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# Going Green at New York-Presbyterian: Hospitals As Sustainable Businesses

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# 1.Introduction

Throughout the past two decades, the reality of environmental degradation has come to the forefront. The health of the environment is most definitely deteriorating. Scientists and scholars have provided and continue to provide growing evidence of environmental problems associated with issues such as climate change, water scarcity, natural resource depletion, energy use, altered landscapes and species loss. It is certain that the creation and escalation of these environmental problems has been heavily influenced by human activity.

Focusing on knowledge in the areas of natural science, public health, and sustainable business, this paper will address environmentally harmful human activity associated with business. Business organizations exist to provide consumers with goods and services. All goods and services essentially come from nature (natural resources). Any given business could not exist without engaging in some kind of interaction with the environment. To this point, the relationship between a business and the environment has tended to be beneficial to the former and harmful to the latter. However, scientific findings are now exposing the true costs of environmental degradation, thereby conveying the importance of transforming the business landscape from traditional to sustainable.

In order to connect sustainable business theory to real world corporate operations, this paper will include a case study which describes and analyzes New York-Presbyterian's NYPgreen program, a relatively new project that has been established with the intention of introducing and enforcing environmentally responsible practices to the hospital and community. NYPgreen provides an example of how a large corporation can be transformed into a more environmentally-friendly entity.

## 1.1 Observed Changes in Climate

Based on scientific observations, climate change exists. Over time, temperatures have been increasing, sea level has been rising and amounts of snow and ice have been decreasing (IPCC 2). According to Al Gore's groundbreaking documentary "An Inconvenient Truth," the ten hottest years ever have occurred in the past fourteen years. Cities have been breaking temperature records for consecutive days at a time. Weather patterns have moved away from what we consider to be "normal." There have been increases in precipitation in some areas and increases in drought in other areas. Natural disasters have been occurring with increasing frequency. In 2004, Japan set its all-time record for number of typhoons experienced (*An Inconvenient Truth*). These weather pattern abnormalities have stemmed from increases in greenhouse gas and aerosol concentrations, land cover, and solar radiation (IPCC 5). It can be said, with high confidence, that these climate issues have primarily been caused by human activity.

With the way things are now, it seems clear that climate will continue to change over time. It is projected that emissions will increase by up to 90% by 2030. If current trends in the release of emissions continue, it is expected that Earth's temperature will rise 4-6 degrees Celsius above today's levels by the end of this century (Stoner 34). Studies also conclude that bodies of water, ecosystems, food, coastal regions, and the health of living organisms will all be negatively affected (IPCC). Different areas of the world will be affected in different ways and changes may be abrupt or irreversible, depending on the severity of the changes in climate.

The following chart describes the potential impacts of climate change based on projections through the mid to late 21$^{st}$ century.

| Phenomenon[a] and direction of trend | Likelihood of future trends based on projections for 21st century using SRES scenarios | Examples of major projected impacts by sector | | | |
|---|---|---|---|---|---|
| | | Agriculture, forestry and ecosystems | Water resources | Human health | Industry, settlement and society |
| Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights | *Virtually certain*[b] | Increased yields in colder environments; decreased yields in warmer environments; increased insect outbreaks | Effects on water resources relying on snowmelt; effects on some water supplies | Reduced human mortality from decreased cold exposure | Reduced energy demand for heating; increased demand for cooling; declining air quality in cities; reduced disruption to transport due to snow, ice; effects on winter tourism |
| Warm spells/heat waves. Frequency increases over most land areas | *Very likely* | Reduced yields in warmer regions due to heat stress; increased danger of wildfire | Increased water demand; water quality problems, e.g. algal blooms | Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially isolated | Reduction in quality of life for people in warm areas without appropriate housing; impacts on the elderly, very young and poor |
| Heavy precipitation events. Frequency increases over most areas | *Very likely* | Damage to crops; soil erosion, inability to cultivate land due to waterlogging of soils | Adverse effects on quality of surface and groundwater; contamination of water supply; water scarcity may be relieved | Increased risk of deaths, injuries and infectious, respiratory and skin diseases | Disruption of settlements, commerce, transport and societies due to flooding: pressures on urban and rural infrastructures; loss of property |
| Area affected by drought increases | *Likely* | Land degradation; lower yields/crop damage and failure; increased livestock deaths; increased risk of wildfire | More widespread water stress | Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water- and food-borne diseases | Water shortage for settlements, industry and societies; reduced hydropower generation potentials; potential for population migration |
| Intense tropical cyclone activity increases | *Likely* | Damage to crops; windthrow (uprooting) of trees; damage to coral reefs | Power outages causing disruption of public water supply | Increased risk of deaths, injuries, water- and food-borne diseases; post-traumatic stress disorders | Disruption by flood and high winds; withdrawal of risk coverage in vulnerable areas by private insurers; potential for population migrations; loss of property |
| Increased incidence of extreme high sea level (excludes tsunamis)[c] | *Likely*[d] | Salinisation of irrigation water, estuaries and fresh-water systems | Decreased fresh-water availability due to saltwater intrusion | Increased risk of deaths and injuries by drowning in floods; migration-related health effects | Costs of coastal protection versus costs of land-use relocation; potential for movement of populations and infrastructure; also see tropical cyclones above |

**Source: IPCC Climate Change 2007: Synthesis Report**

## 1.2 Water Scarcity

Another environmental issue that is becoming prominent is water scarcity. While about 70% of earth's surface is covered with water, only 1% of this water is potable (U.S. EPA). Unlike climate change, which seems as if it is not an immediate concern, water scarcity is affecting populations all over the world at this very moment. Civilizations on every continent are

lacking adequate supply of water for drinking, irrigation, and sanitation. Evidence suggests that over 1 billion people lack access to safe drinking water and 2 billion people lack access to basic sanitation (Pirages 9). According to the United Nations, "There is enough freshwater on the planet for six billion people but it is distributed unevenly and too much of it is wasted, polluted and unsustainably managed" (*Water Scarcity*). Water is often misconceived to be a renewable resource, but it is in fact finite.

### 1.3 Energy Use

Energy expenditure is another issue that has implications for the condition of the environment. Unfortunately, conventional energy production and consumption go hand in hand with environmental degradation (Goldemberg 9). Problems with energy use are related to greenhouse gas emissions, climate change, which has been previously discussed, as well as a number of additional environmental concerns including air pollution, acid rain, ozone depletion destruction of forests and the release of radioactive materials (Dincer 847).

Acid Rain is a form of pollution that results from the combustion of fossil fuels. Rain becomes acidic when high levels of sulfur dioxide and nitrogen oxide are present in the atmosphere. 70% of sulfur dioxide emissions have been linked to the generation of electricity, residential heating, and industrial energy use. 48% of nitrogen oxide emissions have been linked to road transport. The remaining nitrogen oxide emissions come from fossil fuel combustion in stationary sources (Dincer 847). Acid rain causes widespread ecological damage.

Aside from acid rain, energy expenditure also contributes to stratospheric ozone depletion. Ozone depletion is caused by emissions of CFCs, nitrogen oxide, and halons (chlorinated and brominated organic compounds). CFCs are emitted by refrigeration and air conditioning equipment, nitrogen oxide emissions are produced by the combustion of fossil fuels, as previously noted, and halons are produced by various applications related to agriculture,

dry cleaning, and fire suppression (Dincer 874). Aircrafts also play a major role in ozone depletion.

The following table offers a partial list of environmentally harmful chemicals that are emitted by energy-intensive activities. (The Human Disruption Index is a ratio of the human-generated flow of pollutant to the natural, or baseline, flow.)

