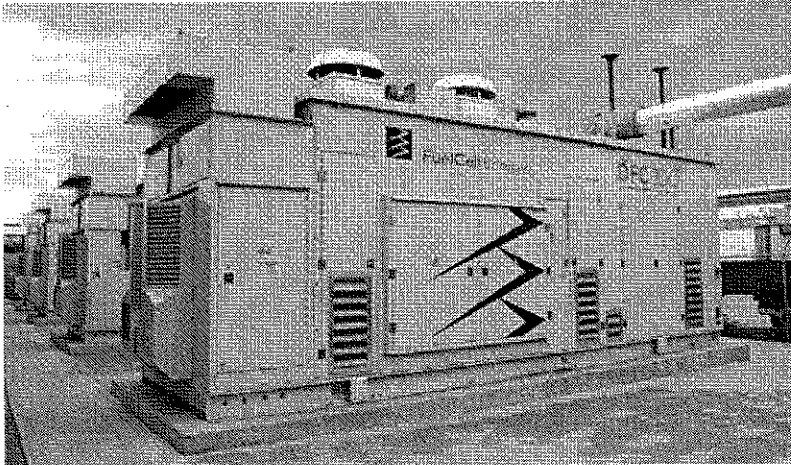
Sierra Nevada has taken extensive efforts to reduce its carbon footprint and has a plan of one day producing 100% of its own sustainable energy (Sierra Nevada, Website). To handle 80% of its energy requirements, the company has installed solar cells and fuel cells. (Herrera, 2008). See figure 2 for a picture of Sierra Nevada's solar energy structure and Figure 3 for a picture of one of its fuel cells. To make its energy production more effective, Sierra Nevada has reduced the amount of energy it consumes by installing energy efficient refrigeration, electronic ballast lights with motion sensors, highly effective air compressors with speed controls, and highly-efficient motors (Sierra Nevada, Website). The plant's energy efficiency programs are so effective that Sierra Nevada has decreased its overall energy use through investment in innovative technologies and operational procedures (Peltier, 2006). For example, Sierra Nevada has built an extensive vapor condenser and heat recovery system that recovers waste steam flow and other heat generated from its operations which is then recycled back to the plant for reuse (Sierra Nevada, Website).

Figure 2. Solar Structure at Sierra Nevada Brewing Co.



(Sierra Nevada, Website)

Figure 3. A Fuel Cell at Sierra Nevada Brewing Co.



(Sierra Nevada, Website)

Sierra Nevada is moving towards becoming a company with zero waste and emissions. To make this possible, the company diverts about 31,000 tons of material from landfills each year. (Herrera, 2008). Sierra Nevada recycles non-organic materials such as glass bottles, cans, shrink wrap and cardboard and reuses organic materials such as spent grains, hops and yeast for animal feed (Ibid). The company recovers its operational wasted carbon dioxide that is reused to provide all the gas that it needs for the bottling process (Sierra Nevada, Website). In addition, waste methane, a byproduct of wastewater treatment, is used to fuel Sierra Nevada's four 250 kilowatt fuel cells (Peltier, 2006). Sierra Nevada has reaped the benefits of its corporate ethic of strong environmental stewardship, in time other companies may follow in the brewer's footsteps and implement sustainable practices of their own.

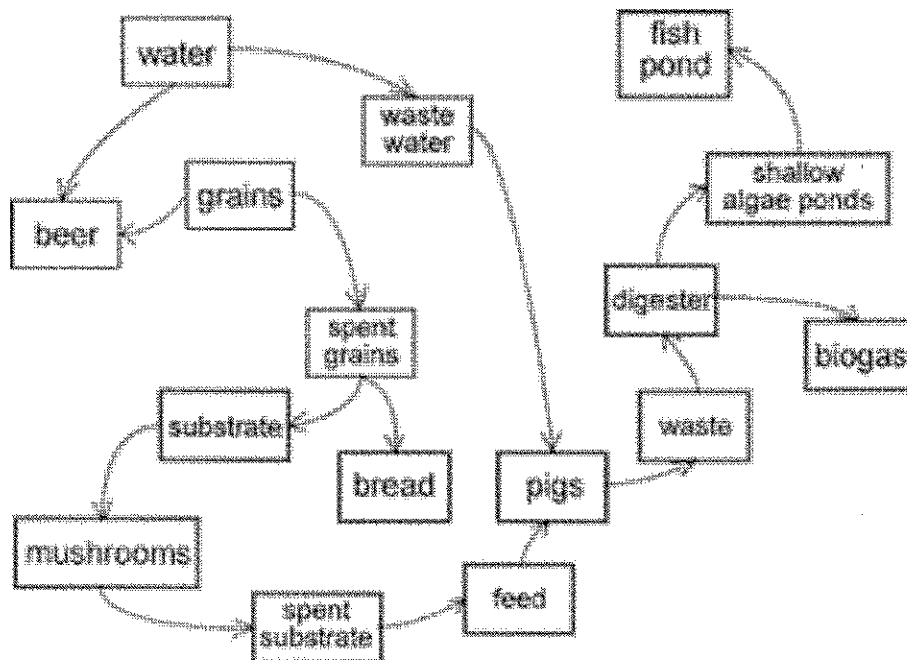
Zero Emissions Breweries

A way to achieve sustainable operations with zero emissions is through industrial clustering. An example of industrial clustering is found in Fiji, Tanzania and Namibia where three breweries brew beer with a zero-emissions concept (Pauli, 2007). These breweries were designed by Gunter Pauli, a social entrepreneur who created the Zero Emissions Research Initiative (Treehugger.com, Website). The concept of the zero emissions research is to redesign the manufacturing processes of the Industrial Revolution into processes that do not pollute and ensures that nothing is wasted (Pauli, 2007). Industrial clustering is a holistic approach to producing goods. It is based on the principle that manufacturing should be based on natural systems where nothing is wasted (Treehugger.com). The environmental benefit of industrial

clustering is that it conserves natural resources and eliminates waste and pollution from the production stream (Pauli, 2007).

Pauli’s breweries holistically manufacture beer by eliminated all waste and emissions from the production stream. The breweries reuse the solid waste that is produced from the spent grains which consist of 70 percent fiber and 20 percent protein (Pauli, 2007). Instead of discarding the spent grains as waste, the breweries use the fiber to grow mushrooms and the protein to cultivate earthworms (Ibid). The mushrooms are used for food and the earthworms are used to feed chickens which are raised next to the breweries (Treehugger.com). A byproduct of mushroom production are carbohydrates which are used to feed the cows raised next to the breweries, providing them with a healthier diet (Pauli, 2007). The feed stock is high quality containing 45 percent carbohydrates as opposed to the feedstock cattle consume in other nations, like the U.S., which contains two percent carbohydrates (Ibid). When fed with food that is more aligned with their digestive system, cows and chickens are healthier and produce less methane (Ibid). The methane that is produced by these animals is collected into a digester and used as energy to fuel the brewery process (Ibid). Finally, byproduct, called slurry, that is produced from the digester is used to grow floating gardens on ponds that breed seven different kinds of fish (Ibid). See Figure 4 for a diagram that explains the system flow of Pauli’s efficient breweries.

Figure 4. System Flow of Zero Emissions Breweries



(Treehugger.com, Website).

Seiko Epson Corporation

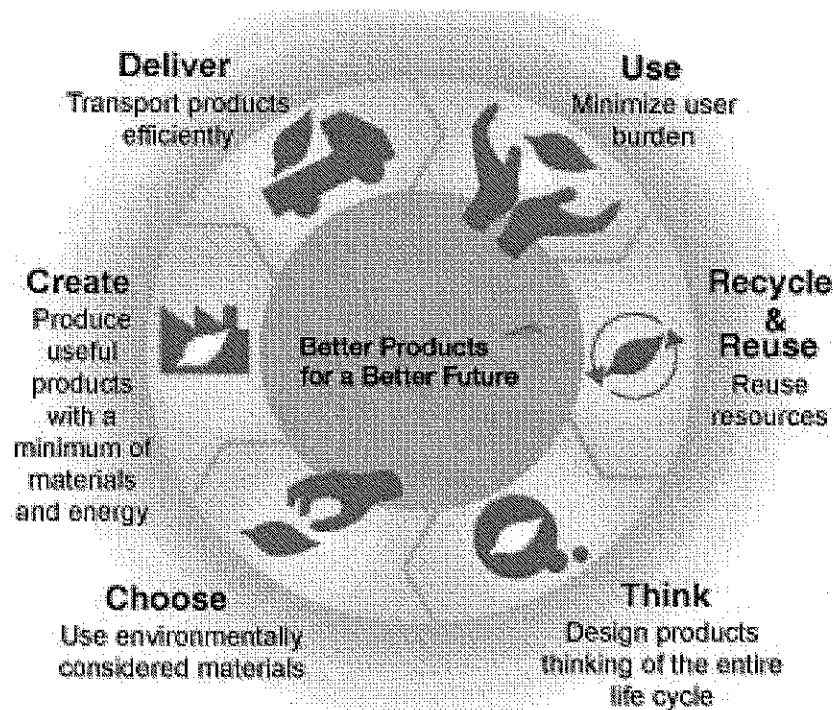
Seiko Epson Corporation, is a global manufacturer and retailer of computer and electronic equipment, semiconductors, watches, factory automation equipment, and other products (Diener, 2006). It is a large Japanese corporation with 106 companies of which 26 are in Japan and the 80 remaining are located around the globe (Seiko Epson Corporation, Website). It is a company that takes its environmental responsibility seriously and was the among the first to help protect the ozone layer by eliminating the use of chlorofluorocarbons (CFCs) from its operations (Diener, 2006). In 2009, Epson published a copy of its sustainability plan which outlines the ways it currently addresses environmental and social concerns (Seiko Epson Corporation, 2009). The environmental component of the plan reduces its operational impact on the planet's ecological services⁵ (Ibid). To accomplish this task, Epson has implemented several measures to harmonize its relationship with the environment (Seiko Epson Corporation, Website). These measures have focused on the overall reduction of its ecological footprint by implementing programs that better address the entire lifecycle of its products (Ibid). Some of these measures include considering the environmental when choosing product materials; manufacturing and delivering the products efficiently; product use and end of life use (Ibid). See Figure 5 for a model of Epson's approach to its product's lifecycle.

Epson has reduced the carbon footprint of its products by not only becoming more energy efficient during its own operations, but also by developing products that consume less electricity when they are in use (Diener, 2006). In 2008, Epson announced its new program called "Environmental Vision 2050" which is aimed at reducing its carbon footprint by 90% across the entire life cycle of its products by the year 2050 (Seiko Epson Corporation, Website). The vision also plans to eliminate its emissions of other greenhouse gases as well (Ibid). Already, Epson has been able to reduce its company greenhouse gas emissions from an estimated high of 1.11 million tons of carbon dioxide emitted in 2003 to 0.80 million tons of carbon dioxide emitted in 2008 (Seiko Epson Corporation, 2009). Epson accomplished its over 25% reduction of carbon dioxide by implementing over 1,000 separate measures to reduce these emissions (Seiko Epson

⁵ Vincent Leung, manager of the legal and environmental planning department, stated " Environmental management of an enterprise is to harmonize its activities, products and services with the environment, with sustainable development as the ultimate goal. Any organization should view this as a long-term effort, involving all the employees, with achievement based on facts and figures and not mere promises. We should all contribute to relieving Mother Earth's burden and to benefit [humanity] for generations to come."

