The Ohio State University
Campus as a Living Laboratory

Ohio State's Athletic Carbon Offset Plan:
Inspired by the University of Florida's "Neutral Gator"

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EXECUTIVE SUMMARY

The Ohio State Athletics Carbon Offset Plan is an initiative to demonstrate Ohio State's commitment to greenhouse gas reductions in a public and community-oriented manner. The plan is to use student volunteers to install energy efficient products in the homes of low-income neighborhoods to reduce the amount of carbon dioxide entering the atmosphere in the Columbus area. The plan was inspired by a nonprofit program at the University of Florida that essentially performs the same task, while also focusing heavily on planting trees to absorb carbon dioxide from the atmosphere. Their program takes these reductions and applies them to the University's athletic department to "cancel out" their athletic department's emissions. This application to the athletic program is strategic because it captures public attention and thrives off the energy generated by Florida athletics.

Our group proposes a program similar to the one used by the University of Florida. However, for reasons identified in the paper, we will focus on increasing energy efficiency in low-income areas rather than planting trees. Our research suggests that we can feasibly offset at least ten percent of Ohio State's athletic carbon footprint through this project. It is our hope that if this program is established, we can increase this percentage by incorporating other projects.

This project will require funding as well as community service. We hope that the University will be willing to contribute at least a portion of the funds required for this valuable service. We have also looked into funding in the form of donations from local environmental non-profit groups or grants from outside organizations. Ideally, we hope to recruit student athlete volunteers for a portion of the labor. Since we aim to link this project with our athletic department, having student athletes contributing would make for great publicity.

Ultimately, we are aware that this project is unlikely to completely neutralize the total emissions generated by Ohio State's athletics program. Additionally, there is still a great amount of work to be done by the university to reduce its emissions on campus and become truly carbon neutral by 2050. We view this project as a way to kick-start public support for our gradual shift to a carbon neutral campus. This project will directly link an environmental service to a community service that benefits those in need. It is not hard to see that this program has the potential for widespread benefits and is worth investing in.

INTRODUCTION

In 2007, The Ohio State University lost NCAA championship games to the University of Florida in both football and basketball. Those, however, were not the only championships the Buckeyes watched the University of Florida win that year. That fall, Florida held the first carbon neutral football game in NCAA history and has been making strides toward carbon neutrality ever since. If there is one thing Ohio State can be better at than losing to the Gators, it is piggybacking on their success. The Buckeyes have already managed to snatch up Florida's champion football coach; now it is time to take their innovation and use it to make our athletic department and our university more climate-friendly institutions. Florida's mission is to achieve total carbon neutrality by 2025, while OSU has set its sights on reaching that goal twenty-five years later in 2050. We believe that Ohio State should be a leader, not a follower, in the race for carbon neutrality. Universities similar to OSU are already implementing unique projects and innovations and we are not satisfied with being beaten to the finish. With this in mind, we propose a project that demonstrates the Buckeyes' determination to fight climate change as well as their commitment to the community. Through energy efficient carbon offsetting projects in low-income Columbus neighborhoods, we aim to balance out the emissions produced by OSU's athletics department. The principle goals of our research are to: discover what makes Florida's programs so successful, what the carbon emissions are for an entire Buckeye athletic year, and finally what resources can be used in the campus area to take a step closer to carbon neutrality. This report will describe how the proposed project will affect the CO_2 emissions of OSU's athletic department, while strengthening OSU's ties to the community. The report will discuss the impact of student-athletes and volunteers, as well as the type of offsets intended for use. However, it is imperative to begin by describing the overarching problem that is climate change.

Background

Human actions such as driving a car, flying an airplane, or burning fossil fuels are known to result in the emission of greenhouse gases into the atmosphere. These greenhouse gases contribute to climate change. In recent years, we have seen rising sea levels, increasing Arctic ice melts, and rising numbers of extreme weather events. Just as human actions have altered our climate, human actions are required to preserve it. Many institutions are working to maintain a

sustainable environment by attempting to offset some of these greenhouse gases, most notably carbon dioxide. In 2008, Ohio State University president Dr. E. Gordon Gee signed the American College and University Presidents Climate Commitment (ACUPCC, Overview and Examples of Climate Action Plans, 2013, OSU CAP, 2011) This commitment aims to make the Ohio State University carbon neutral by the year 2050. In order for Ohio State to achieve carbon neutrality by 2050, the school is going to need to use cleaner and more efficient energy, improve the efficiency of their buildings, reduce their amount of waste, and support better travel and commuting options.