**TABLE 3. ENVIRONMENTAL INSULTS DUE TO HUMAN ACTIVITIES BY SECTOR, MID-1990s**

| Insult | Natural baseline (tonnes per year) | Human disruption index[a] | Share of human disruption caused by | | | |
|---|---|---|---|---|---|---|
| | | | Commercial energy supply | Traditional energy supply | Agriculture | Manufacturing, other |
| Lead emissions to atmosphere[b] | 12,000 | 18 | 41% (fossil fuel burning, including additives) | Negligible | Negligible | 59% (metal processing, manufacturing, refuse burning) |
| Oil added to oceans | 200,000 | 10 | 44% (petroleum harvesting, processing, and transport) | Negligible | Negligible | 56% (disposal of oil wastes, including motor oil changes) |
| Cadmium emissions to atmosphere | 1,400 | 5.4 | 13% (fossil fuel burning) | 5% (traditional fuel burning) | 12% (agricultural burning) | 70% (metals processing, manufacturing, refuse burning) |
| Sulphur emissions to atmosphere | 31 million (sulphur) | 2.7 | 85% (fossil fuel burning) | 0.5% (traditional fuel burning) | 1% (agricultural burning) | 13% (smelting, refuse burning) |
| Methane flow to atmosphere | 160 million | 2.3 | 18% (fossil fuel harvesting and processing) | 5% (traditional fuel burning) | 65% (rice paddies, domestic animals, land clearing) | 12% (landfills) |
| Nitrogen fixation (as nitrogen oxide and ammonium)[c] | 140 million (nitrogen) | 1.5 | 30% (fossil fuel burning) | 2% (traditional fuel burning) | 67% (fertiliser, agricultural burning) | 1% (refuse burning) |
| Mercury emissions to atmosphere | 2,500 | 1.4 | 20% (fossil fuel burning) | 1% (traditional fuel burning) | 2% (agricultural burning) | 77% (metals processing, manufacturing, refuse burning) |
| Nitrous oxide flows to atmosphere | 33 million | 0.5 | 12% (fossil fuel burning) | 8% (traditional fuel burning) | 80% (fertiliser, land clearing, aquifer disruption) | Negligible |

**Source: UNDP World Energy Assessment**

## 1.4 Vanishing Forests and Species

Another environmental issue that poses major threats to biodiversity and ecosystem health is deforestation. Deforestation has been occurring since the beginning of human history, but has become a more serious problem in the last 50 years or so (Pirages 13). The U. N. Food

and Agricultural Organization has estimated that, over the past two decades, 15.4 million hectares of tropical forests have been destroyed each year (Pirages 14). As trade in wood products from tropical forest regions continues to grow, deforestation will continue. The felling of trees in forests implies habit loss, which can lead to species extinction. Preserving biodiversity is of increasing concern for two reasons. First, it is necessary for future plant and animal breeding. Second, and more importantly, it guarantees the provision of life-supporting ecosystem services.

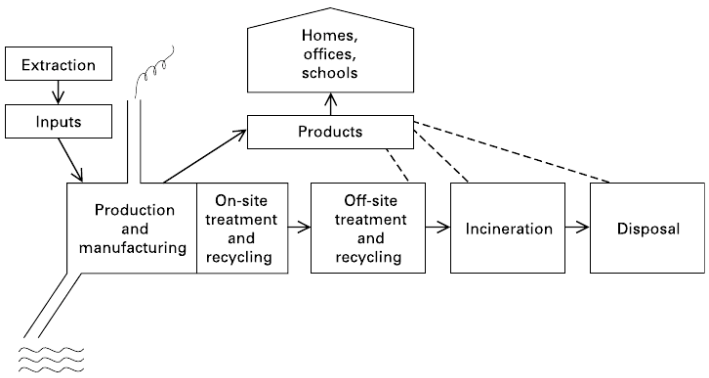
## 2. How Humans Affect the Environment

At this point, it is clear that the environment is being drastically altered. Although there are many causes for environmental alteration, the majority can be traced to human activity.

### 2.1 Greenhouse Gases

According to the IPCC, most of the observed increase in global average temperatures since the mid 20th century is *very likely* due to the observed increase in anthropogenic greenhouse gas (GHG) concentrations" (5). There is a growing consensus around the science of climate change which tells us that human-caused emissions of GHGs are causing the Earth to warm and climate patterns to change. Concentrations of GHGs in the atmosphere have already doubled what they were in pre-industrial times (Stoner 170). Energy-related carbon dioxide is a major contributor to global GHG emissions. In 2007, energy-related CO2 emissions totaled to 28.8 gigatons (Gt). Studies suggest that the power sector will be responsible for more than half of the increase in GHG emissions between 2007 and 2030. Coal-fired power generation alone will yield a 60% increase in emissions (Stoner 170). Another sector that is responsible for a large percentage of GHG emissions is the industrial sector.

The following diagram depicts the workings of an industrial production plant. A plant like this can release toxic emissions at during any stage of the production cycle.




**Source:** ***Environmental Law, Policy, and Economics***

## 2.2 Unsustainable Use of Natural Resources

Another way in which human activity directly affects the state of the environment is through the use of natural resources. Humans underestimate the value of natural resources and tend to use them as if they are "free" and infinite when in reality, Earth's resources are priceless and limited (Stoner 36). Everyday, useful resources are wasted due to human exorbitance and carelessness.

Water, an essential resource for human well-being, is one example of a natural resource that is overused and unevenly distributed. Because of exorbitant water use, humanity is currently facing a global water shortage. According to the World Health Organization, water scarcity affects one in three people on every continent around the globe ("10 Facts").

Overuse of energy, another essential resource, is also proving to cause a great deal of environmental harm. According to the UNDP, "the environmental consequences of current patterns of energy generation and use make up a significant fraction of human impacts to the environment" (Goldemberg 11). The over-use of energy-producing natural resources has stemmed from advances in science, technology, and developments in industrial processes and structures. Human needs and activities that require energy expenditure include transportation, electricity, entertainment, cooking, cleaning, etc. As technologies advance and energy intensive processes that were once conducted by humans are increasingly being taken over by machines, energy output is drastically increasing.

## 2.3 Deforestation

Deforestation is another human activity that causes ecological harm. Forests are generally destroyed for settlements, roads, railways, agriculture, ranching, and industry. Destruction of forests also occurs due to social and economic factors such as political turmoil and property rights. Forests provide a variety of natural resources that are useful to humans. Timber from

tropical forests tends to be used for plywood, decorative objects and paper (Pirages 191). Temperate forests offer timber of higher quality that is generally used for construction.

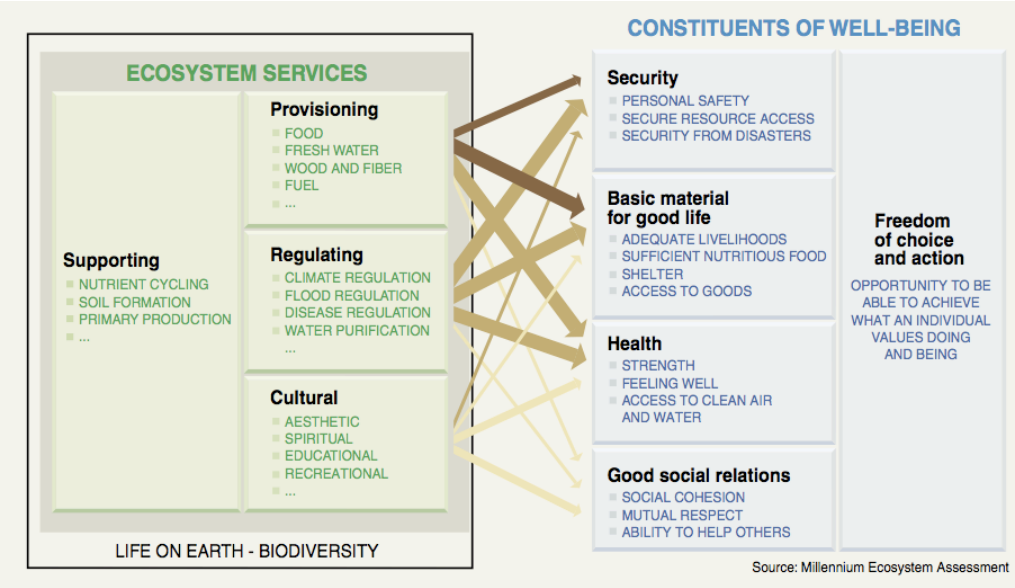
Deforestation is a world-wide issue. Ecologists have argued that the degradation of the Amazon Rainforest has been caused by ranching and agricultural practices that have been deemed unsuitable for tropical soils. Much of Africa is being deforested by pressures associated with urban expansion, civil war, and lack of alternative cooking fuels. Japan has been a major paper manufacturer since the demand for paper skyrocketed during the postwar period. Brazil serves as another home for a large number of paper plantations. Brazilian paper plantations provide increasing quantities of pulp for domestic use, plus a growing quantity for export. Forests throughout Malaysia, Indonesia and Sumatra supply pulp to mills located in China, Taiwan, Korea and India (Pirages 193). Because forestry has become a global industry, the destruction of forests has become an issue in countries all over the world.

