

# **ENVIRONMENTAL SUSTAINABILITY: A DRIVING FORCE IN THE KNOWLEDGE ECONOMY**

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## **Abstract**

My research examines the relationship between the environment, the knowledge economy, and creative class workers. My research details why the environment has become a basis for economic growth in the knowledge economy, and how Industry, Manufacturing, and High Technology Firms can attract creative class workers in the knowledge economy. My best practices focuses on how the Greater Binghamton Area can use their environmental sustainability movement to attract creative class workers, and my recommendations details how the Greater Binghamton Area can effectively market their environmental sustainability movement to attract and retain creative class workers.

*Keywords:* Environmental sustainability; Corporate social responsibility; Knowledge economy; Creative class; Green amenities; Innovative technology

*Binghamton Keywords:* Binghamton Regional Sustainability Coalition; Assemblymember Donna Lupardo; LEED Certification; The Vines Community Garden; Pressconnects.com; GoBroomeCounty.com

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## **Part I - Background Research**

In the last century our global temperatures have increased at an alarmingly rapid rate from 1.2 to 1.4 °F, as a result of Global Warming. Even more alarming is the fact that Global Warming is the direct result of the human activity on our planet (Norcia, 2008), no one is more aware of the reality facing our planet than the creative class workers of the 21<sup>st</sup> century. Creative class workers are defined by three different components: first, they are individuals who are compensated monetarily for their creative output, second, they are currently attending or have recently graduated from higher institutions of learning, my self included, and third, they have firm understanding of the causes and effects of Global Warming. These three components allow the creative class to dominate the biggest change to our 21<sup>st</sup> century society, the knowledge economy.

In the late 19<sup>th</sup> and 20<sup>th</sup> century our society's economic stance was dominated by the age of industrial mass production. In the 21<sup>st</sup> century our economy is dominated by what Richard Florida's 2005 book *Cities and the Creative Class* refers to as the knowledge economy, where the key to being successful and competitive lies in an organizations ability to quickly mobilize their creativity to produce innovation technology, business ideas, and commercial products( Florida, 2005). In the industrial economy, the driving force for success consisted of efficient productivity of physical labor, natural resources advantages, and efficient access to

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transportation in an attempt to reduce the overall costs as much as possible. Economic growth came at the expense of the environment. In the knowledge economy, the situation has reversed itself; the environment has begun to serve as a basis for economic growth by developing innovative environmentally sustainable technology. With the creative class and innovative technology dominating the 21<sup>st</sup> century knowledge economy, environmental sustainability no longer resides on the back burner of economic growth. If human activity is powerful enough to cause Global Warming, then our efforts are certainly powerful enough to reduce its causes. Our society needs to focus its efforts towards communal green practices to follow in the footsteps of the creative class as they lead the way to environmental sustainability through innovative technology. The first part of this paper will examine the activities that have contributed to Global Warming, how the effects of Global Warming are already negatively effecting our environment, and the substantial relationship that has developed between environmental quality, high-technology industry, and the creative class.

In 1990, 750 of the world's leading scientists on climate change considered the fact that human activity was responsible for the environmental degradation on our planet, and decided to actively conduct research to determine the effects of human activity on Global Warming (Norcia, 2008). Over the last eighteen years, these scientists have published their findings in the reports of the *International Panel on Climate Change* (IPCC). The IPCC, a scientific international governmental body (that was established in 1988 by the World Meteorological Organization and the United Nations Environmental Program ) evaluates the risk of climate change caused by human activity. Scientists have focused their studies on how the increases in carbon dioxide and other greenhouse gases are raising the temperature of our planet at an increasingly rapid rate ( Norcia, 2008). The overall consensus based on years of carefully researched scientific work concludes that Global Warming is man-made.