In response to Gordon Gee's signing of the ACUPCC, OSU proposed an individually sponsored Climate Action Plan (CAP). The CAP has developed strategies for reducing greenhouse gas emissions and outlines specific ways to achieve carbon neutrality. Some of the strategies slow the rate of increase in emissions; others eliminate emissions through efficiency and behavioral change (OSU CAP, p.12). This plan is categorized by short, middle, and long-term strategies. The short-term strategies include the period between 2010 and 2014 and consist of green building standards, space planning and management, and energy conservation measures and behavioral change. (OSU CAP, p.13). The short-term strategies are more defined than the medium-term and long-term strategies due to the importance of getting off on the right foot. Since the medium-term and long-term strategies are not as well-defined, there is no exact plan. Some strategies include a combined heat and power plant, heat recovery chillers, regional chiller plants, back pressure steam turbines, geothermal heating and cooling, and various other emission-reducing practices.

Aside from the CAP, OSU encourages students, faculty, and staff to become aware of the issues involved with climate change through education, research, and outreach. Sustainability education is taken seriously at OSU and is intentionally integrated into the student experience. For instance, sustainability initiatives driven by Ohio State's interested faculty and passionate students include concentrations in majors and minors, customized interdisciplinary degrees, graduate specializations and seminars, and other opportunities for student involvement. As far as research is concerned, the university strives for its faculty researchers to apply their knowledge to local, regional, national, and international scales. Recognized research centers on campus include the Center for Automotive Research, the Byrd Polar Research Center, the Center for Energy Sustainability, and Environment and the Center for Resilience. At OSU there are five

institutions conducting sustainability research. They are (1) the College of Arts and Sciences, (2) the Fisher College of Business, (3) the College of Engineering, (4) the College of Food Agricultural and Environmental Science, and (5) the College of Public Health. With respect to community outreach, The Ohio State University Extension Services spread to every county in the state of Ohio. The Ohio By-Product Synergy Network helps businesses convert waste materials into valuable products. This helps protect the environment and stimulate the economy at the same time. The Arts and Humanities also play a critical role in promoting a regional culture of sustainability through programs such as the Wexner Center's film series and OSU Community Access to Resources and Educational Services (OSU CAP, 2011).

When it comes to recycling, there have already been huge steps being taken to lower OSU's footprint. For the second straight year at Ohio Stadium, a "Zero Waste" program has diverted up to 90% of trash and recycling away from landfills. With the help of the Navy ROTC and other volunteers, the "Shoe" is cleared after every game and leftover trash is collected. For the 2012 season, there was a diversion rate of 87.2% and the Illinois game individually yielded a result of 98.2% diversion (Zero Waste at Ohio Stadium, 2013). Another program at OSU is the new recycling initiative both on and off-campus. In buildings across campus there have been "all in one" recycling bins put in through the Scarlet, Grey, and Green initiative to allow for increased recycling. In 2012, a breakthrough came with the implementation of off-campus recycling, which allows a student living off-campus to recycle their waste. With an increase in recycling opportunities throughout the Columbus area, OSU has set itself up for continued success in "green" programs.

Athletic Department's Carbon Footprint

Our group hopes to capitalize on the excitement generated by these successful programs by focusing on carbon neutrality in the athletics department. Our effort will be to quantify the carbon footprint of Ohio State's athletics department and propose a program to offset that footprint. To achieve this goal, we will have to estimate the total carbon dioxide emissions for the department and match up the numbers with offsetting options.

The first steps in quantifying a footprint are to figure out the total mileage traveled, the number of athletes involved, and the different forms of travel. The Ohio State University uses two main types of transportation for its athletic teams, plane and bus. It is estimated that OSU travels to eleven main campuses around the nation (B1G Conference) every year, which

encompasses a total of 9,094 miles. This calculation assumes that for games over 500 miles away, a plane will be involved, equaling 5,280 of the 9,094 total miles. Additional travel for non-conference match-ups would seem like a logical addition to our footprint, but with the uncertain scheduling of future football and basketball seasons and the limitation for other Olympic sports travel (volleyball, baseball, soccer, etc.), our group has decided to leave it out of our estimation. With respect to the carbon output of the main types of travel, it has been established that flying uses 0.85 kg per mile times the amount of passengers and bus uses 0.07 kg per mile times the amount of passengers (Green Rotation Book, 2010). After adjusting the output numbers for bus travel when going less than 500 miles and flying when going more than 500 miles, we calculated the CO_2 footprint using the equation listed above. OSU's athletic department emits approximately 3,500-tons of carbon dioxide annually when factoring in all the aspects [see Figure 1 for all steps involved]. We compared these numbers to the annual emissions of the University of Florida's athletic department (which is similar in size and scope to OSU's department) and factored in the differences in the program's total amount of teams (21 varsity teams (UF) vs. 29 varsity teams (OSU)) and conference alignment (BIG (12 teams) vs. SEC (14 teams)). The carbon footprint for the two schools still remains comparable. This 3,500-ton footprint will be the focus of this group's carbon offset proposal and will serve as the target number to reduce.