## 3. How the Environment Affects Humans

Thus far, dramatic environmental impacts created by humans have been thoroughly considered. We must now analyze how humans are affected in return. It is a two way street. The way humans use resources is irrevocably damaging to the environment, such that the very life systems on which humanity depends are under threat (Stoner 33). Through lack of consideration for the health of the environment, humans are only hurting themselves. Ecosystem services are being lost due to destruction, human health is being jeopardized due to pollution, resources are running low due to over-use, and ecological security is now endangered due to deforestation.

### 3.1 Ecosystem Services

The environment provides humans with various ecosystem services. The Millennium Ecosystem Assessment has divided these services into four categories: supporting, provisioning, regulating, and cultural. Most of the services provided by the environment are essential to human health and livelihood. The following diagram depicts the links between various ecosystem services and constituents of well-being:




**Source: Millennium Ecosystem Assessment**

Based on the information in diagram on the previous page, it is clear that humans depend heavily on services provided by the environment. Unfortunately, if humans continue to interact with the natural world in ways that are harmful, constituents of human well-being will face serious risks.

### 3.2 Effects of Pollution on Human Health

Many of the major pollutants released into the environment as a result of human activity have been shown to adversely affect human health. According to the article "Urban and Transboundary Air Pollution," several toxins that travel by air can cause major damage to the human respiratory system. One such pollutant is sulfur dioxide, a chemical that is produced by the combustion of sulfur contained in fossil fuels. When sulfur dioxide combines with other by-products of fossil fuel combustion such as ash and soot, it forms what is commonly known as "smog." This combination of smoke and fog has been shown to induce asthmatic responses in children and adults. Furthermore, studies have revealed that persons with chronic heart and lung disease who have been exposed to the acidic aerosols that make up "smog" experience shorter life expectancies than those who are not exposed (Ashford 3).

Another type of air pollution that is closely related to air contamination produced by sulfur dioxide is particulate pollution. This type of pollution has been shown to increase mortality rates. For example, during the 1950s, mortality rates in London drastically increased due to the heavy "smog" episodes that plagued the industrial city throughout the period (Ashford 4). Some particulates, specifically those that cause acid rain, contribute to heart and lung problems including asthma and bronchitis.

Additional sources of air pollution that have been shown to adversely affect the human respiratory system are ozone and nitrogen oxides. These are formed when the sun's rays hit the waste products produced by internal combustion engines (nitrogen dioxide and unburned

hydrocarbons). When the sun's rays react with these products, nitrates, ethers, alcohols and acids are produced. These toxins are then present in the air that we breathe. Evidence suggests that these gases can cause damage to any area within the human respiratory system that lies between the airways and the alveoli (Ashford 4). The effects of ozone have been clearly documented in animal studies. When exposed, even briefly, to high doses of ozone, animals experienced severe damage to their lower respiratory systems. The effects of nitrogen oxides have been tested on healthy human subjects. The results of these tests were similar to those yielded by the ozone tests on animals.

A final source of air pollution that has been shown to harm the human respiratory system is carbon monoxide. This toxin impairs oxygen transport throughout the human body. This affects the cardiovascular and nervous systems. Thousands of people die each year from carbon monoxide poisoning. The majority of casualties occur amongst factory workers and others who spend a significant amount of time in poorly ventilated areas where bio-fuels are burned (Ashford 5).

### 3.3 Groundwater Contaminants

Many dangerous pollutants that are harmful to human health are dispersed throughout the environment through waterways. Most are released by agricultural and industrial sources. Humans can be exposed to polluted groundwater in a number of ways, the most common being direct consumption. Swimming in contaminated lakes and rivers can also be quite risky. Certain chemicals can escape from groundwater, rise through soil and be released in gaseous form. They can also seep into basements of homes where residents can be exposed through inhalation.

Chemicals that spread through waterways include toxic heavy metals, pesticides, and volatile organic compounds (VOCs). Exposure to the toxic heavy metal lead has been shown to cause adverse effects on the neurobehavioral development of children. Chronic exposure to

arsenic causes abnormal skin pigmentation, hyperkeratosis, chronic nasal congestion, abdominal pain and various cardiovascular issues. Low levels of exposure to arsenic have been associated with cancer of the skin, lungs, lymph glands, bone marrow, bladder, kidneys, prostate and liver (Ashford 8). Consumption of the heavy metal cadmium causes nausea, vomiting, abdominal cramping, diarrhea, kidney disease and skeletal weakening (Ashford 9).

Pesticides pose a major threat to humans when carried throughout surface and groundwater. The dangers of pesticides were first revealed in Rachael Carson's eye-opening book *Silent Spring.* The first paragraph of a chapter entitled "Elixirs of Death" reads, "…synthetic pesticides have been so thoroughly distributed throughout the animate and inanimate world that they occur virtually everywhere. They have been recovered from most of the major river systems and even from streams of groundwater flowing unseen through the earth" (15). Today, approximately 1 billion pounds of these chemicals are used for agricultural purposes in the U.S. each year (Ashford 9).

The effects of pesticides on human health vary. Different types of pesticides may cause harm to the human nervous system or endocrine system. Others can cause skin and eye irritation. Some pesticides are listed as carcinogens, or cancer-causing agents (US EPA). The exact health affects of many pesticides remain unknown.

Other very common groundwater contaminants include VOCs, or volatile organic compounds, which are used in a variety of industries within the U.S. These chemicals can be found in widely used solutions such as paint-thinners, degreasing compounds and dry-cleaning fluids. In the past, it had been common practice to discharge these chemicals directly to land, bury them in drums, or store them in septic tanks. VOCs can cause headaches, kidney failure, hepatitis, impaired cognition and cancer (Ashford 11).

Throughout history, various environmental disasters have illustrated the effects of pollution on human health. One of the most famous public health incidents related to human-caused pollution is the story of Love Canal. Love Canal is a hazardous waste site on top of which a residential development was built in the 1950s (Gibbs 20). The site was originally purchased in 1892 for the purpose of digging a canal. The project went underway, but was abandoned in 1920. From that time until 1953, Hooker Chemical Company Corporation, The City of Niagara Falls, and The US Army dumped a myriad of chemicals into the giant pit that was left behind (Gibbs 21). Years later, 82 different chemical compounds, 11 of which are suspected carcinogens, were rising upward through the soil, entering the backyards and basements of 100 homes and a public school (Beck). Birth defects, high rates of miscarriages and high white-blood-cell counts are just a few of the abnormalities that plagued residents of Love Canal. Essentially, improper management of chemical waste destroyed the lives of hundreds of innocent people.

### 3.4 Threats to Ecological Security Due to Deforestation

Aside from the over-use of energy, another example of environmental alteration that causes negative repercussions for humans is deforestation. The destruction of forests is a threat to ecological security for many reasons, the three main reasons being the impacts on carbon and hydrological cycles, loss of habitat and biodiversity, and related hardships that indigenous farmers must face.

Every forest is a carbon sink. The function of a carbon sink is to store just the right amount of carbon to keep the Earth's climate in balance. When forests are destroyed, harmful carbon dioxide enters the atmosphere. Since about 1950, tropical deforestation has caused the release of more carbon than all other non-fossil sources of carbon emissions combined (Pirages 189). The destruction of the tree canopy also offsets hydrological cycles by encouraging the drying up of springs as well as a decline in precipitation. These disruptions ultimately become

problematic for humans. A build-up of carbon in the atmosphere contributes to the threat of climate change while changes in hydrological cycles contribute to the threat of water scarcity.