Beginning with the Industrial Revolution in the in the mid-19<sup>th</sup> century, factories, power plants, and cars have been burning fossil fuels, contributing to deforestation, and significant changes in land-use practices and agricultural practices. All of these activities have released large amounts of the three main green house gases: carbon dioxide (CO<sub>2</sub>) methane and nitrous oxide into the atmosphere (Norcia, 2008). The increase in carbon dioxide has resulted from the burning of fossil fuels, while the increase in methane and nitrous oxide has resulted from deforestation and agricultural practices. These greenhouse gases have been trapping heat near the earth through a naturally occurring process called the greenhouse effect (EIA,2008). The greenhouse effect is responsible for the warming of our earth's atmosphere. Research from the IPCC has proven that the natural cycles of sun spot activity and temperature variations are not significant enough to cause the continuous rapid increase in global temperature, proving that humans are the cause. In addition to the lack of responsibility from natural sun spot activity and temperature variations, the natural phenomena's like organic methane and volcanic venting also fall short of a correlation with the rapid increase in global temperature. However, the common human activity of burning fossil fuels for energy produces 6.2 billion metric tons of carbon dioxide per year, and is responsible for 98% of the United States CO<sub>2</sub> emissions per year( EIA, 2008). While the naturally occurring flux of carbon between the atmosphere and the land and oceans can absorb some of the CO<sub>2</sub>, it is estimated that 4.1 billion metric tons of CO<sub>2</sub> are added to the atmosphere annually (EIA, 2008). While natural phenomena's have contributed somewhat to Global Warming, it's clear that we are the ones carrying the heavier burden fault for the rapid increase in global temperature. The United States government and its citizens

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need to gain control over the amount of CO<sub>2</sub> being released into the atmosphere, in order to reduce the causes of Global Warming.

There are four main sectors that contribute to CO<sub>2</sub> emissions in the United States, due to their level of energy consumption: industrial, transportation, residential, and commercial. The industrial sector in our country is the largest consumer of energy, both fuel and electric, and emits 1,700 million metric tons of CO<sub>2</sub> each year. Such an example justifies the reasoning for industry to look towards technological innovations to find more energy efficient methods of production to reduce their CO<sub>2</sub> emissions. The transportation sector accounts for the second largest energy consumption, but surpasses the industrial sector in CO<sub>2</sub> emissions with 1,900 million metric tons per year because of their practically complete dependence on petroleum fuels. In order to combat these statistics and make changes the creative class needs to lead the way with hybrid cars. The creative class needs to focus the knowledge economy on sustainable technology like hybrid buses, or communal practices like carpooling on a regular basis. If every city was able to experience a change in the way we utilize automobiles, the CO<sub>2</sub> emissions from transportation would decrease dramatically. In the residential and commercial sectors, the majority of their CO<sub>2</sub> emissions are caused by the combustion of fossil energy to produce purchased electricity. The residential sectors emits 1,250 million metric tons of CO<sub>2</sub> per year, and the commercial sector emits 1,100 million metric tons of CO<sub>2</sub> per year (EIA, 2008). Once again the creative class needs encourage the entire commercial and residential sectors to use compact fluorescent light bulbs or unplugged appliances when they were not in use, to benefit the environment. The environment would also benefit considerably from the development of energy efficient technological innovations for the commercial and residential sectors. These sectors can make changes to lower their CO<sub>2</sub> emissions, but more importantly they need to. Our environment has already started to feel the effects of such reckless continuous CO<sub>2</sub> emissions.

Our environment began feeling the effects of Global Warming around 1970 when extreme weather events such as heat waves, floods, droughts, and hurricanes became increasingly more frequent. Since then we have witnessed a 75% increase in category 4 and 5 hurricanes, the thinning of Mountain glaciers do to the snow covers retreating earlier in the spring season, the shrinking of sea ice in the Arctic at significantly faster rate than expected, and the rapid rise of sea levels at 3 millimeters per year. The Arctic ice pact has also shrunk from 14mn km<sup>2</sup> (kilometer square) to 13.2mn km<sup>2</sup> since 1980, which is alarming because it's a 6% decrease in only 25 years (Norcia, 2008). The rate of shrinkage is also increasing; if this continues the Arctic ice pact will most likely be completely melted in few centuries, and cause a significant rise in sea levels (Norcia, 2008). As we can see the effects of Global Warming are factual, and are not showing any indication that they are going to come to a standstill. That is, unless we make a conscious and continuous effort to end the environmental degradation, through communal green practices and innovative technology.