Figure 1: Charts of Miles Traveled (Both Ways) and Types of Travel

Iowa	Minn	Wisc	Ill	Ind	Mich	MSU	NW	PSU	Neb	Pur	Total
538	763	502	297	227	192	256	373	323	837	239	9094 (Miles)

Type	Miles Traveled	CO_2 Emissions
Plane	5,280 (>500)	.85 Kg x Passengers
Bus	3,814 (<500)	.07 Kg x Passengers

Carbon Offsets and Athletics at OSU

Carbon offsetting is the practice of reducing carbon dioxide emissions from a specific source to compensate for, or cancel out, the release of carbon emissions from another source. For example, if a company uses a coal-fired power station at location A that generates *X* tons of carbon annually, it can install enough hydropower and wind turbines at locations B and C to

prevent *X* tons of carbon emissions that otherwise would have been generated annually at these locations. The emissions from the coal-fired power station have now been offset.

Carbon offsetting is not the ideal path to carbon neutrality because it does not rid a system of all emissions. It simply uses manageable carbon reductions to cover up the emissions that cannot realistically be prevented. However, by using carbon-offsetting practices at a community level, people begin to gain a greater awareness of the magnitude of their carbon footprint and just how much effort it takes to neutralize it. We believe that carbon offsetting should be viewed as an intermediate step toward carbon neutrality while advances continue to be made on sustainable energy.

In the context of OSU athletics, carbon offsetting would involve preventing 3,500-tons of carbon dioxide from entering the atmosphere in a separate location to cancel Ohio State's athletic emissions. To reduce the footprint, this project will make use of carbon offsetting techniques and the athletics department (its fans, its athletes, etc.). With over 475,000 living alumni and countless fans, OSU is an ideal place to attempt to create an athletics-oriented carbon neutral program. We view the university's athletics program as an avenue to create passion about this plan. The "Buckeye Brand" is one of the strongest, if not the strongest, athletics communities in college sports. Ohio Stadium has an average of 105,096 football fans at every game (College Express, 2013) and the Schottenstein Center averages 15,125 fans at basketball games (Dorish, 2011). These numbers demonstrate the magnitude of the Ohio State athletics department, giving each fan an opportunity to learn about and contribute to the carbon neutrality program, both from a knowledge standpoint and an involvement perspective. There are many other sports, with hundreds of fans at every game, that allow for some sort of carbon offsetting awareness. As mentioned earlier, the athletics department and their footprint may be a reachable goal for a project like ours to work. The fans and the student athletes involved will hopefully not only support the program, but also want to help. It is this hope that gives the project a feeling of optimism that is needed in order to succeed.

Our Proposal

The main aim of the proposal is to offset the carbon emissions of OSU's athletic department by improving the energy efficiency in low-income Columbus neighborhoods (such as the University District, East of Fourth Street) through installation of energy efficient appliances and insulation. Through this plan, we will help lower carbon dioxide emissions while bringing

the university closer to the Columbus community. The goal of the project is to lower carbon emissions through offsetting tactics, not to directly reduce the university's carbon emissions, which may take a larger scale model.

The Neutral Gator Model

In 2008, the University of Florida and a Gainesville-based nonprofit organization called *Earth Givers* introduced the Neutral Gator initiative. Earth Givers' primary focus is reducing carbon emissions through energy conservation and carbon sequestration projects. The Neutral Gator project is devoted to eliminating UF's impact on climate change by supporting the University of Florida's goals of achieving carbon neutrality by 2025 while reducing carbon emissions in the local community. Neutral Gator secured its place in history by applying its various carbon reduction projects toward the carbon footprint of the university's beloved athletics program. The program's efforts have led not only to the first ever carbon-neutral football game, but the first ever carbon-neutral home football season in NCAA history. Florida now boasts the nation's first carbon-neutral athletic program (University of Florida News, 2009).

Neutral Gator employs two simple yet highly effective projects to negate the University's athletic emissions. These projects are the "Revolving Tree Fund" and the "Forest and Village Green Renters' Initiative", and each uses a different type of carbon offset.

Through the Revolving Tree Fund, Earth Givers purchases trees continually to plant throughout Alachua County, Florida. The Neutral Gator initiative holds the belief that trees are the only way to remove carbon dioxide from the atmosphere (Neutral Gator, 2013). Since 2008, the program's volunteers have planted thousands of trees to help scrub the Alachua air of carbon dioxide. According to Neutral Gator, one tree offsets one ton of carbon emissions per year (Neutral Gator, 2013).