Tropical forests contain more biodiversity than any other regions on Earth (Pirages 189). The areas are so species-rich that many inhabitants have yet to be classified by scientists. Because all life forms in tropical ecosystems are highly interdependent, the extinction of one species inevitably leads to the extinction of others. Loss of biodiversity not only causes losses to various species within rainforests, but also negatively impacts humanity. Some of the most significant resources humans acquire from tropical regions are medicines and pharmaceutically useful biochemicals.

Indigenous farmers are also negatively affected by deforestation. It is estimated that over 50 million people currently inhabit tropical regions of the world (Pirages 189). A majority of these rainforest inhabitants are shifting cultivators. When invasion of forests or felling of trees occurs, the livelihood of rainforest dwellers is threatened. During invasions, some inhabitants are even outright killed. The aftermath leaves farmers with no land or means of survival. Thus, they have no choice but to contribute to deforestation themselves, as cutting down trees becomes the only way to make a living.

## 4. The Corporate Sustainability Imperative

Scientific findings such as those found in the *Millennium Ecosystem Assessment*, IPCC's *Climate Change 2007: Synthesis Report*, and additional publications highlighting environmental degradation have brought the urgency of environmental protection to light, paving the way for the emergence of the sustainable business field. A sustainable business is an enterprise that "minimizes environmental impact and maximizes resource conservation and reuse" (Cohen 2). It is a business that takes a triple-bottom-line approach, maximizing benefits to people and the planet without sacrificing profitability. While most traditional businesses focus on the present and near-future, triple-bottom-line enterprises go beyond the typical four-quarter scope to consider what kind of influence they will have over generations of time.

### 4.1 Why Should Businesses Care About Sustainability?

People are beginning to place high value on clean air, clean water, the preservation of the world for future generations and other aspects of sustainable development (DeSimone 7). The state of the environment is now an issue of public concern. Businesses aim to satisfy the public. If big organizations want to secure the support of the consumer base, it is best to take on sustainability initiatives.

The quest for sustainability has already begun to transform the competitive landscape. Forward-thinking businesses that have vowed to increase sustainability are developing competencies that are enabling them to rise above competitors (Nidumolu 58). A positive environmental reputation can benefit recruitment, retention, and morale. A negative environmental reputation can have the opposite effects (DeSimone 8). Promoting change toward more sustainable operations will add value to any organization, while avoiding change will harm any organization. Stuart Hart's *Capitalism at a Crossroads* introduces the idea of "natural selection" applied to business. This idea holds that over time, the corporations that are most

sustainable will replace those with outdated, unsustainable strategies. At the same time, new sustainable businesses will be introduced. Only companies that make sustainability a goal will have a competitive advantage in the future (Nidumolu 58). Long-term success will come to those companies that not only comply with environmental regulations, but do so more efficiently and effectively than other companies.

Financial benefits of increasing sustainability may be difficult to calculate, can take years to emerge, frequently stem from intangible factors such as enhanced reputation, and often take the form of avoided costs rather than cash inflows, however, these benefits are both real and significant and will become more so into the future (DeSimone 24). Financial benefits of increasing sustainability include reducing current costs of poor environmental performance, reducing potential future costs of poor environmental performance, incurring reduced costs of property, plant and equipment, improving market opportunities, and enhancing corporate reputation and image (DeSimone 25).

Businesses are the dominant institutions in today's society. Because of their tremendous presence, they have a huge impact on people and on the environment. At this point in time, there is no alternative to sustainable development. There is no way to maintain current business processes without driving our world toward natural resource extinction. If we want business to thrive well into the future, it must be transformed.

### 4.2 The Challenges to Corporate Sustainability

Any type of business transformation will undoubtedly come with difficulties. The major challenge to corporate sustainability is buying into the misconception that business and sustainability are fundamentally incompatible. Most businesses are convinced that becoming environmentally-friendly will erode their competitiveness and increase costs. However, we are

increasingly seeing the possibilities for businesses to become both socially responsible and profit-earning through the success stories of companies such as Ben & Jerry's (Bilson). The ice cream shop's use of the triple bottom line approach to business has proven to be advantageous, yielding both bottom-line and top-line returns.

A business will face several internal barriers when striving for eco-efficiency. One barrier to eco-efficiency is lack of environmental awareness within an organization. Considering the scale of change needed to become more sustainable, awareness is essential. A related barrier is the presence of organizational structures that inhibit the cross-functional interaction necessary to integrate environment into every area within a business. When making significant changes, every member of every department of a business must be on board. This brings up another hindrance-commitment from senior management. If management refuses to participate in the promotion of changes surrounding sustainability, these changes will not be successfully implemented. One final barrier to eco-efficiency within an organization is a lack of systems and tools. In order to bring the environment into the business decision-making process, appropriate systems must be put into place and necessary tools must be utilized.

### 4.3 Making the Transformation: From Traditional Business to Sustainable Business

The book *Eco-Efficiency: The Business Link to Sustainable Development* lists several key elements that allow environmental progress to be made within the structures of a business. These elements are leadership, foresight, culture, management tools, research and development, operations, and after-service disposal (DeSimone 92).

Leadership is the most important element for environmental progress. Without the support of top management, any kind of transformation within a business could not occur. It is up to management to inform staff about long-term sustainable development goals, communicate

challenges that must be met, motivate workers to participate in new developments, and show workers that eco-efficiency requires day-to-day behavioral changes (DeSimone 94). Leaders must create a communal sense of ambition in facing challenges of sustainable development and must provide a detailed plan for staff members to follow in order to achieve goals.

Foresight, or looking toward the future, is important in terms of long-run improvements. A business must have a clear vision of where it is headed. The sustainable business paradigm "recognizes that the earth is finite, its capacity for recovery from damage because of resource ill-use is limited, and that public and other pressures to modify business behavior will inevitably increase" (DeSimone 97). A forward-thinking organization will assess the impact of these pressures on its industry in order to reduce potential risks and take advantage of potential opportunities. A company that has built its insights and understanding into its long-term plans will benefit accordingly.

In order to make the transformation from a traditional business to a sustainable business, the entire culture of an organization must be altered. The establishment of structures and expectations is essential for employee engagement. Developing a culture that is supportive of sustainability initiatives takes time and requires constant reinforcement (DeSimone 102). It also requires regular feedback on performance and praise for accomplishments. Communication is key to transforming the culture within a business.

There are several management tools that help to identify opportunities associated with sustainability initiatives. One such tool is the implementation of an environmental management system. An environmental management system exists within an organization to identify and assess the organization's environmental impacts, understand legal obligations associated with

environmental impacts, develop plans for improvement, devise means of implementing these plans and monitor performance (DeSimone 108).

Environmental duties within an organization should be assigned to a specific committee. A sustainability committee exists to provide managers with the necessary support needed in dealing with the introduction of new environmental initiatives as well as the enforcement of initiatives that already exist (Stoner 134). Such a committee is responsible for ensuring the organization's compliance with all aspects of environmental laws and regulations, raising awareness, and encouraging all members of the institution to support "greening" efforts. By delegating environmental responsibilities to a specific group of people, issues can be studied in-depth so that comprehensive decisions regarding environmental protection efforts can be made (Stoner 135).

Research and development is vital when making any kind of changes within a corporation, especially increasing sustainability. When acting upon a long-term vision, R&D is crucial. It enables the environmental challenges of tomorrow to be dealt with today (DeSimone 122). In terms of the long-run, new products and processes are necessary. For the present, products and processes must be improved upon (DeSimone 124). For example, some electronics manufacturers are utilizing R&D to improve the environmental acceptability of TV sets by using recyclable materials, reducing the use of plastics, and eliminating toxic substances from products and manufacturing processes.

Introducing sustainability to operations mostly involves waste minimization. Every organization creates excess waste that can potentially be saved or reused. The basic principles of waste reduction appeal to widely shared values such as thrift. Reducing waste can be as simple

as choosing alternative products, reusing and recovering materials and changing processes and techniques.