The substantial relationship between environmental quality, high-technology, and the creative class can be examined in two different parts. First, we must examine why the creative class is committed to environmental quality. As recent graduates or current attendees of higher institutions of learning, global warming and environmental sustainability have become core concepts of a 21<sup>st</sup> century higher education in the knowledge economy. In 2004 Chris Galea a professor of Business at Saint Francis Xavier University, wrote *Teaching Business Sustainability*,

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in which he argues that business schools need to adapt to the 21<sup>st</sup> century economy by teaching environmental sustainability as strategy which can contribute to savings, revenue, productivity, competitiveness, lower risk and new markets( Galea, 2004). Professor Galea's book provides support for the emergence of environmental sustainability on our society's economic stage, and focuses on encouraging the creative class's developing business leaders to face the challenges and reap the benefits of the economic opportunities posed by environmental sustainability ( Galea, 2004). Professor Galea's arguments for teaching business sustainability have become a reality, in 2009 Marylhurst University began offering a MBA in sustainable business. While the degree is brand new, its received wide reception because Marylhurst University is located 10 miles outside of Portland Oregon, America greenest city in 2008 according to Popular Science (Marylhurst.edu, 2009). Support from academics like Professor Galea and programs like Marylhurst's have allowed the creative class to learn about the causes and effects of Global Warming, as well as the different ways in which environmental sustainability has found a place in the 21<sup>st</sup> century knowledge economy. As the creative class demonstrates our commitment to environment quality, the role of the environment and natural amenities have been transformed in the knowledge economy as a critical component in the total package for attracting creative class workers to high technology firms (Florida, 2005). Florida's research found the creative class requires outdoor recreational activities and eco-lifestyle options as the top ranking amenity for job selection. In 2008 the Stanford Graduate School of Business completed a study of 760 students from eleven different business schools across the county, in an attempt to understand the values and decisions of the future business leaders of our country. The study found that corporate social responsibility ranked amongst the highest factors in job placement ( Montgomery & Ramus 2008). Environmental sustainability and development is a main factor in corporate social responsibility. If high technology firms want to attract creative class workers to further their economic growth, they need to demonstrate environmental sustainability and development with their firm, and natural amenities within their regional location (Florida, 2005).

The relationship between high technology and environmental quality developed at the end of the 20<sup>th</sup> century when strategies known as environmental conscious manufacturing, eco-efficient production, and pollution prevention gained prominence as a result of increased knowledge about the temporal and spatial scales of Global Warming. These green approaches to the design and development of certain products and processes allowed industries to understand how technology could be used to reduce the effects of Global Warming ( Mihelcic, 2003). By attempting to reduce industry pollution via recycling, industry management, inventory management, and good housekeeping practices the industrial sector of our country became more proactive in their environmental resource management efforts. Once industries saw successful results from preventive measures, they began to look towards high technology firms for innovative eco-friendly technology, such as the three zero production method. This method includes zero defects production for quality, zero inventory production for delivery, and zero waste and emissions from production (Florida, 2005). These corporations have improved their overall design of their facilities and most importantly their environmental quality, all thanks to technology. These environmentally sustainable measures have also helped to attract and motivate employees. While the preventive measures were successful in creating more eco-friendly production, it is technological innovations like the three zero production method and the work of the creative class that hold the key to overall environmental sustainability and protection. In the current knowledge economy we simply need to further the relationship

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between the creative class, environmental quality, and high technology to ensure the quality and sustainability of our environment.