Corporation, Website). For example, it has implemented simple energy efficiency programs such as turning off lights not in use and setting its air conditioners to the appropriate settings and more elaborate measures relating to its manufacturing processes which includes more efficient automation and downsizing production machines (Diener, 2006; Seiko Epson Corporation, Website). In addition, the company has increased the use of renewable energy sources (Seiko Epson Corporation, Website).

Figure 5. Seiko Epson's Environmental Product Development Lifecycle



(Seiko Epson Corporation, Website)

Epson has reduced the amount of toxins that it uses during the development stage and overall waste by implementing a corporate goal of zero emissions and waste (Diener, 2006). The Corporation has a focus of designing environmentally greener products by reducing the chemical and heavy metals that are used during the manufacturing stage (Seiko Epson Corporation, 2009). For example, Epson has eliminated the use of lead in its soldering processes which means that 12 tons of this heavy metal is no longer mined each year (Diener, 2006). In addition, the company has implementing a system that recovers its own products at their end of their use stage for recycling back into new products (Ibid). Epson has improved its resource recycling efforts by designing operational plans that address specific local issues in each of the five major regions where it operates; Japan, Europe, Americas, Asia and China (Seiko Epson Corporation, 2009).

To date its efforts have been successful as it has collected 12,540 tons of finished products and 4,070 metric tons of ink and toner cartridges in 2008 (Seiko Epson Corporation, Website).

To fully implement its environmental sustainability programs into its operations, Epson adopted a holistic approach to its employee training programs. Epson implemented employee education and incentive programs focused on simple tasks such as turning off lights and computers, and printing on both sides of paper. (Diener, 2006). Epson improved employee ownership in its corporate plans by rewarding employees whose environmental suggestions are implemented into its operations (Ibid). For example, Epson's product and toner recycling program was the result of an employee who thought the idea would have a positive environmental result (Ibid). As discussed, the result of this employee idea has brought overwhelming success (Diener, 2006; Seiko Epson Corporation, Website). Epson's inclusive approach to employee development enabled it to build a culture of sustainability in its corporation (Michaelis, 2003; Diener, 2006).

The preceding focus on the sustainable practices that larger firms have implemented should not be seen as a deterrent to smaller companies who feel that they may not have the resources to become more sustainable. Rather, the opposite is true. Smaller companies have the advantage of looking to the larger firms and seeing what worked and what did not work. The small business owner then can incorporate sustainable business models that make sense for their organizations. In addition, as outlined in the next section, small and mid-sized business owners can now turn to a growing number of government sponsored programs and NGOs that teach companies how to become more sustainable.

Organizations who are Teaching Sustainable Business Practices

Companies who wish to become more ecologically conscious have struggled with the implementation of sustainable principles into their organizations. (Berns, et al., 2009). Some companies are confused over how sustainability can be implemented to improve their enterprises. (Roberts & Cohen, 2002; Berns, et al., 2009). This confusion is not new. The implementation of successful and profitable environmental programs have not always been successful (Perron, Rayond, & Duffy, 2006). While confusion may persist many board rooms, members of the business community are increasingly becoming aware of the fact that they have to be versed in a growing set of complex parameters relating to environmental, social and ethical issues (Martin, 2005). A big hurdle in getting businesses to adopt stronger environmental

policies is shaping the mindset that adopting such standards are actually beneficial (Nidumolu, et al., 2009). There are a growing number of companies who wish to become more sustainable but lack the understanding of how sustainable development will not only meet, but surpass governmental regulations (Roberts & Cohen, 2002). Without a full appreciation of how sustainable development can help their business grow, it thus becomes tempting for companies “to adhere to the lowest environmental standards for as long as possible” because such compliance may seem easier and cheaper (Nidumolu, et al., 2009).

A key component typically missing in green business programs is an environmental education program that gives employees the necessary information “to conduct themselves in an environmentally aware manner and make environmentally responsible decisions in the organization” (Perron, Rayond, & Duffy, 2006). Unfortunately, many corporations lack mission statements that ties sustainable development as an essential part of its business practices (Roberts & Cohen, 2002). To address the pressing need for business environmental education and awareness, government and NGOs have developed programs to provide businesses this valuable information. The following is an analysis of three programs, EPA’s Energy Star Partnership Program, EarthWays Center, Inc., and the San Francisco Green Business Program.

EPA’s Energy Star Partnership Program

Energy Star is a voluntary EPA program that was introduced in 1992 with an aim at reducing greenhouse gas emissions (EPA, Website). It started as a labeling program designed to identify and promote energy efficient products. In the program’s first year, the EPA designated computers and monitors as the only products that could earn the Energy Star label. Since its inception, the EPA expanded this program and by the end of 2007 over 2,000 manufactures were using the Energy Star label on over 40,000 different consumer and business related products⁶ (Ibid). According to the EPA, Energy Star labeled products have reduced greenhouse gas emissions because they require less electricity to operate them. In 2007, Energy Star products saved an estimated 87.8 billion kilowatt hours of electricity and avoided 17.6 million metric tons

⁶ While the Energy Start program has had its share of success, a recent report by the U.S. Government Accountability Office (GAO) cautioned that because it is largely a self-reporting program, Energy Star is vulnerable to fraud and abuse (GAO Report, 2010). During a recent GAO investigation, the governmental agency was able to obtain Energy Star certifications on 15 fake products and was able to successfully market these products based on the bogus Energy Star certification (Ibid). The gravitas of the problem is the fact that Energy Star does not verify the energy-savings that manufacturers report and relies on the integrity of the companies submitting these reports (Ibid).

of carbon equivalent (MMTCE) from being released into the atmosphere which equals emissions from 11.7 million vehicles (Ibid).

Figure 6. Energy Star Label



(EPA, Website)

Energy Star is no longer a narrowly focused program concerning only manufacturers and labeling energy efficient products. By the end of 1999, the EPA had expanded Energy Star to cover commercial and industrial buildings, and new homes (EPA, Website). Businesses and other organizations that want to reduce energy costs and are committed to protecting the environment by improving energy performance can become members in the EPA Energy Star Partnership Program. As of March 2010, the EPA listed over 3,800 entities who partnered with it to improve the energy efficiency of their facilities (EPA, 2009). The results of these partnerships are effective because they reduced energy costs and greenhouse gas emissions. The EPA estimated that partnership participation in 2007 saved an estimated 92.4 billion kilowatt hours of electricity and saved Energy Star Partners \$7.6 billion in energy costs (EPA, Website). In addition, the partners avoided 24.3 MMTCE from being released into the atmosphere which is equaled to emissions from 16.1 million vehicles (Ibid).

The key to operating a successful Energy Star Program as well as a requirement for partnership is developing and implementing an energy efficiency plan that will achieve energy savings and complies with Energy Star Management Guidelines (EPA, Website). The plan will establish a dedicated energy team who will execute the energy management plan throughout organization and will ensure that the program's goals are achieved. In addition, the plan will identify an Energy Director who will manage the overall energy program and lead the energy management team (Ibid). The director does not have to be an expert in energy, rather he or she needs to understand how energy management will result in the organization achieving its

financial and environmental goals (Ibid). The Energy Director will also develop an energy policy that will state the program's objectives, provide for accountability and program administration, ensure continuous improvement, and promote the plan's goals (Ibid).

The energy plan is fluid document that will be regularly updated, perhaps on an annual basis, to reflect a company's achievements, updated goals and performance measures, and enhanced energy efficient systems (EPA, Website). The initial plan will address the organization's initial energy use, and will create performance targets and timelines to reach those targets. The plan will also dictate the steps that the organization will take to reach its goals. Subsequent plans will reflect the company's current status based upon the goals that it achieved and those that it missed, and will provide the framework for continued energy efficiency (Ibid). The energy plan will also measure and track the energy performance of a company's facilities. This will be accomplished by collecting the data from the organization's utility bills. Additional steps may include accounting and documenting each energy source such as electricity, gas, oil and any others that are used. EPA guidelines also suggest using a Portfolio Manager as a way to track energy performance. The Portfolio Manager will also "set investment priorities, verify efficiency improvements, and receive EPA recognition for superior energy performance" (Ibid).

The Energy Star Partnership Program provides a method that businesses can use to reduce their carbon footprint. While it is a good step for companies to take to help reduce greenhouse gas emissions, it is a self-certification program and relies on the integrity of the companies submitting their reports (GAO Report, 2010). In addition, the Energy Star Partnership Program does not address issues with water conservation and reducing waste toxins and pollution. The following examples will provide summaries of programs that address the entire impact of a company's operations.

EarthWays Center, Inc.

EarthWays Center in St. Louis, Missouri started as a project that involved the renovation of an 1885 Victorian house. The residence was abandoned in 1979 by its prior owners and soon fell into disrepair (Missouri Botanical Garden, Website). EarthWays saw the abandoned home as the perfect site "to showcase practical demonstrations in building design, resource efficiency and green building operations" (EarthWays Center, Website). By taking an existing structure that was badly in need of repair, EarthWays wanted to show that any building could be renovated to become a more sustainable structure. After acquiring the structure in 1992, EarthWays began its

renovation project. Supporters contributed \$500,000 in donated materials and labor to finance the renovations (Missouri Botanical Garden, Website). In 1994, renovations were complete and EarthWays Home was opened for tours. See figure 7 for a picture of the EarthWays Center.

Figure 7. EarthWays Center Showing its Solar Cells



(EarthWays Center, Website)

Recognizing the importance of conserving energy, EarthWays incorporated several energy efficiency features into its design. The most efficient, cost-effective way to reduce the amount of energy that a building consumes is to reduce the amount of energy needed (Karolidis, 2002). Energy reduction is one way to decrease a structure's carbon footprint by reducing the fossil fuel used to generate electricity and heat. Another way is to view the existing building "as an opportunity to produce sustainable energy, a chance to reduce the community's carbon footprint and to reduce our collective dependence on fossil fuels" (Beatley, 2000, p. 287). EarthWays accomplished this endeavor by utilizing a photovoltaic (solar panel) array to power high-efficiency exterior lighting and Energy Star labeled kitchen appliances (Missouri Botanical Garden, Website). In addition, it takes advantage of the earth's energy by utilizing "a ground-source (or geothermal) heating and cooling system which uses the earth's constant sub-surface temperatures, instead of ambient air, to maintain indoor comfort" (Ibid). EarthWays installed water-saving fixtures such as a simple faucet aerator which reduces its water use by 50%. (Missouri Botanical Garden, Website). In addition, the home reduced storm-water runoff by placing a rain barrel under a downspout. A green roof is another measure the Center employs to control storm-water runoff. "Green roofs are idea for urban storm-water management because they make use of existing roof space and prevent runoff" (Oberndorfer, et al., 2007). Green roofs also provide a cooling effect during warmer weather because they reduce the amount of heat

transferred through the roof (Ibid). EarthWays Center also used recycled and natural materials during the renovation.