The Village and Forest Green Renters' Initiative targets the Village and Forest Green apartments in East Gainesville, whose residents are mostly low-income. Earth Givers trained volunteers retrofit each unit with the latest water and energy-efficient products, thus conserving local resources, reducing carbon emissions, and reducing residents' utility bills by up to twenty percent. Additionally, the volunteers provide on-site education so that the residents are well equipped with knowledge on how to live more sustainably. This project is extremely valuable because it benefits both the environment as well as those in need in the local community. Since

2008 this project has been responsible for 20,000 certified tons of carbon reductions and $3.5 million dollars in savings for the residents (Neutral Gator, 2013).

There is nothing in the nature of these projects that ties the achieved carbon offsets to the emissions of the university's athletics teams. These offsets could be applied toward the carbon-neutrality of the campus as a whole or toward neutralizing virtually any source of emissions in the world. However, Neutral Gator recognized that Florida athletics has an undeniable value to a wider community and saw a strategy in linking their offsets to the athletic emissions. The following statement from Neutral Gator (2008) sums up the matter beautifully:

> *"We're using UF athletic fame as a megaphone to amplify sustainability issues in the Gator Nation and beyond. Galvanizing the international sports community, the thousands-strong UF alumni network, local fans, community leaders, and other key stakeholders is an unprecedented yet essential approach toward fighting climate change—because, after all, everyone is affected. We're committed to creating offsets on our 'home court'—unlike many carbon offset companies—because we believe a locally-based model supports, educates, and empowers Gainesville…and the Gator Nation! Our motto is 'locally generated, locally applied.' That means that carbon emissions generated in Gainesville are offset in Gainesville!"*

The Ohio State University has an alumni and fan base equal to or stronger than any university in the nation. The university and its athletic teams are more ingrained in Columbus culture than perhaps any other institution in the city. If Gator Nation can fight climate change by capitalizing on the strength of its community and the power of its athletic brand, there is no reason why Buckeye Nation cannot achieve the same success through carbon sequestration or other methods.

Carbon Sequestration through the Planting of Trees (Its Criticisms)

A *carbon sink* is a natural or manmade reservoir that stores and accumulates carbon. The process of removing carbon dioxide from the atmosphere via carbon sinks is known as *carbon sequestration*. Trees, which absorb and store carbon dioxide through photosynthesis, are one of the most widely known and used carbon sinks. A complete halt of deforestation in tropical latitudes would conserve 1.5 to 2.5 billion tons of carbon annually (Dixon et al., 1993). Carbon sequestration can be stimulated through a variety of forest and agroforest practices. Afforestation of non-forested lands as well as reforestation of cut over or abandoned forestlands are each practices with high potential across boreal, temperate, and tropical environments. These practices involve the establishment of plantations, agroforest systems, and other forest cultures.

Though trees can be a carbon sink, the practice of planting trees as carbon offsets comes with its share of criticism. A principle concern of tree offsets is that it is difficult to precisely quantify the amount of carbon sequestered in trees. Studies indicate that more carbon is stored in the forest soils than in the aboveground biomass, and reforestation projects can cause this soil carbon to be disturbed and released. Additionally there is concern over the lack of permanence of forests. Any forest can succumb to disease, insect attacks, fire, or harvest. This makes tree-planting offsets a temporary solution only. Perhaps the greatest criticism of forestry offsets is that they make no contribution toward reducing society's dependence on fossil fuels. It can be argued that the money invested in reforestation projects would be better spent on energy-related projects (David Suzuki Foundation, 2013).

In addition to these concerns, there is simply not enough open space in the Columbus area to have a significant local impact through planting trees. Additionally, the best-known carbon offsetting practices have switched from planting trees to clean-energy projects (Clark, 2011). Due to these reasons, as well as the aforementioned criticisms of forest sector offsets, we have decided not to include tree planting in our proposal of an athletics-linked carbon neutrality project (despite the success of Neutral Gator's Revolving Tree Fund). While we would certainly support creating a tree farm elsewhere in the state on OSU-owned land, maybe the better option for OSU is focusing on energy reducing appliances and insulation.

Energy Efficiency in Low-Income Housing

As previously mentioned, energy efficient projects are quickly becoming the dominant carbon offsetting strategy. This is in large part due to the help of Energy Star. Energy Star is a program of the United States Environmental Protection Agency (EPA) that helps businesses and individuals save money and reduce their climate impact through energy efficiency. The program was established in 1992 under section 103(g) of the Clean Air Act which directed the EPA administrator to "conduct a basic engineering research and technology program to develop, evaluate, and demonstrate non-regulatory strategies and technologies for reducing air pollution" (Energy Star, 2013).

Energy Star clothes washers use anywhere from 20-70% less energy than other clothes washers with an even greater reduction in water usage. Energy Star refrigerators use approximately 15% less energy and energy efficient light bulbs use about 75% less energy. These light bulbs also produce about 75% less heat, which cuts energy costs associated with

home cooling. These products are just a few examples from a lengthy list of Energy Star endorsed home products. Along with less energy usage comes lower utility bills for homeowners and renters who use these products (Energy Star, 2013).