### **Part II- Best Practices**

In the 21<sup>st</sup> century knowledge economy, creative class workers are asking themselves “ what does a sustainable community look like and where can I find one to continue promoting sustainability through my lifestyle”? For the 14,500 creative class workers at Binghamton University, sustainability through technological innovations and communal practices has allowed the university to be ranked by the Princeton Review as one of the greenest campus’s in the country. Only eleven schools made cut, and Binghamton was the only SUNY institution featured on the honor roll. Since university students have proven their commitment to sustainability through communal practices like recycling, and technological innovations like the Energy Management System, they simply need to venture off campus into the surrounding Greater Binghamton Area to find an example of a successful community committed to environmental sustainability. This essay will explore the best practices in the Great Binghamton Area and on the university campus which promote a movement towards environmental sustainability, through technological innovations and communal practices.

The Binghamton Regional Sustainability Coalition (BRSC) is a grassroots, democratically-run organization which began in April 2008. Their mission is to increase the level of civic participation in environmental sustainability through education and collaboration (BRSC,2009) . The organization covers 40-mile radius from the city of Binghamton, and stretches into Tioga County, Chenango County, Delaware County, and Otsego County. Their current projects include Gas Production Education and Action, which is seeking to delay gas drilling by Marcellus Shale Gas Company until new regulations are established by the Department of Environmental Conservation. The D.E.C. currently allows the oil and gas industry exemptions from federal laws such as the Clean Water Act, Clean Air Act, Resource Conservation and Recovery Act, Safe Drinking Water Act, and Section 23 of the NYS Environmental Conservation Law trumps Home Rule Law(BSRC,2008). The current situation leaves municipalities with virtually no control or oversight of this industry, so BRSC is urging the D.E.C. to use technological innovations to analyze and re- evaluate the impact of gas drilling on the surrounding environment and its residents. They are also using communal practices like petitions to lobby for hearings with the D.E.C., so community voices can be heard.

Another project on the BRSC agenda is the establishment of the Binghamton Regional Sustainability Center. BRSC is looking to develop the local church at 68 Susquehanna by September of 2009 to serve as their headquarters’ to further incubate and encourage environmental sustainability in the Greater Binghamton Region. The development of the BRSC headquarters’ would be a major milestone for the organization because they are currently working to become a regional information clearinghouse to promote new and existing sustainability efforts, a source for sustainability training and education, and a center for networking and coordination advocacy that builds community support for public policies that further their mission(BRSC,2009). The center would also serve as a connector between the university and the community because it would look to university students as volunteers and interns. Essentially, by combining the use of technological innovations and communal practices, BRSC serves as the foundation for a sustainable community. In attempting to serve as a

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catalyst, connector, and conniver for the Greater Binghamton Area, BRSC is teaching people how to have a greener tomorrow. Further projects include a call-to-action-person-to-person gathering to continue to build the sustainable community, a regional community food project, an urban farm project, and increased education about sustainability following the city of Ithaca's Model. In the past year BRSC has become an interracial part of the sustainability in the Greater Binghamton Area, and they show tremendous future potential in serving our sustainable community.

In *Cities and the Creative Class*, Richard Florida explains the relationship between the creative class, environmental quality, and our current knowledge economy. In the knowledge economy the environment and sustainability are considered prerequisites and the top ranking amenities for attracting and retaining creative class workers. In the Greater Binghamton Area, their level of environmental sustainability could serve as a major amenity for attracting and retaining creative class workers, if they were able to effectively market it. Creative class workers are the first generation in higher education to receive a comprehensive understanding of Global Warming, the Greenhouse Effect, and environmental sustainability. However, current creative class workers are not the only ones to receive a comprehensive understanding of Global environmental problems through education. New York state is preparing the next generation of creative class workers to enter the knowledge economy, by sponsoring the "*New York State Energy Smart Program*". The program's goal is to create energy-aware students, teachers and facility managers at the K-12 level, who can help their communities become more energy conscious and efficient (Getenergysmart.org, 2009). The program challenges students to ask and answer the big questions about their energy future, and ensure that sustainability through energy efficiency will be a top priority for the next generation of creative class workers.