EarthWays Center contributes to the sustainability of St. Louis by not just being a green building, but also by being a place where one can learn more about the environment and how to live a sustainable lifestyle. The Center stands as an example of what business and homeowners can do to make their workplaces and residences more sustainable. These classes address “energy efficiency, reduce-reuse-recycle, green cleaning, environmentally preferable purchasing, avoiding ‘greenwashing,’ and effectively marketing green practices” (EarthWays Website). EarthWays Center is a place that accomplishes many important goals. Its green design stands as a working model to teach others how to incorporate sustainable design practices in their own facilities and homes. In addition, the Center provides educational opportunities for the community to teach them how to live a more sustainable lifestyle. However, the Center is not specifically dedicated to the greening of the business community. The following will address a program that is specifically geared towards building a more environmentally focused business community.

San Francisco Green Business Program

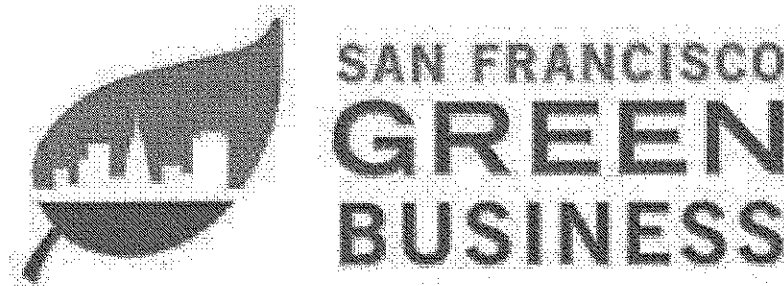
The San Francisco Program (SFGB) provides educational assistance to business interested in becoming more sustainable and by “setting stringent criteria” for participating businesses to follow (SFGB Website). SFGB is “made up of three city agencies: SF Environment, San Francisco Department of Public Health, and San Francisco Public Utilities Commission” (SFGB Website). Currently, SFGB certification includes hotels, restaurants, offices, retailers, and dentists (SFGB Website). See Appendix 1 for a copy of SFGB’s Green Business Template for retailers. SFGB is in the process of adding the following five business sectors: printers, commercial buildings, auto repair shops, janitorial services and garment cleaners. Businesses in eligible sectors⁷ interested in obtaining the certification can submit a request for an application form to the program’s administrator.

To be a participating member of the SFGB Program, a business must first be in compliance with existing environmental regulations and adhere to the SFGB program standards. SFGB standards ensure that businesses adopt measures that will reduce the effect their

⁷ Businesses that do not operate in one of the eligible sectors can still submit their application form and be added to the SFGB’s waiting list.

organizations have on the natural environment. The standards are benchmarks that business can reach and prevent “green washing.” The program standards were developed by the SFGB staff with advice from a number of different stakeholders including “industry experts, utility companies, pollution prevention professionals, city inspectors and trade associations” (SFGB Website). The standards were further revised to address local law and policy, and to consider the environmental resources available to the San Francisco business community⁸ (Ibid). The standards are separated in four general areas: toxics and pollution prevention, recycling and waste reduction, water conservation, and energy conservation.

Figure 8. San Francisco Green Business Program Seal



(SFGB Website)

SFGB publishes its standards on its website in separate sector specific guidelines that are arranged in an easy to follow checklist. They are essentially comprehensive outlines and are tailored for individual sector needs. These guidelines are easy to understand and because they are available to anyone via SFGB’s website they are also a good source of information for any business that wants to become more sustainable. Sector specific guidelines are a key to the SFGB Program’s success because they target individual needs and allow businesses to focus on what is important to their operational requirements. For example, a retailer does not have the same environmental concerns as a dentist or a hotel. While individually tailored, there are overlapping measures that all business must adopt. Some of these overlapping measures include installing energy-efficient lighting, implementing wastewater measures, and using environmental friendly purchasing.

The SFGB guidelines incorporate the key components of environmental sustainability in the following format: Waste Reduction, Energy Conservation, Water Conservation, Pollution Prevention, and General/Staff Education. Each provide mandatory measures that individual

⁸ Prior to adopting a new business sector, SFGB holds public participation workshops to get advice on standards and to stakeholder ideas.

businesses must implement and additional measures that give businesses a choice of picking the ones that best fit their operational needs. For example, SFGB has strong water conservation measures because it recognizes the importance of efficiently using water (Friend & Coutts, 2006). The water conservation measures for Office/Retail Businesses require business owners/managers to take weekly meter reads, check for leaks every six months, document repairs and system upgrades, replace tanks and urinals that were installed prior to the early-1990's, install low flow aerators or flow reducing valves, and post signs in kitchens and restrooms that encourage water conservation. In addition, owners/managers must choose two additional measures which could include reducing water pressure, installing self-closing faucets, modifying irrigation systems, or planting drought tolerant plants and ground cover.

While stringent, the program's standards have been successful in reducing the environmental impact of the business community. To quantify its success, SFGB undertook a measurement project with the Presidio School of Management's Green MBA Program in 2007. The Presidio project measured the effectiveness of five business in the SFGB program. Building on that study, SFGB "completed surveys with twenty additional businesses to quantify their environmental savings" (SFGB Website). Combined, the twenty-five San Francisco Green Businesses annually reduced their electricity by over 2.4 million kWh, decreased water usage by over 9.7 million gallons, stopped using over 116 hazardous materials, reduced greenhouse gas emissions by 382 tons and recycled over 700 pounds of paper per week (Ibid). SFGB will continue to monitor the effectiveness of its program. In 2009, it will obtain environmental recognition data from all recognized businesses (Ibid).

To garner participation in its program, SFGB recognized that incentives would be a key factor. Implementation of SFGB Program standards may be difficult for many businesses to achieve and may require an initial investment. A big hurdle in getting businesses to adopt stronger environmental policies is shaping the mindset that adopting such standards are beneficial (Nidumolu, et al., 2009). It is tempting for businesses "to adhere to the lowest environmental standards for as long as possible" because such compliance is easier and cheaper (Ibid). To make the program attractive to businesses, SFGB advertises that the program participation results in savings relating to reduced energy, water and wastes costs (SFGB Website). The focus on saving money provides a sound rationale for businesses seeking to reduce operational costs. Businesses are more apt to invest in green technology if they are going to get

something in return (Lovins, et al., 2007). In addition, SFGB cites that Green Businesses reported a 42% increase in revenue from environmentally conscience customers (SFGB Website). Green Businesses receive the benefit of being recognized as environmental leaders in the San Francisco community. They are able to place the SFGB seal on their windows and enjoy free adverting by being promoted on SFGB's website, in SFGB newsletters, in the press and at promotional events (Ibid).

After submitting its initial application⁹ and submitting the guidelines detailing the program standards, the applying business will then have a phone consultation. The consultation is about an hour long and covers the completed checklist and provides "provide guidance on measures that still need to be implemented" (SFGB Website). After the consultation, a revised checklist with a list of action items is sent to the applying business. The action items are to be complete before the initial site visit which is a complete walk-through that will identify specific areas that may need improvement (Ibid). After the initial site visit, SFGB prepares a report highlighting the areas that need additional attention and will then schedule subsequent technical visits. The technical visits are educational opportunities and ensure that standards are being met and provide educational instruction on how the business can fully implement program standards. Once in full compliance, the SFGB recognition is awarded and the business has the responsibility of maintaining its standards. The recognition last for three years after which the business must submit a new checklist and meet the latest program standards.

SFGB operates with one full-time employee and five additional part-time staff members who are from other government agencies and are able to devote 20% of their time to SFGB operations. Natalie Hubbard, SFGB's Green Business Associate, is the organization's only full-time employee. During a phone interview, Hubbard stated that she handles the day-to-day operations, enrollment and performs site audits. The additional staff members are from other governmental agencies (Water Department, Waste Management, Energy, Department of Toxic Substances, etc.) and perform the technical site visits and offer educational assistance to guide businesses through the process of implementing the standards. Hubbard explained that SFGB is funded through government grants and receives some revenue from waste collection fees and other city taxes (Interview, Hubbard). The limited staff and budget hinders the overall reaching

⁹ There is no current application fee, but SFGB is considering introducing one to cover costs of the operation due limited staff and overwhelming interest.

effectiveness of the program. With more resources, the program would be able to render more assistance to applying businesses. However, despite limited resources, the program does a good job at providing educational opportunities for the entire business community. SFGB provides workshops in a variety of areas including Free Green Cleaning Training for Custodial Staff, Fundamental of Green Cafe Operations, and an Webinar for Creating an Eco-Friendly Workplace. Also, SFGB provides assistance in the form sample letters for businesses who want to apply for the program but rent their office space from an outside entity.

The SFGB Program provides an excellent avenue for businesses to become more sustainable. It enhances the overall sustainability of San Francisco by providing standards that conserves resources and reduces pollution and waste. A drawback of the program is related to the lack of funding that it receives and the limited staff. However, despite limited resources, the program provides educational opportunities and is an excellent resource for businesses. SFGB is improving the scope of its program by including additional business sectors and continues to include education programs on its monthly calendar. In the future, the program's success will not only be measured in environmental indicators and the number of participating businesses, but also in the extensive reach of the program as more cities across the nation implement similar programs of their own.

Building a Sustainable Business Community

Sustainable Cherry Hill Green Business Task Force: Sustainability Template

The focus of the Green Business Task Force (GBTF) of Sustainable Cherry Hill is to provide educational opportunities and resources for the South Jersey business community. The project designed a sustainability template for the group's initial green business program. GBTF decided that the initial template should be a comprehensive and easy to follow guide that would include no cost and low cost techniques that would apply to the typical small to mid-sized business in the Cherry Hill area. A large program like those found in larger companies and manufactures, such as Interface who has implemented over 400 sustainability initiatives within is seven part sustainability program, was not necessary (Stubbs & Cocklin, 2008). The initial template is an instructional guide to get businesses used to following an outline of measures to help them become more sustainable. Once the business community is used to following the outline, then pending funding a more elaborate certification program can be enacted.

The project designed the template so that each local business could address its own operational affect on the planet's ecological services. Thus, like their counterparts in San Francisco, South Jersey businesses are encouraged to conserve water, reduce their energy use, eliminate waste, and reduce toxins and pollution from their operations (Michaelis, 2003; SFGB, Website). The sustainability template is just the first step in a larger plan for Sustainable Cherry Hill. Like some programs, Sustainable Cherry Hill's initial program will be self-identifying and will rely on the integrity of the companies participating in the program to accurately report on the measures they employed to implement sustainable design. Thus, participating business will submit their completed templates and certify to Sustainable Cherry Hill that they have met the program's sustainability requirements as outlined in the sustainability templates. The required measures are listed as "No Cost" and "Low Cost" items and the optional ones are listed as "Optional Higher Cost Measures" (see Appendix 2 for a copy of the template). Because this all-volunteer group lacks the resources to fund a more involved certification program, it is unable to hire professionals who can actively certify that businesses are meeting program standards. As the program grows and funding may become available, the group may consider adopting certification program in the future. Instituting an actual certification process will alleviate the concern from businesses gaming the system by submitting inaccurate reports as was seen in the GAO's report of the Energy Star program (GAO, 2010).

GBTF intends to provide supporting and more detailed information on its website to further assist businesses with their sustainability efforts. The group will provide summaries of those organizations who have made strides to becoming more sustainable. In addition, Cherry Hill Township will use the sustainability template as part of its green business program. The township plans to video record participating businesses at the beginning, middle and end of their efforts to implement sustainable design into their operations and to use the recordings as instructional aids for others. As the awareness of sustainable design grows and consumers begin to demand products and services from businesses who operate more sustainably, more local businesses will become interested in adopting the template¹⁰ (SFGB, Website). A summary of the Sustainability Template follows.

