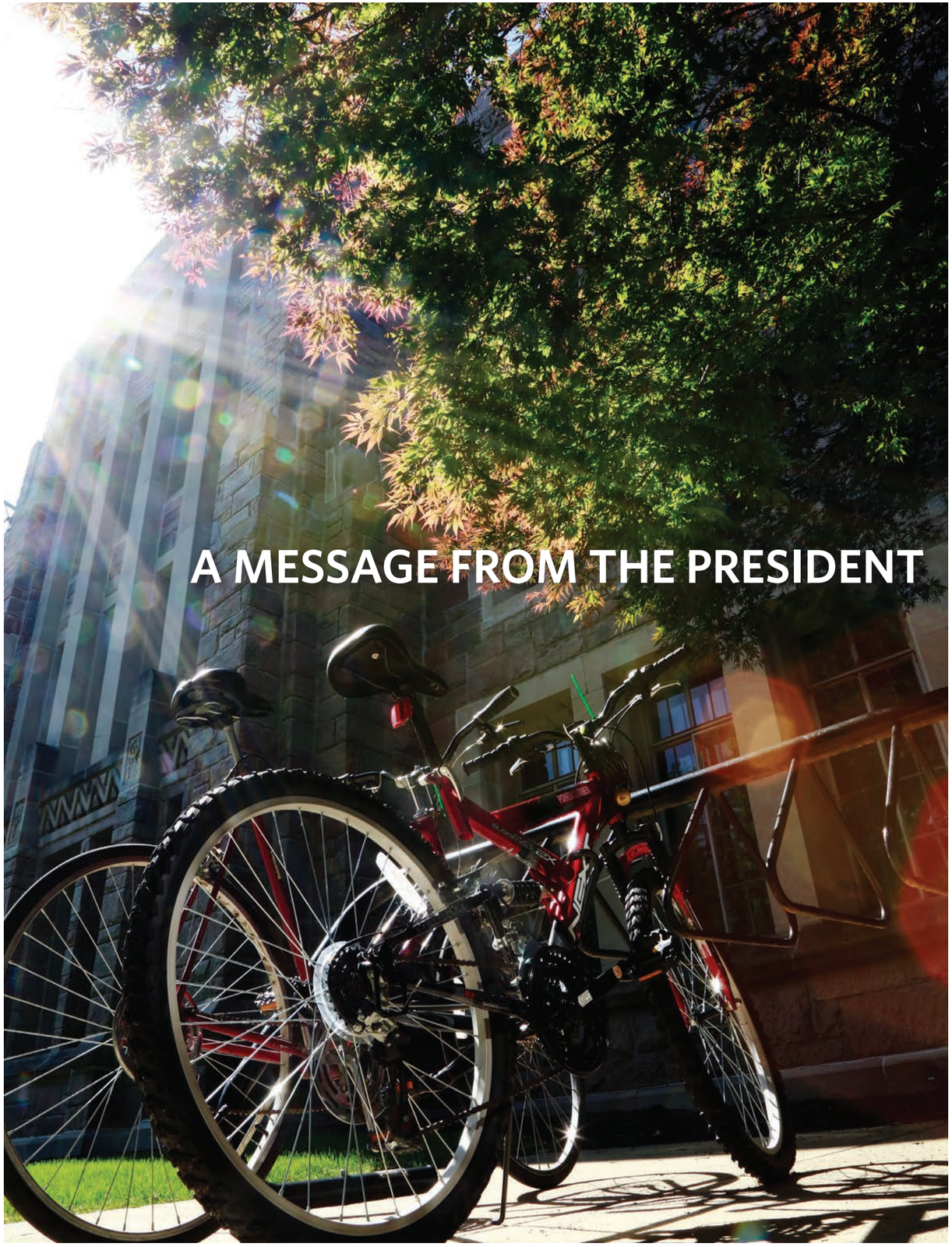
BUTLER SUSTAINABILITY

Sustainability and Climate Action Plan

BUTLER UNIVERSITY



A MESSAGE FROM THE PRESIDENT

Butler University's learning community provides more than outstanding academics: it prepares its students for lives of responsible global citizenship. Butler's curricular roots in the liberal arts—along with a long-standing commitment to selflessness and integrity defined as "The Butler Way"—foster within its students a desire to think about the world differently. To make bold decisions, to aspire to their highest goals, and to enact positive change in their communities—locally, nationally, and around the world.