When creative class workers consider their knowledge of our global environmental problems, they look for regions with lifestyle amenities that contribute to sustainability, when choosing locations for jobs and continuing educational opportunities. At Binghamton University creative class worker Natalie Carmeli has proven Florida's theories. As an Environmental Psychology major, Natalie has spent her college career exploring the relationship between people and the environment, with a focus in urban sustainability. Through CIC-LI 2020, Natalie was able to gain a comprehensive understanding of how cities were organized and discover several opportunities for leadership. Last spring, Natalie was introduced to a model of urban sustainability efforts, and began to think critically about the level of urban sustainability in the City of Binghamton. Realizing that the environmental sustainability is not always public knowledge, Natalie decided develop a Capstone Project by creating a green map that charts the sites of sustainability in the Binghamton Area. The project involved two parts, first, Natalie conducted field research to investigate and inventory local sites of sustainability, and second, she designed and developed a green map for the Binghamton Area (Carmeli, 2009). Environmental sustainability was very important to Natalie, and she saw her Capstone Project as way to connect with the Binghamton Community.

Green Map Systems are global map-making movement of communities that work towards environmental sustainability all over the world. On the local level green maps serve as environmentally themed maps that use a universal set of symbols and map making resources provided by the non-profit Green Map System. All maps are based on the principles of cartography by plotting the location of a community's natural, cultural, and sustainable

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resources. This includes recycling center, heritage sites, community gardens, toxic waste sites, and environmentally-conscious businesses ( Carmeli, 2009). Natalie felt the Green Map System was a good approach for several reasons. After conducting preliminary research, Natalie realized most of the efforts towards sustainability were rather isolated from each other which made it difficult to promote sustainability. She considered how powerful the sustainability movement would be for students, residents, and visitors if everyone was aware of each other and could collaborate. Natalie discovered it was difficult to have access to that kind of information if you weren't from the area, because it's usually local knowledge. In particular Natalie was considering all of the students who most likely had no idea how sustainable the City of Binghamton actually is. After discovering the Green Map System, Natalie decided to create a green map, and use it as a powerful tool to inform more people about the level of environmental sustainability in the City of Binghamton. Natalie's capstone project is one of the best examples of creative class workers commitment to environmental sustainability by illuminating the inter-connections between society and the environment. More importantly Natalie has illuminated the inter-connection between Binghamton University students and environmental sustainability.

The Greater Binghamton Area falls under the 126<sup>th</sup> district in the New York State Assembly, and requires us to be represented by Donna A. Lupardo. Assemblywoman Lupardo, a former Binghamton University faculty member was elected in 2004 and has been a consistent advocate for environmental sustainability. Assemblywoman Lupardo has been a lifelong proponent of environmental sustainability, she first moved to upstate New York in the early 1980's in an attempt to get away from the pollution and urban sprawl in the city. She served as one of the founding members of earth fest in 1990, and began to look at other sustainable communities best practices for ideas on how to get Binghamton on the sustainable track. In 2004 Lupardo was elected to the New York State Assembly with the intent of taking on the bigger picture in economic development and environmental sustainability. In 2006, Assemblywoman Lupardo introduced and passed the State Green Building Construction Act (SGBCA). The SGBCA requires all new construction and substantial reconstruction projects undertaken by the state to comply with green building principles (Lupardo, 2006). The green building principles are defined by the Leadership in Energy and Environmental Design (LEED), and use resources such as energy, water, materials, and land more efficiently and effectively to provide a sustainable working, living, and learning environment. The benefits of LEED certified buildings include providing employees with healthier indoor work environments by effectively controlling air ventilation systems, using alternative paints, finishes, adhesives, furniture, and fabrics that do not negatively affect air quality. LEED certified buildings also save money by reducing maintenance costs and fostering new developments in green technology (Lupardo, 2006). Assemblywoman Lupardo green incentives have directly contributed to environmental sustainability at Binghamton University. In August of 2007, the university opened the doors to its LEED certified downtown center. The LEED features in the building include high-efficiency mechanical equipment and lighting, energy-efficient windows, daylight views to reduce the need for artificial lighting, and recycled building materials (News Release, 2009). In November of 2007 the university was awarded more LEED certifications for the Cascade and Windom dormitories, and plans to build more dormitories according to LEED standards.