Though the Energy Star program has achieved high levels of success in reducing carbon emissions generated in the home, the most effective method of reducing home emissions is through insulation and sealing (Energy Star, 2013). By sealing air leaks throughout the house (focusing on leaks in the attic space, throughout the foundation, and around windows and doors) and adding insulation (in the attic, floors over crawl spaces, and in accessible basement rim joists), the EPA estimates that the typical American home can reduce both their emissions and utility bills by up to 20% (Sanchez, Brown, Webber, & Homan, 2008). By rough estimate, if student volunteers seal and insulate fifteen homes per month, their work will offset about 10% of the estimated annual carbon footprint of Ohio State Athletics. This estimate was calculated using the average energy usage of an American home and applying the energy savings from sealing and insulation to this number. This told us how much energy could be saved per home. That savings multiplied by fifteen homes and twelve months came out to be around 465 tons of emissions, or around 13% of OSU's 3,500-ton athletic footprint. Figure 2 below gives an estimation of how much energy can be saved in an average household through insulation and upgrades in appliances, and then applies these savings to the annual athletics carbon footprint of Ohio State. While 13% may seem like a small target number to offset, we believe it is best to set realistic goals while the plan is still in its infancy. It is our hope that the project expands over the years to serve more homes, install more products, and reach out to more areas of Columbus.

Figure 2: Average Home Energy Savings through Insulation and Appliance Upgrades

Average CO2 emissions for an Ohio Household	13.88 tons CO2/year
Energy savings of Energy Star refrigerator	0.03 tons CO2/year
Energy savings of Energy Star washing machine	0.01 tons CO2/year
Energy savings of 10 energy efficient light bulbs	0.60 tons CO2/year
Energy savings of sealing and insulation	1.94 tons CO2/year
TOTAL SAVINGS = 2.58 tons CO2/household/year = 19% reduction in household CO2 emissions	
ESTIMATED COST PER HOUSEHOLD = $1,200	

Annual savings of treating 15 homes per month = 464.7 tons CO2 = 13.3% of athletics footprint
Estimated annual cost of treating 15 homes per month = $216,000

(COTAP, 2013; Cool the World, 2010; Energy Star, 2013)

Certainly all Americans are encouraged to practice energy efficiency in their homes by using energy efficient products and keeping their homes well insulated. However, for millions of low-income Americans, upgrading appliances or spending hundreds of dollars on sealing and insulation is simply unrealistic. It is for this reason that the proposed project focuses on low-income housing in the campus area. The residents of these homes likely do not have the option to shift to an energy-efficient lifestyle. Their appliances may be decades old and it is likely that many homes lack sufficient sealing and insulation. If the Ohio State community can provide these residents with Energy Star products as well as sealing and insulation services, they will emit less carbon dioxide and enjoy lowered utility bills. Additionally, student volunteers may provide the residents with education on easy ways to live sustainably and save money on utilities (as was the case in the Neutral Gator Model).

We believe that if this project gets off the ground, it has the potential to surpass the Neutral Gator project. Because we have elected to focus solely on energy efficiency rather than planting trees, we can put twice as much effort into lowering carbon emissions around Columbus. We see this as more beneficial than simply planting trees and hoping they grow large and long enough to make some a roughly quantified difference in the atmosphere.

Student Athletes, Volunteers, and PR

Many may look at our group's plan and question how support for the program will be generated. We see the general public as a primary source of support, due to the sheer number of Ohio State fans. The public could include fans at football, basketball, or baseball games, or in the form of alumni who are made aware of the plan. We hope that strong public support will translate into financial support in the form of donations or a wider volunteer base. This will help the project build reputation within both adults and students at the university.

This project aims to use student-athletes and student volunteers as a way to carry out the plan. Ohio State student athletes are required to participate in community service activities and thousands of other students are involved in service-based organizations. A carbon neutrality project could be a way to contribute to this need for service opportunities. Whether it involves planting trees or installing energy-efficient technology, Ohio State students and student athletes can always help out. Student volunteers, who value the environment and have already embraced movements like those brought up earlier in the paper (Zero Waste), would be the type of people our group looks to seek out. They would have a passion for the project and a desire to make a

difference in the community. In this aspect, our group sees the plan as one that can create positive public relations for the parties involved.

If the university is able to boast about both student athletes and volunteers helping out the environment and the community, they will have the perfect opportunity for bragging rights. The possible images of popular football players helping out in low-income areas, or the lacrosse team planting trees outside is something that our community and nation will want to see. We may be able to alter the opinions of some towards Ohio State athletes if these students are helping out in the name of a good cause. On top of that, we may create a relationship with the surrounding non-profit organizations, communities, and businesses that present even greater opportunities for the school. This project creates the chance for environmental change and community change. It is something that the athletics department can put their signature on and truly benefit from.