¹⁰ Eco-conscious consumers in San Francisco seek business with the SFGB seal and a recent study in San Francisco revealed that business with this seal saw a 40% increase in customer traffic (SFGB, Website).

Water Conservation

The first component of the Sustainability Temple is a list of ways that a company can reduce its water use and limit the amount of stormwater that drains from its property. The template provides measures that will enable businesses to efficiently use water to meet their operational needs without limiting their community's ability to meet the water needs of its citizens (Friend & Coutts, 2006). Some of the measures involve simple tasks such as reviewing water bills, meter readings, using dry floor cleaning methods, repairing leaks, and encouraging employees to conserve water by posting signs in the restrooms and work areas (SFGB, Website; EarthWays Center, Website). Storm water management is achieved through rain barrels and constructing rain gardens. Future models may include additional stormwater management measures such as green roofs (EarthWays Center, Website). In addition, the template provides a method for measuring success by keeping track of water usage and savings resulting from reduced use.

Energy Reduction

The Sustainability Template provides a component to help a company reduce its carbon footprint. The template achieves this effort through the promotion of energy efficiency programs. Some of these programs are similar to those that other companies have implemented. For example, the template encourages similar practices that Sierra Nevada developed with respect to installing energy efficient refrigeration and electronic ballast lights with motion sensors, and using highly effective air compressors with speed controls and highly-efficient motors (Sierra Nevada, Website). In addition, the template encourages tasks similar to those that Epson implemented which includes turning off lights and electronic equipment when not in use, using the standby mode for copiers and printer, and setting air conditions to the appropriate levels (Diener, 2006; Seiko Epson Corporation, Website). In addition, it includes improvements to the structure of the company's building by installing insulation and energy efficient windows (EarthWays Center, Website). It also encourages the use of energy efficient equipment and devices that reduce the energy needed to power motors and pumps (Ibid). Businesses can measure success by tracking their utility bills and accounting for the amount of energy that has been reduced and the money saved from energy reductions.

Reducing Toxins and Pollutants

The toxins and pollution reduction component of the template encourages steps that will decrease the environmental harm resulting from the use of products that degrade the planet's ecological services (Ottman, 1999). Steps to achieve these efforts include identifying the actual and potential sources of pollution in the office, keeping dumpsters covered, and cleaning parking lots and storm drains (SFGB, Website). In addition, companies are encouraged to use low toxic cleaning products and non-toxic writing implements (Ibid). The template encourages transportation programs such as employee car pooling, public transportation and biking to work (Ibid). Businesses can measure success by tracking the amount of they are saving on reducing toxic cleaning supplies, using local vendors, and the fuel that is saved by encouraging sustainable transportation.

Reducing Waste

The waste reduction component of the template encourages reducing the amount of material that a business consumes and to either reuse or recycle these materials at the end of their use. For example, the template encourages businesses to reuse packaging material. The template also encourages tasks similar to those that Epson implemented which includes printing on both sides of paper; setting printers and copiers to print on a double-sided default; and employee recycling programs (Diener, 2006). It also designates a recycling coordinator to oversee recycling efforts and sustainable purchasing (SFGB, Website). The template identifies no cost measures such as a company to purchase products from vendors that use minimal packaging and buying paper products made from post consumer waste (Ibid). Businesses can measure success by tracking the amount of paper that is used and the amount of material purchased, reused and recycled.

Case Studies on Cherry Hill Business who Adopted more Sustainable Business Practices

Several businesses in the Cherry Hill community have already adopted sustainable design into their operations. They have realized that building the ecological value of their businesses by considering environmental issues and resource productivity when implementing improvements to their operations will provide them with cost saving benefits and a healthier relationship to the natural environment (Porter & Van der Linde, 1995). The following provides case studies on three business that are moving closer to sustainability; EcoWash Mobile International, Kress Wine, and the Playdrome Cherry Hill.

EcoWash Mobile International

Waterless car washing has finally arrived to South Jersey. EcoWash Mobile International is an innovative Australian company that was established in 2004 by Jim Cornish and Stewart Nicollos who had the idea of providing 100% waterless mobile car washing and detailing services (EcoWash, Website). The idea originated from two necessities; Australia's water shortages and the lack of time that people had to wash their cars (Ibid). Rather than have people drive to a car wash or wash their vehicles at home which can waste about 50 gallons of water, EcoWash associates will drive to their customers. To clean the vehicles, the company uses a biodegradable polymer compound that encapsulates and lifts dirt from the car's paint and provides a polished finish that lasts for six weeks (Ibid). Since the company's inception, it has won a number of awards¹¹ and on a weekly basis saves about 100,000 gallons of water (Ibid). It has grown to 52 franchisees that operate over 60 mobile units in Australia and over 70 international units operating in the U.S., Central America, Europe and the Middle East (Ibid). See Figure 9 for a picture of the typical waterless automobile washing service that EcoWash performs.

Figure 9. Staff of EcoWash washing a fleet of cars



(EcoWash, Website)

Businesses and residents in South Jersey can now have their vehicles cleaned by a local franchise owned and operated by Randall McGinnis. Like his Australian counterparts, McGinnis

¹¹ From its inception to the current day, EcoWash has won eight awards. In 2008, EcoWash was named the best services retailer by the National Retail Association and won the BRW "Fast 100" award (EcoWash, Website).

and his team will arrive to his customer's location in an eco-efficient vehicle¹² ready to begin their waterless services (Interview, McGinnis). Eliminating water use is not the only sustainable operational component of the franchise. McGinnis incorporated several additional measures to enhance his franchise's performance. For example, he saves fossil fuel use by targeting large work areas and shopping malls which makes his trips more efficient and reduces the amount his customers have to drive (Ibid). The franchise also implemented several waste elimination measures which includes rendering payment through a mobile credit card system that sends electronic receipts and using electronic marketing (Ibid). In addition, the wash cloths used to wash the vehicles are reusable and last for several months (Ibid). McGinnis recycles all material and takes all of the packing material from the shipments that he receives to a local UPS store which reuses the material for their own operations (Ibid).

Kress Wine

South Jersey residents who are interested in purchasing fine wine and spirits can go to Kress Wine, which is located in Cherry Hill, NJ. See figure 10 for a picture of the Kress Wine store. Kress Wine is a small family business owned and operated by Ann Delmonte, Mario Delmonte, and George Cuneo. Not only does Kress Wine offer a selection of award-winning wine, it also does its part to help preserve the planet's ecological services. This small family owned business has implemented several measures to become more sustainable and reduce its environmental footprint.

Figure 10. Kress Wine



(Kress Wine, Website)

Kress has implemented several energy efficiency measures to reduce its carbon footprint. The retail store keeps its thermostat to 72 degrees in the summer and below 65 degrees during the winter months (Delmonte, Ann). It also performs regular maintenance on its air conditioning

¹² EcoWash has a policy that it employees drive eco-efficient vehicles and has provided McGinnis with a Yaris, which gets an average of 38 MPG (Interview, McGinnis).

unit and all refrigeration units which includes replacing filters and cleaning condenser coils (Ibid). Kress is in the process of upgrading its lighting by installing compact fluorescent light bulbs. It employs not only the task lighting by keeping lights off in areas that are not in use, but also task heating and cooling by not maintaining a constant temperature in those areas unless they are in use (Ibid). Kress keep track of its energy efficiency efforts by reviewing its monthly utility bill and will continue to implement additional measures to reduce energy and save money by doing so.

Kress Wine has reduce the amount of waste by implementing several measures that reduces the need for paper products. For example, Kress reduced the need for office paper by implementing electronic billing and marketing (Interview, Delmonte, Mario). The additional benefit is that Kress saves money by not purchasing postage and paper marketing materials. In addition, Kress Wine has significantly reduced the necessity of paper bags. The small business encourages its customers to bring reusable bags by offering a 10% discount to those that do (Ibid). To support is reusable bag campaign, Kress Wine gave its customers a reusable bag during the holiday season instead of the typical calendar (Ibid). This simple and innovated idea not only saved paper by not having calendars printed, but also encouraged the use of reusable bags. Kress also reuses corrugated cardboard as inserts for the reusable bags to hold wine bottles and other glass products and further reduces the need to individually wrap each wine bottle with a paper bag (Interview, Delmonte, Ann). For customers with larger purchases, Kress Wine will reuse the boxes it receives from product shipments (Ibid).

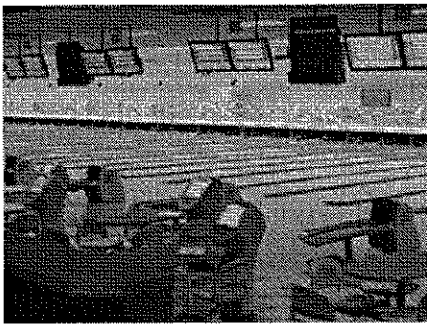
Playdrome Cherry Hill

Bowlers, pool sharks, and video arcade players living in South Jersey can engage in their favorite pastime at the Playdrome Cherry Hill. See figure 11 for a picture of Playdrome's blowing lanes and figure 12 for a picture of the Playdrome's video arcade. The Playdrome is a great location for bowling leagues, birthday parties, meetings, and any other type of celebration. In addition, it serves food and beverages in its restaurant. The Playdrome is owned by Jon Perper who has a passion for incorporating sustainability into his business operations. For the past several years, Perper has implemented several sustainable measures into his operations to help preserve the planet's ecological services. Perper's successful implementation of sustainable design can be attributed in part to his own research into new energy efficiency technologies and

his employee awareness program. Perper utilized the expertise of his staff and solicited ideas from them regarding additional ways the Playdrome could become more sustainable.

The Playdrome has made strides to reducing its carbon footprint by implementing an energy efficiency program. Perper reduced his lighting needs by installing a new LED lighting system that he helped design (Interview, Perper). In addition, the Playdrome's staff turns off all electronic equipment at the end of the business day and ensures that all printers and copiers are on standby mode (Ibid). To ensure employee ownership in his energy efficiency program, Perper placed stickies on different equipment with instructions on when they should be on, off or in standby mode. Perper reduced the electricity needed to run the pin changers by installing capacity reducers for the motors (Ibid). In addition, the Playdrome's pin setting mechanic is HVAC certified and preforms regularly maintenance on the facility's HVAC and refrigeration systems. The regularly scheduled maintenance includes changing filters, checking the system for leaks and inefficiencies, and cleaning condensers and evaporator coils (Ibid).

Figure 11. Bowling lanes at the Playdrome Cherry Hill



(Playdrome, Website)

Figure 12. Video Arcade at the Playdrome Cherry Hill



(Playdrome, Website)

The Playdrome has made successful strides in the area of waste reduction. The bowling facility became a member of the township's recycling program called Retailer Rewards Provider

and has increased the amount of material that is recycled (Interview, Perper). To improve his recycling efforts, Perper contracted with a recycle hauler that accepts commingled recyclables which increases the amount of material that is recycled because people do not have to sort between paper and plastic (Ibid). The Playdrome's recycling efforts have been so successful that it has eliminated one regular waste pickup per week with plans to eliminate additional days (Ibid). The Playdrome has decreased its paper usage by using electronic marketing and printing on both sides of the paper. In addition, a result of an employee suggesting led to a purchase of a Xerox printer that uses new solid ink technology. The printing process maximizes the amount of ink that is used which results in it being able to print 30,000 pages on both sides of the paper on just one cartridge (Ibid). The result is a reduction in ink purchases and less packaging material because the new cartridges last much longer than traditional inks and toners (Ibid).