A final key element for environmental progress to be made within a business is after-service and disposal. Every company has a responsibility to consider the environmental impacts created by the use and disposal of items. Proper disposal policies within a business are generally influenced by external regulations. These policies end up benefitting companies, as they enhance competitive advantage, involve lower operating costs, increase customer satisfaction, and reduce the risk of long-term liabilities (DeSimone 132).

The authors of Harvard Business Review article *Why Sustainability is Now the Key Driver of Innovation*, have broken down the transformation from a traditional business to a sustainable business into 5 stages. Stage 1 is entitled "Viewing Compliance as Opportunity" and deals with laws and regulations (Prahalad 58). Mandatory environmental regulations vary by region. By law, every organization must comply with these. In addition to legal regulations, businesses may feel pressured to meet further environmental standards that have been proposed by various non-governmental organizations. These are generally more stringent than legal obligations, but are voluntary. While most organizations may be tempted to settle for the lowest environmental standards permitted by law, it is extremely beneficial to comply with more stringent standards. In fact, this compliance can be viewed as opportunity. In the long run, it will save time and money. For example, in the early 1990's, Hewlett Packard discovered the potential toxicity of lead. By taking initiative to explore alternatives, the company was fully prepared to comply with the European Union's Restriction on Hazardous Substance Directive, which proposed regulations on the use of lead paint in electronics, when it emerged in 2006 (Prahalad 58).

The second stage of transforming from a traditional business to a environmentally responsible business is "Making Value Chains Sustainable" (Prahalad 59). After a business has brought itself up to speed in terms of compliance with regulations, it tends to re-work the links on its supply chain. The initial aim of supply chain substitution tends to be image enhancement, but can lead to other benefits such as cost reduction and the creation of new business. By making purchases from environmentally responsible suppliers, companies achieve reductions in waste, decreases in emissions, and increased energy efficiency (Prahalad 60). This allows a company to operate in a more sustainable way.

The third stage of sustainable innovation is "Designing Sustainable Products and Services" (Prahalad 61). At this stage, businesses tend to realize that sustainable enterprises receive more public and consumer support than those enterprises that are lagging behind in the drive towards sustainability. Thus, they begin to completely redesign the way they provide goods and/or services.

"Developing New Business Models" comes next (Prahalad 63). Changing an organization's business model requires exploring alternatives to current means of doing business as well as understanding how to meet the needs of consumers in different, more effective ways (Prahalad 64). At this stage, a business aims to find novel ways of capturing and delivering value (Prahalad 60). This can be done through new partnerships, technologies, and methods. For example, Waste Management, a company that transports waste to landfills, discovered that a myriad of reusable materials can be found in the waste it carries. With this idea, the company set up a unit to pull valuable objects from piles of junk. Today, its "Green Squad" earns $9 billion a year in materials that would have otherwise wound up in landfills (Prahalad 63).

The fifth and final stage in the process of becoming a sustainable business is "Creating Next Practice Platforms." The central challenge to this stage is looking through the sustainability lens to question the logic behind business as it exists today (Prahalad 61). By questioning norms, forward-moving changes are often developed. To do this, companies must understand how renewable resources affect business. In addition, they must possess the expertise to synthesize business models, technologies and regulations in different industries. With these tools, business organizations will have the ability to change existing paradigms and develop innovations that lead to next-practices.

# 5. Going Green at New York- Presbyterian

Organizations all over the map, from food trucks to large corporations, are making the transformation from traditional business to sustainable business. In order to keep up with other forward-thinking organizations, New York- Presbyterian hospital has joined the race towards environmental responsibility.

## 5.1 Introducing NYPgreen

To bring sustainability to the forefront, New York-Presbyterian has created a program called NYPgreen. Basic information about the program, including its mission and goals, can be found on the hospital's official website. The "NYPgreen - About Us" section reads:

> **"**New York- Presbyterian is resolved to put patients first in everything we do and we recognize the intrinsic relationship between sustainable practices and ecological health. By adopting environmentally responsible practices in the hospital and the community, it is our goal to create a healthier environment for our patients, their families, and our staff, and improve health outcomes for the communities we serve."

The core values NYPgreen has been founded upon include respect for limited resources, working together to build a sustainable organization, leadership in sustainable healthcare, understanding the challenges that sustainable operations present, striving towards ecological innovation, and assuming responsibility for ensuring the future through sustainable practices ("NYPgreen: Overview").

NYPgreen initiatives are handled by the Senior Executive Sustainability Committee (SESC), a multi-disciplinary team of hospital employees. Members of this committee include representatives from Administration, Operations, Nursing, Perioperative Services, Support Services, Facilities, Environmental Health and Safety, Government, and Community Affairs ("NYPgreen: Overview").

The SESC has developed a comprehensive set of goals for "greening," focusing on areas in which there are opportunities to reduce waste, minimize energy use and decrease the organization's overall carbon footprint.


### 5.2 Waste Management

To reduce waste, New York-Presbyterian has set up a recycling program for paper, metal and plastic bottles. Recycling bins are located throughout clinical and administrative areas of the hospital. Signs in some areas indicate which types of items should be recycled and which should be discarded in regular trash bins. Recycling guidelines can also be found on hospital computers. Unwanted or obsolete hardware such as PCs, printers and fax machines are collected by IT staff members and other electronics such as PDAs, data storage devices, telephones and batteries should be directed to the telecommunications department for proper disposal ("NYPgreen: Initiatives).

On average, NYP uses over 10,000 printer toner cartridges on an annual basis. For this reason, an additional program has been established for recycling used cartridges. In addition to reducing waste, this effort also reduces costs, as each printer toner cartridge used to contribute about 2 pounds to the weight of the regular trash stream. By removing them from this stream, disposal costs have been drastically reduced.

To minimize paper waste, NYP has defaulted the settings on all photocopy machines, in both clinical and administrative areas of every hospital campus, to print double-sided copies. In

the event that an individual copy job should require one-sided copies, a user may temporarily revert the settings on the machine. Prior to the establishment of the double-sided photocopy program, NYP was using more than 1,000 tons of copy paper on an annual basis. Immediately following the launch of the program, the Procurement and Strategic Sourcing Department reported significant decreases in paper demand ("NYPgreen: Initiatives").

Another waste reduction program that has been implemented at NYP is clinical device reprocessing for single-use medical devices such as surgical forceps, endoscopes and stethoscopes. Reprocessing is done by a FDA regulated outside organization that inspects, tests, cleans, sterilizes and packages the devices in such a way that the quality, characteristics, and functionality of the devices are not significantly affected and that the device will continue to operate in a safe and effective manner for its intended use. Since the start of this program, NYP has reduced the amount of single-use clinical device waste it produces and now saves over $1 million associated with medical device costs ("NYPgreen: Initiatives").

To rid of obsolete or unwanted medical or non-medical devices that are not suitable for reprocessing, NYP has established a supply donation program. To make this possible, the hospital has partnered with Afya, an organization that collects donation items from healthcare facilities and delivers them to countries in need ("NYPgreen: Initiatives).

Hazardous waste volumes are closely monitored by the Health and Safety Department in collaboration with the Lab, Pharmacy, Facilities and Support Services departments. New opportunities are continually sought to minimize the volumes within hazardous waste streams. The Health and Safety Department follows hazardous waste reduction practices set forth by the EPA and the New York State Department of Environmental Conservation ("NYPgreen: Initiatives").

### 5.3 Energy Management

New York-Presbyterian is an established leader in energy management and has been recognized as such by the US Environmental Protection Agency since 2005. In 2005, the EPA awarded NYP with an ENERGY STAR Award for leadership in recognition of the hospital's efforts to reduce greenhouse gas emissions through energy efficiency. In addition to this, NYP has been granted Partner of the Year awards for Energy Management in 2005 and 2006 and Partner of the Year awards for Sustained Excellence in Energy Management in 2007, 2008, 2009, 2010, and 2011. Out of 15,000 organizations, New York-Presbyterian was the sole recipient of the Sustained Excellence in Energy Management award. The hospital remains dedicated to energy efficiency through energy studies, infrastructure remodeling, LEED building design, NYSERDA (NYS Energy Research and Development Authority) grants, and commitment to sustainable maintenance ("NYPgreen: Initiatives").