The project is not asking for an overhaul of the athletics department, nor should it put a great deal of stress on the department's leaders. We only see them as a partner in the form of their carbon footprint and possible labor help. At worst, this project will fall on volunteers to create, and not be in the hands of athletes. Ohio State would still have the opportunity to host a carbon neutral football or basketball game (meaning the game's emissions have been offset) and be connected in the academic world to successful "green" initiatives. The beauty of this project will be the win-win nature of it. The university can benefit from a connection to carbon offsetting and community service, and the students and student athletes are given the opportunity to meet new people and create new contacts.

Funding and Additional Support

The project we are proposing will not succeed without funding for purchasing the insulation and the appliances needed to help the community and lower carbon emissions. Insulation is relatively cheap at about $1.30 per square foot, but this can add up to several hundred dollars per home. Energy efficient appliances can cost from $200- $500. If we spend an estimated $1,200 per home and serve 15 homes per month, this would make for an annual cost of $216,000. The project may require a monetary investment for Ohio State without a monetary return, so the university might not be willing to fund it entirely. If the Ohio State University will not fund the entire project, there are other options we can pursue in the form of non-profit or for-profit organizations.

(1) Sierra Club

The Sierra Club is an organization that is dedicated to protecting the wilderness and educating others to help restore the environment. The Sierra Club's Ohio chapter has an Energy Committee that is directly connected to energy efficiency. The Sierra's Ohio Energy Committee works to:

- Advocate for strong implementation of Ohio's new energy efficiency and renewable energy standards
- Promote utility investments in energy efficiency and renewable energy
- Push for policies that will require new construction to be more sustainable and energy efficient
- Educate Ohioans on how to reduce energy consumption in their own homes and workplaces (Sierra Club Ohio, 2013).

The Sierra Club's Ohio chapter could be of great assistance in funding our project. Due to our projects goals and methods, the Sierra Club would be a good place to seek funding for our project because it matches their mission.

(2) The Ohio Environmental Council

The Ohio Environmental Council (OEC) is the state's most comprehensive and respected environmental advocate for a healthier, greener, and more prosperous Ohio. The OEC acknowledges that we can always improve the efficiency of energy in our homes, and understands that great investment in efficiency is needed. Through advocacy, legal action, and partnerships, the Ohio Environmental Council works to:

- Protect the health and well-being of Ohioans;
- Restore and maintain Ohio's natural beauty and resources;
- Promote the creation of clean energy and green jobs (The Ohio Environmental Council, 2013).

Our plan promotes the exact message that the OEC puts forth and embodies. The OEC would be a great partner for the Ohio State because our project would allow us to work together with the community for a great cause.

(3) Habitat for Humanity - MidOhio

Habitat for Humanity is a non-profit organization that looks to work in partnership with God and people to build affordable homes, empower families, and develop communities (Habitat

for Humanity MidOhio, 2013). The MidOhio (HFHMO) chapter is in charge of the Columbus area and could serve as a consultant to our project's proposal. Due to their mission and HFHMO's Habitat Restore (retail outlet for reusable and efficient home improvement), they seem like logical and productive partners.

(4) American Electric Power (AEP)

AEP is a for-profit organization that is headquartered in Columbus, Ohio. Their location, along with their community pledge "to support and play an active, positive role in communities where we live and work," make AEP another possible partner (American Electric Power corporate giving guidelines, 2013). AEP sponsors programs to encourage economic development in the community and helps projects like ours by giving "gifts" or contributions. AEP makes contributions of non-cash items such as real estate, furniture, equipment and the services of employees on short-term loan to organizations, using similar criteria as cash donations. They have the power, money, and connections to ensure our proposal not only is funded, but also run effectively.

Community

The community of Columbus is the keystone to our plan and its success. We will need to work with Columbus residents to complete the goal of changing insulation and appliances in homes. The decision for which houses will be worked on will come from an application sent to the homeowner that they would in turn submit. Based on the applications, the best-suited houses for the project, evaluated on the level of need and potential energy savings, will be chosen. This will improve the lives of the Columbus residents affected, and will help lower carbon dioxide emissions. Though the primary goal of this project is to lower carbon emissions, we believe community outreach is what sets this project apart.

Community Service

Community service is a major part of our proposal. For the project to succeed, we will need volunteers to enter the homes of those who have applied for our service, and change appliances and insulation. Community service through the project will help the Ohio State University become closer to the Columbus community, while also creating good publicity for the university. There are many options to gain volunteers, but we would like to start with Ohio State students and athletes to gauge how much interest there is in helping. From there we can look into

adult volunteers, partners within non-profit organizations, or people who need community service hours (either through an Honors program, a court order, or other avenues).