DISCUSSION

Sustainable development is now recognized by a growing number of companies, governing bodies, and those concerned with environmental and social issues as a way to limit the negative operational affect that business has on the planet's ecological services (Davidson, 2000). Applying its principles in a holistic way to achieve the result that sustainable design promises will help reverse the impending crisis that will result from continued reliance on the current business paradigm of overuse and ecological harm (Ibid). Sustainable design offers a way to alleviate the stress that business has on the natural environment and the overuse of natural resources (Onisto, 1999). It will also preserve valuable ecological services for their own future operations (Ibid).

Despite the uncertainty and misconceptions about sustainability, one thing is certain; "sustainability is an absolute concept" (Peattie, 1999). Sustainability will not be achieved if it is a passing trend or there is not an absolute commitment towards its principles (Knowles & Espinosa, 2009). In other words, sustainability must not be a term misused as a marketing ploy simply to appeal to a growing number of customers who are concerned about the health of the planet's ecological services (Ibid). Peattie (1999) cautioned that humanity can only achieve sustainability "if pressure to make concerted progress towards it is maintained, and is not diffused by environmentally related concessions made by governments and companies." Real and measured sustainable design will continue to grow as more business leaders realize that the future profitability of their companies is tied to the natural world (Onisto, 1999).

The idea that a company can be profitable and even increase its economic potential by incorporating environmental and social policies into its organizational design is a new concept when compared to traditional business practices of the fossil fuel economy (Roberts & Cohen, 2002). Sustainable development is growing and becoming increasingly more established in Fortune 500 corporations (Fields, 2002). The 21st century arrived with about 300-400 corporations annually publishing sustainability and environmental reports, a dramatic increase from just twelve in 1990 (Ibid). However, the growth in sustainability development is not the same in smaller companies. Unlike their larger counterparts, small to mid-sized companies are not as likely to engage in voluntary environmental programs (Stretesky & Gabriel, 2005).

Garnering stakeholder support from those associated within the organization and the community is an important factor that should be utilized when developing and implementing business sustainability programs (Kanji, 2005). Such a task may seem daunting as expectations may differ among shareholders, business owners, members of the community and the customer purchasing a company's products or services (Ibid). Some entities have streamlined the stakeholder process by limiting the initial meetings to major players which may include interested companies, governmental agencies, NGOs and other public interest groups (Davidson, 2000). However, companies should be cautioned when limiting anyone from the stakeholder process because the main purpose of stakeholder development is to gain community consensus (Steurer, et al., 2005).

Sustainable development has been encouraged by an increasing understanding of humanity's role in the natural world and by the influence of corporations and governmental programs that support its continued growth (Potocan & Mulej, 2003). However, there is no universal reporting measure for companies who have implemented some sort of sustainable design into their operations (Onisto, 1999; Fields, 2002). Such measures will better assess how the planet's ecological services are being protected. They will show how a company's improvements to industrial and business operations improve its use of energy and water; and reduction of waste, toxins and pollutants (Lovins, et al., 2007). A way to assess the entire value of sustainable development in a company's portfolio is to have the company use a triple bottom line accounting system (Roberts & Cohen, 2002). Such a measuring system will account for the ecological capital that is enhanced, used or destroyed during the company's operations (Ibid). This accounting system will require a "multidimensional definition of success" that will enable

business owners assess their economic performance, their operational measures, and societal and ecological worth (Kanji, 2005). The accounting system does not have to be elaborate, it could be as simple as a scorecard that list different sustainability objectives, whether the company is meeting them, and measure the results for achieving the specific standards (Petrini & Pozzebon, 2009).

A more standard assessment of evaluating a company's ecological and social performance will help gauge the full national and global impact that sustainable design is having on the environmental and community health. While necessary, the standard reporting system should include a holistic approach to ensuring that there are measures in place to adequately ascertain the base value of the ecological services that were either destroyed, saved or created (Roberts & Cohen, 2002, Potocan & Mulej, 2003; Knowles & Espinosa, 2009). In addition, the reporting system should include a baseline to adequately account for the company's environmental initiatives and how they have reduced its affect on the planet's ecosystem services (Onisto, 1999). Such measures and information will provide the foundation for future support for sustainable design.

Studies should be conducted and published in peer-reviewed articles showing the impact that sustainable development has had on overall business operations. As the benefits of sustainable design are more understood, companies will be more willing to invest in their measures and join in the community of peers who have already adopted this discipline (Fields, 2002). As companies begin to see the benefits of sustainable design, more will adopt these principles to take advantage of increased profits that result from saving money by using less material and resources (Ottman, 1999; Fields, 2002). In addition, many companies will want to benefit from a growing customer base who is more apt to invest and spend on businesses that consider the planet's ecological services (Fields, 2002).

CONCLUSION/RECOMMENDATIONS

Companies striving to be more sustainable consider the needs of future generations when developing their business model and maintain a healthy triple bottom line ensuring profitability, social, and ecological value (Roberts & Cohen, 2002; Potocan & Mulej, 2003; Yeganeh & Glavas, 2008; Berns, et al., 2009). A sustainable business model will consider the value of the planet's ecological services and how the operational component either adds or diminishes the value of those services. Companies adopting a sustainable business model recognize that the economy is a subsystem of natural systems and connect themselves to the natural world (Onisto, 1999). In doing so, these companies will usher in a new generation of business thinking that takes active steps to reduce their operational affect on the natural world by becoming more energy efficient, conserving water, reducing waste and decreasing toxins and pollutants (Lovins, et al., 2007).

Sustainable development is growing in the business community as companies begin to move from mere compliance of government regulations to incorporating a more holistic approach to developing their business models and making sustainability a core component (Potocan & Mulej, 2003; Berns, et al., 2009). Holism should also be applied to evaluating and measuring the success of procedures and systems incorporated to preserve the planet's ecological functioning (Kanji, 2005). While contemporary environmental programs such as ISO 14000 and EMS will help companies achieve this effort, they should not be the sole driver of sustainable development (Davidson, 2000; Potocan & Mulej, 2003; Steurer, et al., 2005; Knowles & Espinosa, 2009). These models do not account for the stress that companies have placed on environmental systems, only achieve governmental compliance, and do not integrate employees and staff in the development stages (Onisto, 1999; Knowles & Espinosa, 2009). Taking a holistic approach will also enable companies to increase their ecological value by polluting less and incorporating natural processes in material and energy flows (Ottman, 1999).

Companies of all sizes can use sustainable design to help them become more economically stable (Lovins, et al. 2007; Stubbs & Cocklin, 2008). The companies outlined in the case studies have incorporated new technology and methods that reduce their ecological affect on the natural environment (Peattie, 1999; Lovins, et al. 2007). Given the importance of preserving the planet's ecological services for the current and future viability of the business community and for generations living today and tomorrow, communities like Cherry Hill, NJ are

incorporating green business models for the small to mid sized companies who wish to become more sustainable.

Sustainable Cherry Hill encourages sustainable design in its community. It has even encouraged participation by Cherry Hill Township which is adopting a green business program for the local business community and is supporting Sustainable Cherry Hill's program through advertisement efforts and promotional events. These efforts will encourage the business community to apply sustainable design to individual operations. By early next year, Sustainable Cherry Hill has plans to grow the program and implement a more comprehensive participatory type program similar to the San Francisco Green Business Program. One way that Sustainable Cherry Hill can measure the success of the program is to establish a baseline year for participating businesses. Businesses should record their energy and water consumption prior to implementing sustainable design and then track how much was saved after implementing these measures. In addition, businesses should account for their waste, and toxins and pollutants used before and after specific sustainable measures were implemented. By measuring their success, businesses will be able to gauge how much money they are saving and their reduced affect on the planet's ecosystem services.

Businesses and communities need to continue efforts to incorporate sustainable design into everyday living. In doing so, they will be helping to preserve the planet's ecological services and life itself. However, those living today may not live to see the fruits of these efforts. Perhaps on a sandy beach in New Jersey, grandparents will be walking with their grandchildren and tell them that the oceans, streams and all land have been restored and life is now flourishing. They will say to them, "We have clean air to breath, ample freshwater to drink, and land to live upon. We have our great grandparents to thank for that."

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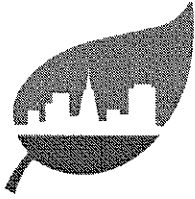
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Appendix 1

SFGB's Green Business Template for Retailers



**SAN FRANCISCO
GREEN
BUSINESS**

- A** Waste Reduction
- E** Energy Conservation
- W** Water Conservation
- P** Pollution Prevention
- G** General/Staff Education

REQUIRED ITEM

Bold Items Indicate a required measure in SF and must be completed, if applicable.

Email
stgreenbiz@sfgov.org

Website
stgreentiz.org

Waste Reduction Tip

For information on setting up waste diversion programs and to learn about the cost savings achieved through waste diversion, visit sfgarbagerates.com. You can also call SF Environment's Zero Waste program at 415.355.3745 for free technical assistance in starting a recycling or composting program.

San Francisco Green Business Program Standards

OFFICE/RETAIL

Waste Reduction

Complete the required measures below and a minimum of two additional WASTE DIVERSION measures.

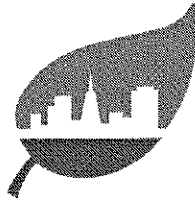
- A-01** Recycle or reuse paper including cardboard (corrugated cardboard boxes), mixed paper (junk mail, scrap and colored paper), newspaper, office paper (white ledger, color paper, computer, large format and copier paper).
- A-02** Recycle all glass, plastic, and aluminum.
- A-03** Compost all organics including food and yard discards, soiled paper products, and compostable food containers.
- A-04** Conduct on going education about recycling, composting, waste reduction, and other environmental topics. Document dates and methods (emails, meetings, lunch presentations, etc.).
- A-05** Designate a recycling coordinator (or coordinators) to take responsibility for monitoring and maintaining recycling and composting programs.
- A-06** Collect items that are prohibited from the garbage (batteries, CFLs, cell phones and other electronics, etc.) and institute a program for their safe disposal.

Complete the required measures below and a minimum of eight additional SOURCE REDUCTION measures.