In order to encourage staff to conserve energy in the form of automobile fuel, NYP launched a web-based employee car-pool program known as CommuterLink. This program, which is sponsored by the New York City Department of Transportation, connects hospital employees with other employees who are interested in ride-sharing. The online program is easy to use and can be accessed by all employees by logging onto their hospital web account ("NYPgreen: Initiatives").

In recent years, the City of New York has made it easy to travel by bicycle by constructing new bike lanes and promoting awareness around the presence of cyclists on paths and roadways. NYP is also encouraging employees to use alternative modes of transportation to travel to and from the hospital and around the city. NYPgreen is collaborating with the City of New York and the Department of Transportation to install bike racks around hospital premises.

Another green transportation initiative that has been rolled out by NYPgreen is the introduction of 13 hybrid vehicles to the hospital's cross-campus fleet ("NYPgreen: Initiatives"). The hybrid Ford Escapes boast fuel efficiency of around 34 mpg.

A second energy conservation initiative that has been rolled out by NYPgreen is the "Take the Stairs Campaign," a program that encourages hospital employees to avoid elevators when feasible. The hospital's campaign messages work parallel to the Mayor's plaNYC advertisements, which encourage New Yorkers to pave the way to a greener future by making small changes in routine activities. Signs that state "Burn Calories, Not Electricity," provided by the NYC Department of Health and Mental Hygiene, have been posted through New York-Presbyterian facilities. Since the start of the "Take the Stairs Campaign," statistics have shown a significant increase in stair usage among patients and employees ("NYPgreen: Initiatives").

### 5.4 My Involvement in NYPgreen

This February, 2012, New York- Presbyterian accepted me to fill the new position of Sustainability Intern through the Spring semester. Under the supervision of the Sustainability Officer, I have worked to advance and improve various aspects of New York- Presbyterian's sustainability program.

### 5.5 Outreach Via Infonet

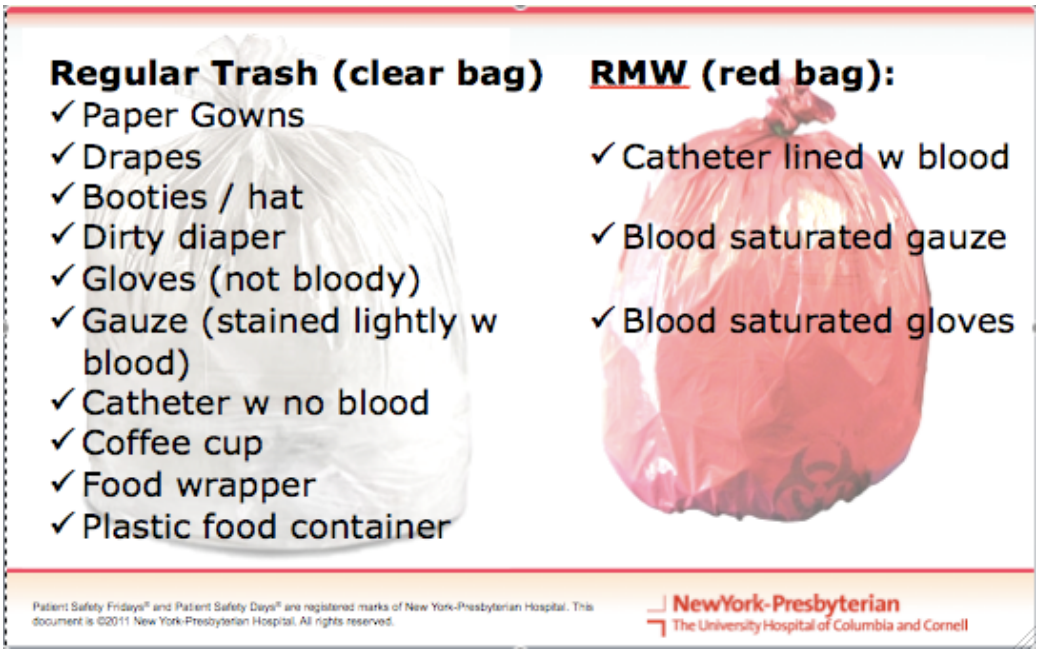
Because NYPgreen is a relatively new program, many employees are unfamiliar with its mission. In order for NYPgreen to be a success, every New York-Presbyterian hospital employee must not only be aware of the program, but must also support it. For this reason, employee outreach is necessary. One of the main resources used to convey goings-on around NYP is the hospital's Infonet. This is an internal database that is accessed by all employees through hospital computers. It relays important news, events, meetings, and information about program initiatives.

When I first started my internship at NYP, the NYPgreen Infonet page was poorly organized, difficult to navigate, and outdated. Thus, I was presented with the task of connecting with the web-programming and marketing teams to re-vamp it. Working together, we were able to design a new and improved web-page layout that has proven to be much more accessible to employees.

### 5.6 Regulated Medical Waste Separation

Another one of my focuses at New York-Presbyterian has been on the proper disposal of waste. At NYP, there are two major waste streams: one for regular trash and one for regulated medical waste (RMW). Regulated medical waste is any type of waste that is contaminated by blood, bodily fluids or other potentially infectious materials, thus posing a significant risk of transmitting infection. State regulations require that RMW is treated in such a way that renders it non-infectious by the time it is officially discarded. Possible treatment methods include incineration, chemical treatment, or thermal treatment. RMW produced by New York-Presbyterian is collected by a regulated medical waste handling company, taken off-site, and incinerated.

NYP has had major issues with waste being disposed of improperly. Many times, regular trash ends up in the RMW waste stream. Because the collection of RMW costs five times more than the collection of regular trash, NYP incurs unnecessarily high waste collection fees. To help remedy this problem, I began by performing RMW audits throughout the hospital. This essentially entailed entering "Soiled Utility Rooms" located throughout patient care units and recording trash content observations. Along the way, I would have brief conversations with staff members to remind them about proper waste disposal policy.


It is our hope that, over time, staff members will become more conscious of proper waste disposal regulations and make efforts to put waste in the correct place. In the end, these efforts should translate to steep decreases in waste disposal costs.

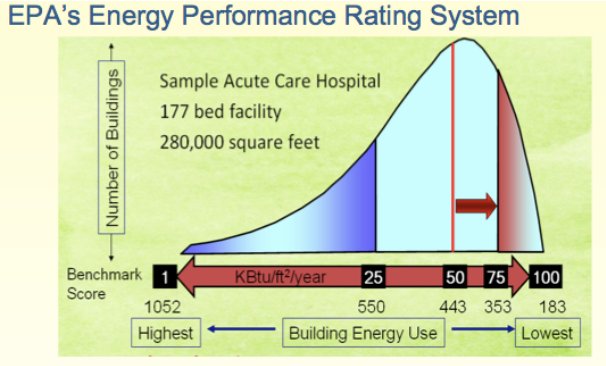
## 5.7 Benchmarking Energy & The Push for Solar Power

Recently, I teamed up with NYP's Energy Programs Manager to learn more about New York- Presbyterian's plan for sustainable energy. In December 2009, Mayor Bloomberg signed four legislative components of the Greener, Greater Buildings Plan along with the most comprehensive set of laws in the U.S. to reduce energy and carbon emissions. NYP is now responsible for abiding by these new laws.