Outline of Main Strengths

In summary, we believe our project has great potential due to its "win-win" nature. Though the fight against climate change initially motivated us, we soon realized our program's success would come with benefits that extend beyond the issue of climate change.

- Environmental benefits: Through installation of energy efficient products, insulation, and sealing, we can make a significant reduction in local carbon emissions.
- Community benefits: By making homes more energy efficient, the homeowners we serve will face savings in utility bills in the future. This can make a significant difference for low-income neighborhoods.
- University benefits: This project is simply one more way Ohio State can improve its community relations. Our university takes great pride in sustainability, community service, and athletics. This project combines all three.

Addressing Potential Barriers

Our group is aware that our proposal faces certain challenges. We have already addressed the greatest challenge, which is funding. However, we feel it is necessary to address further challenges regarding feasibility and the nature of the project itself.

(1) Efficiency of Labor

A major challenge of the project lies in the feasibility of having volunteers go into the homes of low-income renters to conduct a home makeover of energy efficiency. Critics may argue that for families with major financial problems, reducing their carbon dioxide emissions is likely the least of their concerns. Additionally, it is unlikely that these people will be comfortable welcoming strangers into their homes to tamper with their possessions. The purpose of the project could be unclear to the tenants and they may feel as though they are merely a charity case for privileged university students. We plan to combat these arguments by making it clear that our primary motive is to reduce the carbon footprint of the university area as a whole and then explaining the benefit to the tenants, which is that these products should save them money by reducing their monthly energy bill. Our mission is not to simply provide the less fortunate with free products and we intend to make that clear to them.

Another issue we have considered is how to choose which homes to work with and how to gain the permission of residents to enter their homes. One method already mentioned in this paper is to send out mailings to certain neighborhoods describing our program with an application for our services enclosed. This application will give us information on the age and models of the homeowner's current appliances and the level of insulation in their homes. This way we will be able to ensure that our services are well thought out and will make a significant impact. If this method has a low response, we may send volunteers door-to-door to advertise our service, giving more details of its purpose and other concerns.

Due to the nature of our project, there are inherent safety concerns. We need to make sure our volunteers are safe when entering the homes of strangers. To assure safety, we suggest our volunteers would only work in sizeable groups (at least five people), which they would likely need to complete the workload anyway. Additionally, we suggest these services only take place during daylight hours. Finally, all volunteers will be required to participate in a training session to ensure they are qualified for their work and are aware of necessary safety measures.

(2) Criticism of Carbon Offsets

The most overwhelming critique of our project and to the practice of carbon offsetting in general, is the complaint that it does not actually do anything to solve the problem of carbon emissions. It can be seen as masking the problem or taking the easy way out. It is true that carbon offsetting will not actually reduce the carbon emissions of our athletic department or our university as a whole. Carbon offsetting seeks to achieve neutrality by cancelling out the carbon we are already emitting, rather than preventing the emissions in the first place (which would be the preferred method for obvious reasons).

We would like to remind our critics that the path toward carbon neutrality is not a short one. Ohio State's target date for a carbon neutral campus still lies 37 years ahead of us. The carbon emissions of the athletics department certainly will not be neutralized in a single project of such small magnitude. This project does not seek to alter their action plan or offer any earth-shattering solutions. What this project aims to do is to take advantage of the substantial audiences drawn by our athletic department to generate public support for a commitment to reduce our carbon footprint. We want the OSU fan base to know that the athletic department and student athletes are not only committed to helping the university reach its 2050 deadline, but are

giving back to the community in the process. Our hope is that this project gains enough support to open the doors for sustainability projects in the years to come.

DISCUSSION

Our group's project is similar to the University of Florida's Neutral Gator program but with an emphasis on energy efficiency rather than tree planting. We propose applying the concept of carbon neutrality to the OSU athletic department's carbon footprint. OSU's commitment to create a carbon neutral campus by the year 2050, we have looked into carbon offsetting and its implications. Our project attempts to create a community bond with the Columbus area and to outfit and install both energy efficient appliances and insulation to those in need. It hopes to use students at OSU (both volunteers and student-athletes) to strengthen the bond between Columbus and Ohio State. This project is one that not only helps low-income areas by saving money and energy, but also one that helps the environment. It would be an incredible accomplishment to say that OSU has held the second ever carbon neutral football or basketball game. This is something that we could all be proud of and it would continue to shape the culture of "going green" at Ohio State. The plan we have put forth includes several challenges regarding funding and feasibility, but these can be overcome. As discussed in the barriers section of the paper, by having applications for low-income areas and by building relationships with those that we help, our project will aid those in need without coming off as overbearing. They will see us as helping them out not in the name of charity, but rather in the form of environmental and energy-related need. Due to this fact, and our continued commitment to helping the Columbus community, our own version of Neutral Gator seems like a plausible solution to a large issue (climate neutrality).