- A-07** In the lunch/break room, replace disposables with permanent ware (mugs, dishes, utensils, etc.) and use refillable containers for sugar, salt & pepper, etc. to avoid individual condiment packets.
- A-08** Retailers- Eliminate the use of plastic bags (Paper bags, preferably made with minimum 40% post consumer waste, or BPI certified compostable bags are acceptable).
- A-09** Make two sided printing and copying standard practice in your business (set all computers to print double-sided default). Make single-sided the exception instead of the rule.
- A-10** Use green caterers, that use only reusable and/or compostable dishes, compost and recycle, and/or purchase produce from local, organic vendors.
- A-11** Practice efficient copying by using the size reduction feature (e.g. print two pages of a document on one page, set word processing defaults for smaller fonts and margins). Minimize misprints by posting a diagram showing how to load paper, like letterhead or envelopes.
- A-12** Keep a stack of previously used paper near printers. Use it for scratch paper or internal memos, make it into notepads, or designate a bypass tray on printer for printing draft single-sided documents.
- A-13** Reduce unwanted mail by the following: • Write to or call senders requesting removal from mailing list. • Return labels from duplicate mailings & subscriptions requesting all but one be removed. • Write "refused" on first class mail and return to sender. • Use an on-line service to help reduce junk mail (ex. 41 lbs., Green Dimes, Catalog-Choice) • Purge your own mailing lists to eliminate duplication. Document the process.
- A-14** Eliminate paper documents by having electronic forms and contracts.
- A-15** Send and receive taxes directly from computers without printing.
- A-16** Centralize employee schedules, meeting announcements and journals in a single location (bulletin board, white board, email, etc.) to reduce printed copies.
- A-17** Design marketing materials that require no envelope – postcards or fold and mail.
- A-18** Eliminate individual bottles of water for employees and guests. Install a water filtration system or use bulk bottled water instead.
- A-19** Reduce number of garbage bin liners by reusing bags, having unlined bins, or reducing the amount of garbage bins (please note that recycling bins should not have liner bags. If using bags for composting bins, they must be BPI certified).

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SAN FRANCISCO
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A Waste Reduction

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C Water Conservation

D Pollution Prevention

E General/Staff Education

REQUIRED ITEM

Bold items indicate a required measure in SF and must be completed, if applicable.

Email
sfgreenbiz@sfgov.org

Website
sfgreenbiz.org

Waste Reduction Tip

Use the EcofinderPRR: www.ecofinder.org to find out how to dispose of items that do not belong in the garbage or recycle bins (such as paint, appliances, furniture, electronics).

OFFICE/RETAIL MARCH 2009

- A-20** Purchase used or refurbished equipment and/or furniture.
- A-21** Lease, rather than purchase computers and printers or Upgrade desktop computers instead of purchasing new ones.
- A-22** Replace several similar products with one or two that do the same job. Give two examples. If using a multi function printer/scanner/fax eliminate auxiliary printers.
- A-23** Choose vendors that take back products after their shelf life is over (Batteries, fluorescent light bulbs, and toner must be recycled. Please use other examples.) OR work with vendors to minimize product packaging: Request that they use recyclable packaging materials (no Styrofoam, bubble wrap, etc) or ask them to take back packaging materials.
- A-24** Donate, sell, or exchange unwanted but usable items (furniture, supplies, electronics, office supplies, etc.). Document donations and sales of materials. Use the EcofinderPRR at sfenvironment.org for help.
- A-25** Retailers- offer durable, reusable bags at checkout.
- A-26** Retailers - offer an incentive to customers who bring their own shopping bags, coffee mugs, etc. and/or use a disincentive such as charging a fee for disposable containers and bags.
- A-27** Use laundry service that provides reusable bags for dirty and clean linen.

Complete the required measures below and any additional ENVIRONMENTALLY PREFERABLE PURCHASING measures

- A-28** Purchase copy, computer and fax paper with a minimum 50% post consumer waste content (recommended 100%).
- A-29** Purchase letterhead, envelopes and business cards with minimum 50% post consumer waste. Documentation from your printing vendor will be required.
- A-30** Purchase marketing materials with a minimum 50% post consumer waste content. Documentation from your printing vendor will be required.
- A-31** Purchase janitorial paper (toilet paper, tissues, and paper towels) with minimum 35% post consumer waste content.
- A-32** Purchase large format or plotter paper with a minimum 30% recycled content, or higher recycled content if available.
- A-33** Use a corrugated or recyclable board in place of foam core board.
- A-34** Implement procurement guidelines for purchase of recycled content products.
- A-35** Purchase folders or other paper products with recycled content.
- A-36** Retailers – stock/sell products made with recycled content.
- A-37** When Conducting Remodels: Use recycled content, refurbished, or salvaged materials such as building fixtures, ceramic tiles, drywall, insulation, concrete, composite lumber/wood, roofing, flooring, cabinets, ceiling tile, interior paneling, etc.

Energy Conservation

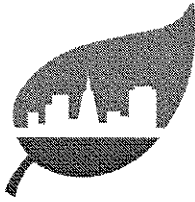
Complete all of the following HVAC (heating, ventilation and air conditioning) and refrigeration measures

- B-01** Complete regularly scheduled maintenance on your HVAC (heating, ventilation and air conditioning) and refrigeration system at least twice a year.
- B-02** Clean permanent filters with mild detergents every two months (change replaceable filters every 2 months).
- B-03** Check entire system each year for coolant and air leaks, duct sealing, clogs, and obstructions of air intake and vents.
- B-04** Clean condenser coils of dust & lint.
- B-05** Clean evaporator coils of excessive frost.
- B-06** Inspect and repair economizers on AC systems.

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REQUIRED ITEM

Bold items indicate a required measure in SF and must be completed, if applicable.

Email
sfgreenbiz@sfgov.org

Website
sfgreenbiz.org

Energy Conservation Tip

SF Environment in a partnership with PG&E, provides free energy audits, reports, technical assistance, and rebates, for all commercial and multifamily customers in San Francisco. Contact SF Environment's SF Energy Watch program and we will refer you to PG&E's Express Efficiency program for efficiency rebates not covered in our programs. SF Energy Watch: www.sfenergywatch.org.

OFFICE/RETAIL MARCH 2009

- B-07** Assign a person to monitor each energy bill for sudden rises in energy use.

General

Complete the required measures below and at least four additional **EQUIPMENT/FACILITY CHANGES** measures.

- B-08** Use office equipment with energy saving features (e.g. ENERGY STAR®) and ensure ENERGY STAR® settings are enabled.
- B-09** Use power management software programs that save energy by automatically turning off idle monitors and printers (must be purchased separate from computer).
- B-10** Use sensors on vending machines and place machines in shaded areas.
- B-11** Use weather stripping (weatherizing and caulking) to seal air gaps around doors and windows and keep a maintenance log for the same.
- B-12** Insulate all hot water pipes and cold suction lines.
- B-13** Use a solar water heater or preheater.
- B-14** Purchase ENERGY STAR qualified refrigerators.
- B-15** Install plastic strip curtains on walk-in refrigerator/freezer doors.
- B-16** If purchasing new computers, buy EPEAT certified (www.EPEAT.net). If purchasing monitors, consider flat-screen LED monitors which consume approximately 1/3 less energy than larger ray tube monitors.
- B-17** Use or invest in renewable energy for at least 50% of your energy needs (ask your local utility of the Center for Resource Solutions at 415-561-2100 or <http://www.resource-solutions.org>).
- B-18** Institute a written policy that all electronic devices, lighting and room cooling units be turned off when not in use and use light switch reminders to remind staff to turn off the same.
- B-19** Use the standby mode on equipment (e.g., energy saver buttons on copiers).
- B-20** Rearrange workspace to take advantage of areas with natural light and design for increased natural lighting when remodeling.
- B-21** Set hot water heaters to standard 125-130° F.
- B-22** Institute a written policy that ensures blinds and curtains are closed during peak summer period (white reflects) or use ceiling fans to reduce A/C load.
- B-23** Install or use plug load controllers for office equipment that switches equipment off after working hours.

Lighting

- B-24** Replace all T-12 fluorescent lighting with energy-efficient T-8 or T-5 fixtures with electronic ballasts or other equivalent efficacy lighting.
- B-25** Replace non-dimming incandescent bulbs with compact fluorescents. Replace low wattage dimming and non-dimming incandescent bulbs with cold cathodes. Use halogen lamps only for low wattage spotlighting in retail environments.
- B-26** Improve exit sign efficiency to less than 5 watts per sign by using LED signs, electroluminescent, photoluminescent or other applicable signs.
- B-27** Reduce number of fixtures or lamps per fixture where appropriate.
- B-28** Increase lighting efficiency by installing optical reflectors and/or diffusers.
- B-29** Use lighting controls such as dual technology occupancy sensors, bypass/delay timers, photocells, or time clocks, especially in low occupancy areas such as closets and restrooms.
- B-30** Use daylight dimmers that turn off automatically when light is sufficient.
- B-31** Clean lighting fixtures, diffusers and lamps twice a year so they are lighting as effectively as possible (dirt can reduce lighting efficiency by up to 50%) and maintain a written policy to do the same.

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REQUIRED ITEM

Bold items indicate a required measure in SF and must be completed, if applicable.

Email
sfgreenbiz@sfgov.org

Website
sfgreenbiz.org

Energy Conservation Tip

When buying new appliances or refrigerators, look for the Energy Star (R) label. Rebate requirements for energy efficient appliances are set by the Consortium for Energy Efficiency. Check here www.cee1.org to find a qualifying model, and contact SF Energy Watch to inquire about rebate levels and advice on selection.

- B-32 Properly set and maintain lighting control devices (current time and on/off schedule) such as time clocks, photocells and sensors and adjust for season.
- B-33 Use task lighting instead of lighting the entire area.
- B-24 Use light switch reminders to remind staff to turn off lights when not in use.

Implement all applicable EMPLOYEE PRACTICES

General Facility and HVAC

- B-35 Set thermostat to 76° F for cooling, 68° F for heating; use timing devices to turn system down after hours.
- B-36 Seal off unused areas. Block and insulate unneeded windows and other openings.
- B-37 Use small fans OR space heater during off hours instead of conditioning entire office.
- B-38 Use ceiling fans to promote air circulation.
- B-39 Use economizers on A/C to increase air circulation.
- B-40 Replace single or package A/C unit with one that exceeds Title 24 building standards.
- B-41 Provide shade for HVAC condenser, especially roof-top units.
- B-42 Shade sun-exposed windows and walls: use awnings, sunscreens, shade trees or shrubbery. Only applicable for air conditioned spaces.
- B-43 Apply window film to reduce solar heat gain on clear, single-pane non-Northern facing windows. Only applicable for air conditioned spaces.
- B-44 Use energy-efficient double paned windows on at least 90% of windows.
- B-45 Replace an electric heating system with a natural gas system, unless building has onsite renewable electricity production. Conversion must have taken place in last 2 years.
- B-46 Install variable frequency drives (VFDs) on pumps and motors.
- B-47 Use Variable Air Volume (VAV) systems for central air conditioning.
- B-48 Use occupancy sensors to adjust set points for the air conditioning, and heating equipment and to control other electrical devices and appliances.
- B-49 Set refrigerator temperature between 38°F and 41°F and freezer between 10° F and 20°F.
- B-50 Additional measures for building owners or large tenants.
- B-51 Plant native shrubs or trees near windows for shade. Building must have mechanical cooling.
- B-52 Replace or supplement an A/C system with an evaporative cooler.
- B-53 When repainting building exterior and roofs, choose light colors to reflect more sunlight. Painting should have been performed within the last year.
- B-64 Use an energy management system to control lighting, kitchen exhaust, refrigeration and HVAC.
- B-66 Use variable speed drives on motors where appropriate.