The first law that NYP must abide by is *Local Law 85: NYC Energy Conservation Code*, which states that all buildings (excluding historic buildings and buildings within national parks) must be in compliance with the NYC Energy Conservation Code when undergoing renovation or reconstruction. NYP is also responsible for abiding by *Local Law 84: Benchmarking*, which states that all buildings larger than 50,000 square feet must benchmark energy and water consumption. Annual benchmarking using EPA's Portfolio Manager Tool must be completed by May 1st each year. *Local Law 87: Energy Audits and Retro Commissioning* requires all large buildings to undergo an energy audit every ten years and additionally requires energy managers to perform retro commissioning in order to ensure maximum energy efficiency. This law will go into effect in 2013. A final law that NYP must comply with is Local Law 88: Lighting Upgrades and Sub-Metering in Tenant Spaces. This law requires large non-residential buildings to upgrade lighting to meet NYC Energy Conservation Code standards and also install electrical sub-meters to measure electricity flow. Reports documenting installation of sub meters and lighting upgrades must be filed by 2025.

In order to gain experience in the field of energy management, I will be assisting with a walk-through/energy audit of the Allen Hospital. This walk through will help energy managers identify areas where energy can potentially be reduced. I will also be trained to use EPA's

Portfolio Manager Tool, n interactive energy management tool that allows NYP to track and assess energy and water consumption across its entire portfolio of buildings in a secure online environment. After I am trained, I will be responsible for calculating the total amount of energy consumed by the Allen Hospital and preparing a document to be submitted to the City of New York.




Another exciting energy initiative I have been participating in is a push for the installation of solar panels at the Westchester Campus. On April 2, 2012, NYP's energy program managers met with a representative from the TriState Solar Alliance, a non-profit solar energy provider, to review a solar power feasibility assessment. I was fortunate enough to attend this meeting to get some background on the initiative, as well as gain some insight into the concept of solar energy in general.

TriState Solar Alliance proposed to install an array of panels that would provide 600 kilowatts of solar energy to NYP's Westchester division. This would cover about half of the campus' total energy load. There are not many drawbacks to this plan, aside from cost. The total cost of the project will fall around $2.8 million, however, several organization provide tax grants and other financial incentives, drastically reducing this estimate. After accounting for all applicable deductions, the net cost of the project should fall around $640,000. Thus, New York-Presbyterian will only be responsible for about 30% of the total value of the project.

At the conclusion of the solar meeting, all seemed in favor of pursuing the panel installation. At this point, there are still several issues to work out and agreements to finalize, but it looks like NYP will eventually become the largest solar energy provider in Westchester, New York.

### 5.8 Expanding Recycling

Currently, New York-Presbyterian's recycling program is very limited. Paper and plastic bottles with screw-tops are the only items accepted in recycling bins. This means that plastic food containers, cups, utensils, cans, etc. can not be recycled. If an over abundance of these items ends up in any recycling bin, the entire contents of the bin will be downgraded to trash. Until we are able to recycle a wide variety of plastics (which can only be done after the current contract between NYP and its waste vendor expires), we aim to focus on spreading the word about proper waste disposal.

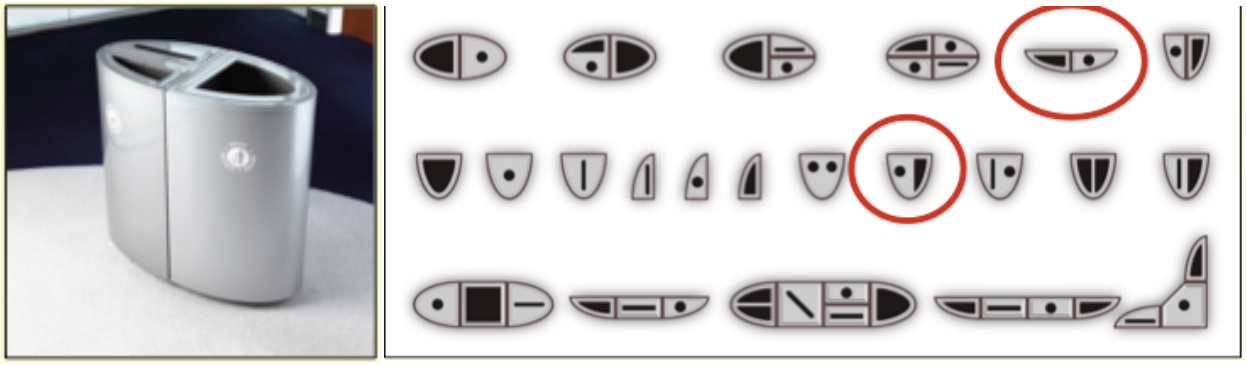
**Contaminated Recycling Bin**

When making rounds to view contents in recycling bins throughout patient care units, I noticed that most bins were contaminated with trash. The most common forms of trash that get thrown into recycling bins seem to be Styrofoam cups, plastic food ware, and food wrappers.

Seeing these items in recycling bins tells me that hospital employees do not have sufficient knowledge about proper recycling practices. Since most people are accustomed to recycling a large variety of containers, they must be made aware that recycling rules at the hospital may be different than those followed at elsewhere.

Aside from lack of knowledge, the other main problem we are targeting is the lack of clearly labeled waste disposal bins. Many times, it is difficult to decipher which bins around the hospital are for trash and which are for recycling. The shape and size of bins varies throughout patient care units and hospital wings. Some trash bins have recycling bins adjacent to them, while others do not. To ameliorate this problem, we are working on ordering new bins that will be standardized and clearly marked.

**Current Recycling Bin Situation**



**Ideas For Improvement**

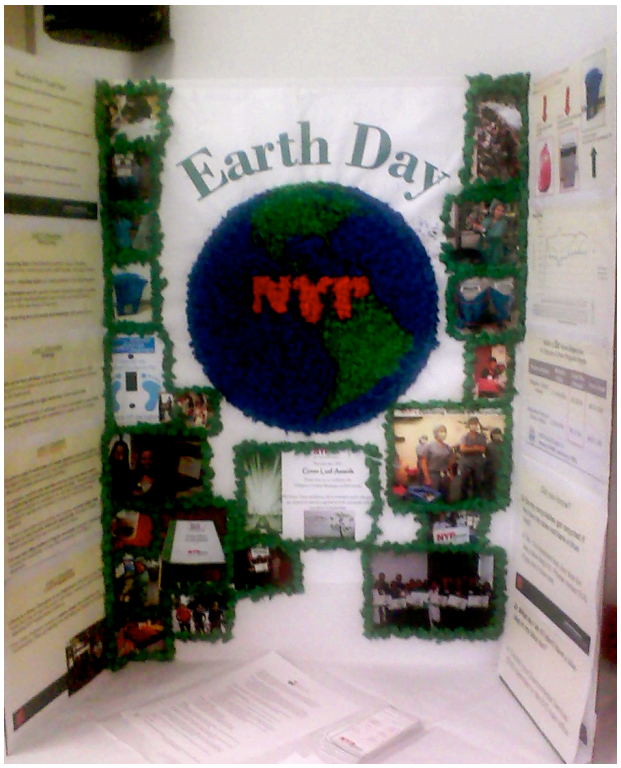
Recently, we have been investigating the feasibility of starting an alkaline battery recycling program. Many other hospitals recycle alkaline batteries, so establishing a program at NYP seems like a good move to make. However, through research I discovered that recycling alkaline batters has a negligible impact on environmental conservation.

The most harmful component of a traditional alkaline battery is mercury, a chemical that is known to cause neurological damage in humans. In 1996, the Mercury-Containing and Rechargeable battery Act was passed. This outlawed the manufacture of batteries containing mercury. Thus, today's batteries are relatively harmless, containing very low levels of toxicity, making them safe to dispose of in regular waste streams.

Alkaline batteries can still be recycled to recover small amounts of steel and trace amounts of zinc. But is it worth it? Personal accounts have revealed that batteries brought to recycling centers are separated from rechargeables and typically end up in landfills or incinerators anyway. Even stores and chains that have established take-back programs admit that batteries often end up in the trash. Based on this information, the Sustainability Manager at NYP has decided not to pursue the creation of an alkaline battery recycling program, as there are more pressing issues at hand.

### 5.9 Earth Day at NYP

In honor of Earth Day, NYP holds annual Earth Awareness Events across all five campuses. The purpose of Earth Awareness Events is to educate staff, patients, and members of the community about environmentally-friendly practices used throughout the hospital and share information about green living at home. The events offer educational materials, interactive demonstrations, and prize giveaways.