For groups who may seek to expand upon our idea, there are more issues to explore. They may want to search for more organizations that can fund the project beyond the Sierra Club, OEC, Habitat for Humanity, or AEP. Future research could investigate a more precise measurement of the athletics carbon footprint (contact with the athletic department was made, but true travel plans were not disclosed) or explore building better relationships with student groups already on campus (Scarlet, Grey, and Green, etc.). Our group has built a foundation for this type of program, but there is always room for improvement. We understand this, and are committed to progressively move forward to close any gaps this project may have.

CONCLUSION

For the reasons given throughout this paper, our group believes that a Columbus-based program like Neutral Gator can succeed here at OSU. Carbon offsetting may not reduce our university's dependence on carbon, but this project can lower the carbon footprint of the Columbus community while creating public awareness of the importance of reaching carbon neutrality. With a smaller footprint of 3,500-tons in the OSU athletic department, we will look to use energy efficient appliances and insulation as our means of offsetting. We will use the fan base that is Buckeye Nation and the hundreds of student volunteers or athletes eligible to help to create a labor force that feels the need to help out. By building a relationship with the low-income areas around Columbus and by applying for funding (whether through non-profits, OSU, or grants), we believe our plan is feasible. With the help of our community and with the support of our university, carbon neutrality is, without a doubt, something that we at Ohio State can achieve.

LITERATURE CITED

American electric power corporate giving guidelines. (2013). Retrieved April 10, 2013, from http://www.aep.com/community/CorporateGivingGuidelines/

Clark, D. (2011). A complete guide to carbon offsetting. Retrieved April 1, 2013, from http://www.guardian.co.uk/environment/2011/sep/16/carbon-offset-projects-carbon-emissions

College Express. (2013). Attendance at football games by the numbers: Top 20 in division I (FBS). Retrieved March 20, 2013, from http://www.collegexpress.com/lists/list/attendance-at-football-games-by-the-numbers-top-20-in-division-i-fbs/530/

Cool the world: How much CO2 does each appliance emit. (2010). Retrieved March 13, 2013, from http://www.cooltheworld.com/appliance_table.php

COTAP carbon emissions calculator. (2013). Retrieved March 13, 2013, from http://cotap.org/carbon-emissions-calculator/?gclid=CIjak8P8qrYCFaI-Mgod6kMA5Q

David Suzuki Foundation. (2013). The problems with carbon offsets from tree-planting. Retrieved April 1, 2013, from http://davidsuzuki.org/issues/climate-change/science/the-problems-with-carbon-offsets-from-tree-planting/

Dixon, R. K., Andrasko, K. J., Sussman, F. G., Lavinson, M. A., Trexler, M. C., & Vinson, T. S. (1993). Forest sector carbon offset projects: Near-term opportunities to mitigate greenhouse gas emissions. Water, Air, & Soil Pollution, 70(1-4), 561-577. doi: 10.1007/BF01105022

Dorish, J. (2011). Top 10 college basketball attendance Teams in Ohio. Retrieved March 20, 2013, from http://rivals.yahoo.com/ncaa/basketball/news?slug=ycn-10519431

Energy Star. (2013). Energy star products. Retrieved April 1, 2013, from http://www.energystar.gov

Green Rotation Book. (2010). The cost of everyday living. Retrieved March 31, 2013, from http://www.greenrationbook.org.uk/resources/footprints-air-travel/

Habitat for humanity MidOhio. (2013). Retrieved April 10, 2013, from http://www.habitatmidohio.org/

Neutral Gator. (2008 & 2013). Neutral Gator Welcome to the Neutral Gator Nation Comments. Retrieved February 20, 2013, from http://neutralgator.org/

Overview and Examples of Climate Action Plans. (2013). Retrieved February 20, 2013, from http://www.presidentsclimatecommitment.org/resources/overview-climate-action-plans

Sanchez, M. C., Brown, R. E., Webber, C., & Homan, G. K. (2008). Savings estimates for the United States Environmental Protection Agency's ENERGY STAR voluntary product labeling program. Energy Policy, 36(6), 2098-2108.

Sierra Club Ohio. (2013). Retrieved February 2, 2013, from http://ohiosierraclub.org/

The Ohio State University: Climate Action Plan. (2011) Retrieved February 20, 2013, from http://rs.acupcc.org/site_media/uploads/cap/857-cap.pdf

The Ohio Environmental Council. (2013). Retrieved February 2, 2013, from http://www.theoec.org/

University of Florida News. (2009). Gators claim title to nation's first carbon neutral athletic season. Retrieved April 24, 2013, from http://news.ufl.edu/2009/09/03/gators-claim-title-to-nation's-first-carbon-neutral-athletic-season/

Zero Waste at Ohio Stadium. (2013). Retrieved February 20, 2013, from http://sustainability.osu.edu