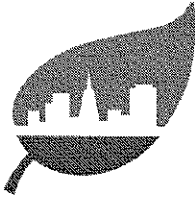
Water Conservation

Complete all required WATER CONSERVATION MAINTENANCE measures applicable to your business

- C-01 **Understand your water bill and review it monthly for indications of leaks, spikes or other problems. Call your water department for a free water walk-through if you notice any unusual increases in use or if you need suggestions on how to improve the efficiency of your water use.**
- C-02 **Check the property for leaks every 6 months. Leaks in toilet tanks can be detected with leak detecting tablets, which may be available from your water company.**

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REQUIRED ITEM

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Email
sfgreenbiz@sfgov.org

Website
sfgreenbiz.org

Water Conservation Tip

SFPUC offers rebates for high efficiency toilets and urinals. For information on where you can buy efficient fixtures and current rebates, contact the SFPUC Water Conservation Section: www.sfwater.org.

OFFICE/RETAIL MARCH 2009

- C-03** Learn how to read your water meter. (It is recommended that the meter is read twice a day for early detection of water consumption spikes that may indicate leaks or other high use problems).
- C-04** Take weekly meter reads and log into a spreadsheet to be submitted on a monthly basis.
- C-05** Document any changes and repairs made to plumbing fixtures and devices. Keep maintenance logs on file. (You are required to submit these documents upon recertification).

Facility Changes/Equipment

Complete the required measures below and at least two additional WATER CONSERVATION measures.

- C-06** Replace pre-1994 tank style toilets (>3.5 gpf) with high efficiency toilets (average flush volume 1.28 gpf). Your water department may have a rebate program for this.
- C-07** Install toilets with maximum flush volume of 1.6 gpf (gallon per flush) or less. Your water department may have a rebate program for this.
- C-08** Replace all pre-1992 urinals that flush more than 1.0 gpf with high-efficiency models that flush .5 gallons or less.
- C-09** Install low flow aerators or flow reducing valves with flow rates not to exceed .5 gpm for hand-washing sinks, 1.5 gpm for kitchen sinks, and 1.5 gpm high-efficiency showerheads. All infrared faucets must be fitted with aerators not to exceed 0.5 gpm.
- C-10** Post signs in restrooms and kitchen to encourage water conservation and to report leaks.
- C-11** Install self-closing faucets (0.5 gpm and 0.25 gallon/cycle).
- C-12** Adjust boiler and cooling tower blowdown rate to maintain TDS (total dissolved solids) at levels recommended by manufactures' specifications.
- C-13** Replace water-cooled equipment, such as air conditioning units, with air-cooled.
- C-14** Install and monitor conductivity controller on cooling tower, if it does not exist.
- C-15** Reduce water pressure to no higher than 50 psi by installing pressure reducing valves.
- C-16** Indoors, use dry floor cleaning methods, followed by damp mopping, rather than spraying or hosing with water.
- C-17** Change window cleaning schedule from "periodic" to "as required."
- C-18** Clean surfaces using dry sweeping methods and pressure wash surfaces with a 1.6 gpm or less high velocity spray nozzle. Use of a hose to spray down surfaces is prohibited.

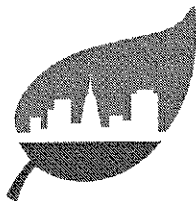
Landscaping

- C-20** Adjust sprinklers for proper coverage—optimize spacing, avoid runoff onto paved surfaces.
- C-21** Modify your existing irrigation system to include drip irrigation (or soaker hoses where feasible).
- C-22** Test irrigation sprinklers monthly to ensure proper operation and coverage and repair all broken or defective sprinkler heads/nozzles, lines and valves.
- C-23** Clock irrigation usage on the water meter to monitor and prevent excessive use.
- C-24** Adjust sprinkler times and/or duration according to seasons, water during non-daylight hours (generally before 7 AM or after 9 PM).
- C-25** Apply at least 2 inches of mulch in non-turf areas, preferably with recycled wood chips.
- C-26** Replace water intensive turf with woodchips, plant based mulch, loose stones or permeable pavers. [Brick and cobblestones will block water from penetrating the ground since they are typically installed with concrete].
- C-27** If installing new turf, limit area and use drought tolerant species, space sprinkler heads such that the water from one sprinkler head reaches the adjacent sprinkler heads.
- C-28** Install rain shut-off devices or moisture sensors that turn off (or override) the irrigation system during rain.

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Appendix 1

SFGB's Green Business Template for Retailers



SAN FRANCISCO GREEN BUSINESS

A Waste Reduction

B Energy Conservation

C Water Conservation

D Pollution Prevention

E General/Staff Education

REQUIRED ITEM

Bold items indicate a required measure in SF and must be completed, if applicable.

Email
sfgreenbiz@sfgov.org

Website
sfgreenbiz.org

Pollution Prevention Tip

Safely dispose of all unwanted chemical products by using the City's VSCG program (contact 330.1425) or find a recycling/disposal facility by using EcoFindARRR: www.ecofindarr.org.

OFFICE/RETAIL MARCH 2009

- C-29 Plant (or renovate using) drought tolerant plants and ground cover, preferably native species. Assistance may be available from your water department.
- C-30 Group plants with similar water requirements together (hydrozone) on the same irrigation line, separating plants with different water requirements on separate irrigation lines.
- C-31 Plant and maintain a street tree next to your business. If there is no space for a tree, install a sidewalk garden with drought tolerate plants (guidelines and permits are available from www.sfwater.org and www.plantsf.org).
- C-32 Use repeat cycles when watering turf or shrubs to encourage percolation and deep root growth.

Pollution Prevention

Complete all of the following TOXICS REDUCTION measures:

- D-01 ***Evaluate each area of your business to identify actual and potential sources of pollution, and ways to prevent it. *Assess your office to develop an inventory of hazardous materials (cleaning products, building maintenance, pesticides, fertilizers) in use regularly and identify ways to reduce their use * Check Material Safety Data Sheets (MSDS) and labels for each product in use and identify safer alternatives * Call your local Household Hazardous Waste Program for disposal of hazardous substances not in use.**
- D-02 **Reduce or eliminate the use of chemical pesticides by implementing an Integrated Pest Management (IPM) program which utilizes good housekeeping, pest monitoring and exclusion as well as less toxic pesticides and/or non-chemical pest control.**
- D-03 **Contract with a PCO certified by EcoWise certification (<http://www.ecowisecertified.com/index.html>). Please provide the name of your PCO and a contract that states that they provide services to your facility.**
- D-04 **Require your PCO to only use SF Approved pesticides (www.sfenvironment.org/sfapproved) when it is necessary to apply them. Please provide a letter from your PCO confirming that only SF Approved products will be used in the facility.**

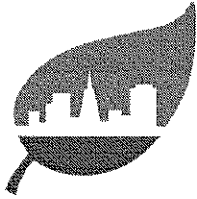
Complete the required measures below and at least four additional ENVIRONMENTALLY PREFERABLE purchasing measures:

- D-05 **Work with your janitorial service, building maintenance staff, or other service providers to use safer alternatives to potentially harmful products. Require your janitorial service company to use only low toxic cleaning products such as those that are SF Approved (www.sfenvironment.org/sfapproved) or that meet Green Seal certification standards (www.greenseal.org) in your facility. Provide an inventory (that includes manufacturer name, product name and application, ingredients) of all products purchased and used in the facility.**
- D-06 **Replace all aerosols with pump dispensers, if available.**
- D-07 Use low-toxicity multipurpose cleaners, rather than many special-purpose cleaners.
- D-08 Replace standard fluorescent lights with low or no mercury fluorescent lights. Provide make and model.
- D-09 Use products with low VOCs, low or no formaldehyde, and the highest recycled content in non-aerosol packaging, when painting or polishing any office space. Products can include paint, paint removal products, furniture and casework. See www.buildtgreen.org.
- D-10 Obtain a battery recharger for the office. Use rechargeable (instead of disposable) batteries for flashlights, radios, remote controls etc.
- D-11 Use recycled oil for vehicles/equipment.
- D-12 Use unbleached and/or chlorine-free paper products (copy paper, paper towels, napkins, coffee filters, etc.).
- D-13 Replace toxic permanent ink markers/pens with water-based ones.
- D-14 Print promotional materials with vegetable or other low-VOC inks.
- D-15 Use low- or no-VOC paint products.
- D-16 Use recycled or remanufactured laser and copier toner cartridges.
- D-17 Use natural or low emissions building materials, carpets, or furniture.

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SFGB's Green Business Template for Retailers



**SAN FRANCISCO
GREEN
BUSINESS**

A Waste Reduction

B Energy Conservation

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D Pollution Prevention

E General/Staff Education

REQUIRED ITEM

Bold items indicate a required measure in SF and must be completed, if applicable.

Email
sfgreenbiz@sfgov.org

Website
sfgreenbiz.org

Pollution Prevention Tip
To find green products (paper, lamps, cleaning products, pesticides) for your business, visit www.sfenvironment.org/ /stapproved or visit the resources section of the website.

- D-18** Purchase Electronic Product Environmental Assessment Tool (EPEAT) registered desktop computers, notebooks & monitors. EPEAT certified products are energy efficient and use lower quantities of hazardous constituents.
- D-19** Do business with other "green" vendors or services, such as certified Bay Area Green Businesses (see full listings at www.greenbiz.ca.gov/). Provide examples.
- D-20** Retailers – stock/sell products, which are less toxic or less polluting than conventional products.

Complete the required measures below and at least two additional WASTEWATER measures:

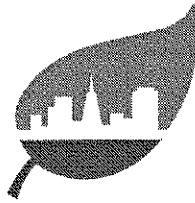
- D-21** Regularly check and maintain storm drain openings and basins. Keep litter, debris and soil away from storm drains. If you have debris catch basins, clean them annually before the first rain and as needed afterward.
- D-22** Keep a spill kit handy to catch/collect spills from hazardous materials, grease, or leaking company, employee, or guest vehicles. Make sure there is adequate absorbent material to contain the largest possible spill.
- D-23** Clean private catch basins annually (by October 15th), before the first rain and as needed thereafter.
- D-24** Keep dumpsters covered and impermeable to rainwater. Keep them from overflowing and keep dumpster/parking areas clean.
- D-25** Label all storm water drains with "No dumping, Drains to Bay" message. You may choose to have a volunteer organization label storm drains on your behalf.
- D-26** Post signs at targeted trouble spots to explain proper practices to prevent pollutants from reaching storm drains.
- D-27** Have an outdoor ashtray or cigarette "butt" can for smokers.
- D-28** Clean parking lots by sweeping or using equipment that collects dirty water (which must be disposed of to sanitary sewer).
- D-29** Mulch, use ground cover, or use a barrier to prevent exposed soil from washing landscaped areas into storm drain.
- D-30** Clean spills in a way that minimizes water use (sweeping, damp mopping, hydrophobic spill clean up methods rather than hosing) and routes water to sanitary rather than storm drains.

Complete the required measures below and at least three additional CLEAN AIR measures:

- D-31** Join the Air District's "Spare the Air" program and notify employees and customers of "Spare the Air" days.
- D-32** Sign up for Commuter Benefits (www.commuterbenefits.org/), which provides savings, and benefits for commuting employees who use bicycles, transit or vanpools.
- D-33** Sign up for Emergency Ride Home (www.sferh.org/), which provides a free or low-cost ride home in cases of emergency for employees who use alternative transportation, such as carpooling, vanpooling, public transit, bicycling
- D-34** Use electric (not gas) powered tools.
- D-35** When possible, arrange for a single vendor who makes deliveries for several items.
- D-36** Patronize services close to your business (e.g., food/catering, copy center, etc.) and encourage employees to do the same.
- D-37** Cut shipping, packaging and transportation wastes by buying supplies from local vendors. List at least 2 local vendors.
- D-38** Offset company's transportation CO2 emissions. See www.liveneutral.org/, www.cameutral.org/, or www.terrapass.org/.
- D-39** Install renewable energy sources, such as solar panels or wind generators. Specify system size.
- D-40** Buy renewable energy credits or green tags to offset the CO2 emissions from your office's use of electricity and natural gas (see www.green-e.org/).