In 2008 Assemblywoman Lupardo organized a Green Economy Summit for representatives from various disciplines to engage in dialogue about how to use green principles

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to stimulate the economy in the Southern Tier. Lupardo addressed issues like investment in research and development of clean, renewable energy for economic growth, developing a "green collar" workforce, production of local foods, renewable energy, and more energy efficient and environmentally friendly communal practices. Assemblywomen Lupardo most recent green initiative has focused on encouraging Governor Patterson to delay natural gas drilling in Broome County until new regulations are established. She also is looking toward university students to engage in the many avenues of sustainability in Broome County, such as sustainable farms, community gardens, and the CHOW organization. She also hopes to promote sustainable to stimulate the local economy through the development of green-collar jobs. Assemblywomen Lupardo is a leading example of what can be accomplished at the governmental level if our representatives are committed to environmental sustainability.

During the 2009 Spring semester Binghamton University decided to participate in RecycleMania, a friendly competition and benchmarking tool for college and university recycling programs. RecycleMania promotes waste reduction activities on college campus communities. Over a 10-week period, schools report recycling and trash data which are then ranked according to 3 categories; the largest amount of collected recyclables per capita, the largest amount of total recyclables, and the least amount of trash per capita, or the highest recycling rate Each week participating schools submit reports for ranking, and watch how their results fluctuate against other schools and use this to rally their campus communities to reduce and recycle more( Recyclemania,2009). At the conclusion of the competition 69.4 million pounds of waste had been recycled, and Binghamton University placed 3<sup>rd</sup> in the nation for most recycled bottles and cans. Binghamton University is directly in synch with their surrounding community.

All of these practices directly contribute to sustainability, and have the potential to serve as a powerful amenity to attract and retain creative class workers in the Greater Binghamton Area. The retention of creative class workers from Binghamton University would significantly stimulate our locate economy, and reduce the "brain-drain" in upstate New York. For environmental sustainability and quality to serve as an amenity to attract and retain creative class workers, Binghamton's governmental and county officials need to effectively markets the sustainability in the Greater Binghamton Area, because it could convince the 14,500 creative class workers at the university to become permanent members of the Greater Binghamton Area.

### **Part III- Recommendations**

This paper has fully examined the Environmental sustainability movement in the Greater Binghamton Area. After careful research and examination, I have concluded that the Greater Binghamton Area is an excellent example of an environmental sustainability movement, however there is not enough awareness through community resources about the different sustainable efforts, for existing and potential residents. My recommendations are for the county and city officials to work on effectively marketing the different sustainability efforts in the community and at the university as an amenity to attract and retain creative class workers. The exceptional level of environmental sustainability should be advertised on the gobroomecounty.com website, by creating a specific tab that would list all of the different sustainability organizations and links to their websites. This page should also include a link to greenpressconnects.com which details all of the green happening in the Greater Binghamton Area. Secondly, the Chamber of Commerce's Quality

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of Life Resource Guide needs to feature a section on sustainability. This magazine is targeted at attracting people to the Greater Binghamton Area, yet it is completely devoid of any mention of sustainability or environmental quality. Sustainability and environmental quality have been proven as top-ranking amenities in attracting creative class workers. So if the Quality of Resource guide is really aimed at attracting creative class workers to the Greater Binghamton Area, the Chamber of Commerce needs to make some revisions to their magazine. Both the *GoBroomeCounty* website and the Chamber of Commerce magazine should feature Natalie Carmeli's Green Map as a resource for students, residents and visitors. Finally, the city needs to strengthen their partnership with the University to show the 14,500 creative class workers why the Greater Binghamton Area is an ideal location to settle in on account of the sustainable Amenities. If the Greater Binghamton Area is serious about retain creative class workers from the university, they need to give the students some attention, and increase their efforts to market the Greater Binghamton Area as an idea location.

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