This year, there were 10 “booths” set up by different vendors. Vendors included groups from within NYP such as Environmental Services, Environmental Health Services, and Food & Nutrition, as well as outside organizations, including Rubbermaid, Unitex, NYCgrow, Green Mountain Energy, and NYSERDA. In speaking with these vendors, event attendees gathered important information about NYP’s sustainability guidelines, CommuterLink program, supply donation policy, Ipay (direct deposit program) and also learned how to “green” their lifestyles through initiatives like supporting renewable energy and purchasing local foods.

I was responsible for running the NYPgreen booth. First, I greeted guests and had them sign in. Then I gave a brief description of the hospital’s recycling and RMW reduction goals in order to spread the word about the importance of proper waste segregation. Finally, I informed those who were interested in getting involved with NYPgreen about the “Green Champion” program and helped them sign up.

This year's NYPgreen Earth Awareness Events were a success. We had a large turnout and received a lot of positive feedback. The NYPgreen team is extremely happy to see more people taking an interest in the NYPgreen program and getting involved in sustainability efforts throughout the hospital. It is our hope that NYPgreen continues to gain support from patients and employees across all five campuses.

## 6. Policy Recommendations

New York-Presbyterian has made great strides towards sustainability, however, transforming from traditional business to sustainable business is a long process that requires endless attention. In fact, it has been 5 years since the hospital's NYPgreen program was established and still, there are bountiful opportunities for improvement in areas related to environmental sustainability.

Based on my observations and experiences at New York-Presbyterian, I have devised a set of recommendations for increasing the effectiveness of NYPgreen. The recommendations are as follows:

- Information and Training Sessions in Patient Care Units

  One of the main focuses, and perhaps the most challenging goal of the NYPgreen program is achieving reductions in waste stream contamination. NYPgreen has devised a comprehensive set of regulations, so the policies are present, but few employees have significant knowledge about these regulations. The only way to stop waste stream contamination is to prevent those who handle waste from discarding it in the wrong bins.

  Based on my experiences with waste auditing and my observations at Earth Day events, I believe employees must be educated. The best way to do this is to conduct mini seminars. These seminars will be held in small groups throughout every patient care unit

in the hospital. The best people to hold seminars will be Green Champions. This way, employees can learn from their peers, rather than an administrator with whom they rarely interact and have no personal connections to. Being taught by someone with whom one works on a daily basis will be most effective because the educator will always be present to hold his or her "students" accountable for their actions. In addition, the educator will be readily available at all times to answer any questions and clear up any confusion. I believe this method will encourage employees to adopt the right habits, thus ameliorating the problem of waste stream contamination.

- Operating Room Checklist

My next recommendation closely relates to my previous suggestion, as it also addresses the problem of waste stream contamination. This suggestion will not deal with waste in patient care units, however. Instead, it will target waste stream contamination in operating rooms. Right now, there are two large red bins and two large regular trash bins in every operating room. Surprisingly, there is very little need for a regulated medical waste bin in any operating room, as the majority of standard surgical procedures involve very little blood loss. Unless waste is heavily saturated with blood, it can be discarded with regular trash. For this reason, I suggest keeping the two large trash bins, but downgrading to one small RMW waste bin in each operating room. In the event that a bloody situation occurs, additional red bags will be on hand. Decreasing access to regulated medical waste bins where they are not necessary will be a crucial step towards reducing overall waste stream contamination in operating rooms.

An additional problem in operating rooms is energy use. Every operating room is set and ready for use 24 hours per day however, these rooms are rarely, if ever, used during

overnight hours. Each day, after the completion of the final scheduled surgery, staff members are responsible for making sure that every operating room is clean for use the following morning. To confirm that everything is in order, staff members must fill out a checklist and display it inside the front door of the operating room. Currently, this checklist contains check boxes representing the set up of necessary medical equipment and other surgical tools. I suggest the addition of a few reminders about energy conservation. In unoccupied rooms, there is no reason for any light fixtures, computer monitors, or other electronic equipment to remain activated. Thus, staff members will be instructed to ensure that all energy-saving measures are taken and will document these measures on a new, updated checklist. This new checklist will contain the same set-up measures that have always been required with the addition of energy-saving measures (for example, new check boxes stating: "all non-essential electronic equipment has been shut down," "main lights are turned off," and so forth).

- Presence and Prominence

  Although the NYPgreen program has come a long way since it was established, it still lacks attention. Many hospital employees have no understanding of NYPgreen's mission, initiatives, or accomplishments. This is not to say that these things are unimportant. Rather, they simply lack publicity. The majority of staff members at New York- Presbyterian have never and will never work directly with the NYPgreen team, yet these groups still ought to be inter-connected. When it comes to sustainability, every member of an organization must get involved.

  In order to resolve this problem, I suggest the development of an awareness campaign. NYPgreen needs to become present. For this to happen, representatives of the program need to reach out to personnel throughout the hospital. Perhaps one week

("NYPgreen Week") could be set aside for sustainability administrators to travel around each hospital campus simply to engage in conversation with other employees as a means of sharing information about NYPgreen's mission and initiatives.

An additional medium that could be used to raise awareness about NYPgreen is the hospital's internal InfoNet. As I previously noted, the NYPgreen web page is on its way to being re-vamped. Once the new page goes live, an outreach email should be sent out to all hospital employees, encouraging them to browse the new site. I would also suggest sending monthly emails to update hospital employees on NYPgreen's progress and achievements.

Shortly before I started my internship at NYP, NYPgreen would electronically distribute weekly "Green Tips" throughout the organization. These tips would appear on the home page of the InfoNet. Although this was a good effort, I don't think it received a great deal of attention. One way "Green Tips" could attract a larger audience is by making them more personal. Tips could be communicated in the form of quotes by hospital employees. For example: "This week's Green Tip comes from Mr. John Smith in Radiology. He says_____." Because this method would incorporate ideas and opinions from employees from all sectors of the hospital, it would most likely appeal to the larger hospital population.

- Food Services

The area of New York-Presbyterian that seems to have the most opportunity for improvement in terms of sustainability is Food Services. As of now, the only environmentally-friendly practices going on in NYP's cafés are composting and recycling (bottles only). Through my experiences dining at the Garden Café at NYP/Weill Cornell

Medical Center, I have noticed a tremendous amount of unnecessary waste being produced. Firstly, any food item that is ordered or picked up in the Café is packaged "to go," regardless of whether the customer is eating in or carrying out. Plastic, paper, and cardboard are inevitable. Reusable food ware is not an option, but it should be. I would estimate that about half of all Garden Café patrons stay in the cafeteria to eat. For this reason, reusable cups, dishes, and utensils are necessary.

Aside from material waste, there is also reason to be concerned about food waste. Yes, NYP does compost, but only for kitchen scraps. Any food wasted by customers is thrown away in the regular trash waste stream. Since composting is already being done in the kitchen, NYP might want to consider placing an additional waste bin in the seating area, specifically for food scraps. These scraps could easily be combined with those produced in the kitchen and composted.

Another means of reducing food waste is to partner with food donation organizations. Organizations throughout NYC, such as City Harvest, are willing and able to collect excess food items and deliver them to community food programs throughout NYC. I suggest that NYPgreen administrators look into food donation programs and conduct a feasibility assessment.

One last measure any food service operation can take to increase sustainability is local food sourcing. NYPgreen promotes the consumption of natural and organic, locally sourced foods, but foods of this nature are not served in NYP eateries. Although it may cost a bit more to order organic foods, many local farmers offer deals for committed customers, especially high-volume eateries such as the Garden Café at NYP/Weill Cornell Medical Center.

## 7. Conclusion

Traditional business practices are simply unsustainable, as made apparent by the deteriorating condition of our environment. In order to combat this immense problem, we need to transform the way we do business. Transforming business is crucial to environmental preservation, as businesses are among the few societal institutions that are uniquely equipped to lead us into a more sustainable future. A large and influential business like New York-Presbyterian hospital has the technology, resources, capacity and reach required to pave the way towards global sustainability.

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