Appendix 1

SFGB's Green Business Template for Retailers



**SAN FRANCISCO
GREEN
BUSINESS**

A Waste Reduction

B Energy Conservation

C Water Conservation

D Pollution Prevention

E General/Staff Education

REQUIRED ITEM

Bold items indicate a required measure in SF and must be completed, if applicable.

Email
sfgreenbiz@sfgov.org

Website
sfgreenbiz.org

Pollution Prevention Tip

The Bay Area offers many ways to get around without a car and all green business applicants are required to provide incentives for commuters using transit. For more information, visit www.commuterbenefits.org.

- D-41 Offer telecommuting opportunities and/or flexible schedules so workers can avoid heavy traffic commutes.
- D-42 Offer lockers and showers for employees who walk, jog or bicycle to work. Provide your own, or subsidize the cost of locker rentals and shower passes at a nearby health club.
- D-43 Encourage bicycling to work by offering rebates on bicycles bought for commuting, or provide employees a stipend or subsidy for bicycle maintenance.
- D-44 Provide secure bicycle storage for staff and customers.
- D-45 Encourage commuter alternatives by informing employees, customers and others who visit your office about various transportation options (post bicycle route maps, and transit schedules before driving directions).
- D-46 Enroll in a car share program.

Additional Measures for Company-Owned Vehicles

- D-47** Keep company vehicles well maintained to prevent leaks and minimize emissions; encourage employees to do the same.
- D-48** Maintain an inventory of the company fleet. The inventory must include make, model, model year, fuel type, annual vehicle miles traveled and gallons of fuel type for one year (i.e. 50,000 gallons of gasoline etc.).
- D-49** Develop a fleet greening plan. Provide a copy of your plan.
- D-50** Provide the criteria used for buying new vehicles.
- D-51** Provide your vehicle's retirement policy.
- D-52** Develop a plan that outlines strategies to reduce vehicle miles traveled (VMT) and provide a copy. If you do not have a plan, provide a description of how you will incorporate VMT reduction plans into your policies in the future.

Additional Measures for Larger Employers

- D-53 Carefully plan delivery routes to eliminate unnecessary trips.
- D-54 Convert company vehicles to low emission vehicles (electric, hybrid, natural gas or alternative fuels).
- D-55 Provide car/van pool parking spaces.
- D-56 Provide commuter van.
- D-57 Offer a shuttle service to and from bus, train and/or light rail stops.
- D-58 Have a bike kit for employees who may have bicycle emergencies or problems.
- D-59 Offer electric vehicle recharge ports for visitors and employees' electric vehicles.

Appendix 1

SFGB's Green Business Template for Retailers



- A** Waste Reduction
- B** Energy Conservation
- C** Water Conservation
- D** Pollution Prevention
- E** General/Staff Education

REQUIRED ITEM

Bold items indicate a required measure in SF and must be completed, if applicable.

Email
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Website
sfgreenbiz.org

General/Staff Education Tip

Offer individual employee awards such as "zero waste hero of the month." Reward the winners with prizes such as gift certificates to local green businesses.

General/Staff Education

Complete all of the required general measures below:

- E-01** Track water and energy usage and solid and hazardous waste generation.
- E-02** Provide 3 on-going incentives or training opportunities to encourage management and employee participation in the Green Business Program. For example, incorporate Green Business into:
 - Performance appraisals, job descriptions, training programs, employee orientations.
 - Staff meeting discussions.
 - Your employee reference materials.
 - Your company newsletter or bulletins.
 - Your company suggestion and reward programs.
- E-03** Inform your customers about your business' environmental efforts and what you are doing to meet the green business standards. For example:
 - Post the Green Business logo, certification and pledge in a visible location.
 - Post reminders listing steps you are taking to be a Green Business.
 - Offer tours that highlight your Green Business successes.
 - Offer customers "green" service or amenities options.
 - Highlight your Green Business efforts and/or certification on your website, and link it to the GBP home page.
 - Other:
- E-04** Adopt a written environmental policy statement stating your businesses' commitment to operate as a green business and some practices that your business is implementing as a green business.
- E-05** Train new employees on green business procedures and practices implemented by your business through your company's employee handbook.
- E-06** Conduct all staff presentations periodically on your businesses environmental policy and ways in which employees can implement green business practices.

Appendix 2
Sustainable Cherry Hill Green Business Template

Sustainable Cherry Hill's Green Business Task Force
Sustainability Template

I. Water Conservation

Companies can save money and help conserve a precious resource by reducing the amount of water they use. In addition, the business community can ensure a cleaner freshwater supply by reducing the amount of stormwater runoff that eventually finds its way back to neighborhood streams.

No Cost Measures

- Review water bill monthly.
- Call water department for a service check if you notice any unusual increase in use.
- Check for leaks every 6 months.
- Keep a log of weekly meter reads.
- Document any changes and repairs made to plumbing fixtures and devices.
- Encourage water conservation by posting signs in restrooms and kitchens.
- Encourage staff and customers to report leaks.

Low Cost Measures

- Reduce water pressure to no higher than 50 psi by installing pressure reducing valves.
- Clean office windows only when needed.
- Use dry floor cleaning methods.
- Use rain barrels to collect water for office plants.

Optional Higher Cost Measures

- Install low flow aerators or flow reducing valves.
- Infrared faucets must be fitted with aerators not to exceed 0.5 gpm.
- If renovating, use low flush toilets (1.6 gallon per flush).
- If renovating, replace all urinals with waterless urinals.
- Reduce water pressure to no higher than 50 psi by installing pressure reducing valves.
- Install a rain garden to capture storm water runoff.

Tracking Success

- Track how much you are spending on water.
- Track water usage.
- Track how much you spent on water conservation items.
- Track how much you spent to repair leaks and plumbing.

Appendix 2

Sustainable Cherry Hill Green Business Template

II. Energy Conservation

Energy conservation and efficiency will not only save a businesses valuable resources and money, it will also reduce their carbon footprint. Companies will also be taking the necessary steps to helping the global community reduce the effects of climate change.

No Cost Measures

- Monitor each energy bill for savings and usage.
- Turn off all lights and electronic devices when not in use and at the close of business.
- Use standby mode for copiers and printers in operational use.
- Use natural lighting by rearranging workspace where appropriate.
- Use task lighting instead of lighting the entire area.
- Clean and maintain lighting fixtures.
- Clean permanent air filters every two months and change replaceable ones.
- Annually check entire heating and cooling system for leaks and air obstructions.
- Clean condenser and evaporator coils twice a year.
- Set thermostat to 76° F for cooling, 68° F for heating.

Low Cost Measures

- Use T-8 or T-5 fixtures or other energy efficient lighting.
- Use compact fluorescents (CFL) or LED lighting for non-dimming lighting.
- Exit sign efficiency should be 5 watts per sign by using LED signs or photoluminescent signs.
- Insulate hot water pipes and cold suction lines.
- Apply window film to reduce solar heat.
- Maintain HVAC and refrigeration system at least twice a year.
- Inspect and repair economizers on AC systems.

Optional Higher Cost Measures

- Purchase new equipment with energy saving features such as those with Energy Star.
- Instal energy-efficient double paned windows.
- Use or invest in renewable energy for at least 50% of your energy needs.
- Install load controllers to power off equipment.
- Use variable speed drives on motors and variable frequency drives on pumps.

Tracking Success

- Track how much you are spending on electricity.
- Track how much you are spending for heat.
- Track electricity usage.
- Track use of natural gas, oil or other fuel sources.
- Track how much you spent on energy efficiency items.

Appendix 2 Sustainable Cherry Hill Green Business Template

III. Pollution Prevention

Reducing the amount of toxins and pollutants that are discharged into the environment is a critical step for all companies to ensure a sustainable future for all generations.

No Cost Measures

- Identify actual and potential sources of pollution in your office and ways to prevent it.
- Reduce or eliminate the use of chemical pesticides.
- Keep dumpsters covered and impermeable to rainwater.
- Keep dumpster, parking areas clean and storm drain openings and basins clean.
- Use local vendors.
- Support encourage the use of car pool, shuttle bus programs and public transportation.
- Encourage employees to bicycle to work.
- Designate/reserve parking spots close to building for carpool vehicles.

Low Cost Measures

- Use low toxic cleaning products (those are Green Seal certified).
- Use unbleached and/or chlorine-free paper products.
- Use only non-toxic water-based pens, markers, etc.
- Use recycled or remanufacture laser and copier toner cartridges.
- Provide bicycle safe and secure storage for employees, customers and visitors.
- Have a bike repair kit for employees who run into bicycle emergencies.

Optional Higher Cost Measures

- Use rechargeable batteries.
- Use indoor bicycle storage facilities where possible.

Tracking Success

- Track how much you are saving by reducing toxic cleaners and pesticides.
- Track savings from using local vendors.
- Track savings by using recycled or remanufacture laser and copier toner cartridges.
- Track the amount of fuel that is saved by employee car pooling, biking or use of public transportation.

Appendix 2

Sustainable Cherry Hill Green Business Template

IV. Waste Reduction

Companies who reduce the amount of material and resources they consume and incorporate effective measures to eliminate as much waste as possible will take steps closer to being more sustainable organizations. In addition, they may save money in the process by not having to purchase products they are reusing.

No Cost Measures

- Designate a recycling coordinator to oversee recycling efforts and sustainable purchasing.
- Recycle or reuse paper including cardboard and boxes.
- Recycle all glass, plastic and aluminum.
- Eliminate the use of plastic bags.
- Encourage customers to bring their own reusable bags and maintain a supply for purchase.
- Reuse boxes and other packaging material for customer purchases.
- Encourage your employees to bring their own reusable ware.
- Make double-sided printing and copying a standard practice.
- Set printers and copiers to print with double-sided default.
- Eliminate junk and unwanted mail.
- Use green marketing (e-market services and use paper marketing only when needed).
- Work with vendors who use minimal and recyclable packaging materials and do not use Styrofoam, bubble wrap, etc.

Low Cost Measures

- If needed, use BPI certified compostable or paper bags with a least 40% consumer waste.
- Purchase all paper products with a minimum 50% post consumer waste (100% is recommended)
- Use janitorial paper (toilet paper, tissues, paper towels) with a minimum 35% post consumer content.
- Do not use liners for recycling containers and individual employee trash containers.
- Use corrugated or recyclable board in place of foam for packaging.

Optional Higher Cost Measures

- Maintain an electronic data base to eliminate the use of paper documents
- Use a filtrated system or purchase bulk water for guests.

Tracking Success

- Track how much you are spending on office paper products.
- Track the savings by not using plastic bags and liners for employee trash cans..
- Track savings by reusing packaging materials.
- Track savings by not purchasing bottled water and employee plastic ware.
- Track saving by reducing marketing material purchases.
- Track the number of certified compostable or paper bags bags that customers used for their purchases.
- Track the amount of paper and marketing material that is used.
- Track the amount of materials that are reused and those that are recycled.