As administrative leaders and faculty members, we also understand that "practicing what we preach" is fundamental to The Butler Way. Just as we expect our students to set and reach imaginative and ambitious goals, so, too, must we strive for the highest levels of excellence for our University. This includes responsible stewardship of our campus, our region, and our planet.

I am therefore extremely proud of the formal commitment that Butler University is now making through the submission of this Sustainability and Climate Action Plan. Building upon the existing efforts of Butler students, faculty, and staff, our institutional environmental stewardship will play an increasingly vital role in Butler's curricula, student projects, campus master planning, and operations in the coming years as the University implements its new strategic plan, Butler 2020. Furthermore, through this pledge to achieve climate neutrality, Butler is reaffirming its commitment to serve as a champion for the City of Indianapolis and the State of Indiana, helping to ensure that future generations of Hoosiers inherit a healthy planet.

Environmental change will continue whether we're ready or not. The courage to make creative decisions around sustainability will enable Butler to become a university that is admired for its high academic standards, its dedication to making the world a better place, and its readiness to tackle environmental challenges with tenacity and optimism.

Butler University has made great strides toward climate neutrality, and is pleased to redouble its efforts in this area moving forward.

James M. Danko
President, Butler University

CONTENTS

The Butler University Sustainability Council created the Butler University Sustainability and Climate Action Plan, as part of the American College & University Presidents' Climate Commitment. Contact McKenzie Beverage, Sustainability Coordinator, mbeverag@butler.edu, Butler University, 4600 Sunset Avenue, Indianapolis, IN 46208.

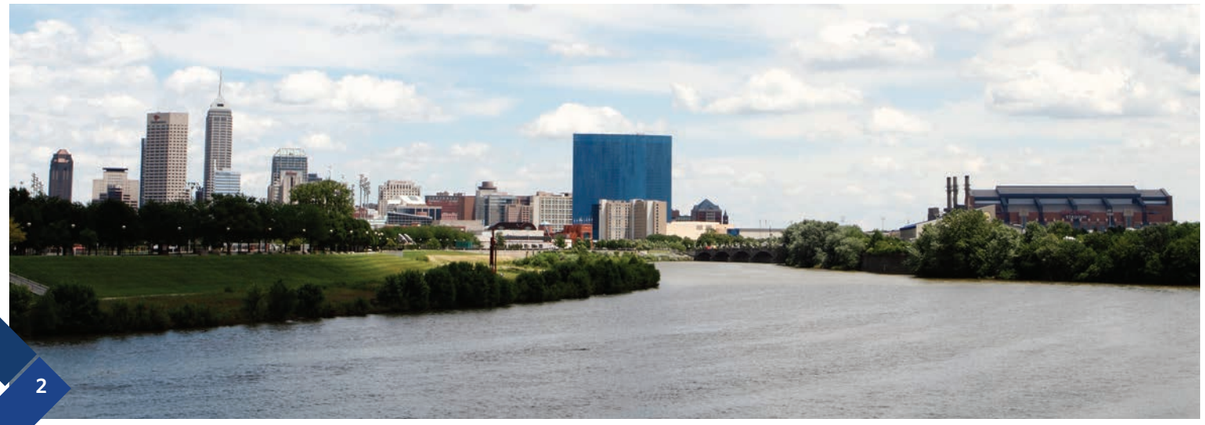
EXECUTIVE SUMMARY

Butler University has been a leader in Indianapolis, Indiana, since 1855. Its founder, Ovid Butler, was an outspoken abolitionist and avid proponent of gender equality. His ambition and drive to position Butler as an innovative cultural leader created an inspiring legacy for the institution. Butler was the first university in Indiana to accept both men and women and the first American university to grant an endowed chair to a female professor.

Butler University remains connected to those roots today. President James M. Danko envisions a university that is nationally recognized as an innovative leader, preparing graduates to make a lasting and positive impact on the world. The world includes not just fellow citizens, but the non-human environment as well. For years, Butler has been making significant efforts to be more sustainable. Student groups, staff, faculty, and administrators have collectively driven the "green" agenda by starting a comprehensive recycling program, starting a campus farm, and installing rain gardens across campus. The Butler community is committed to making Butler a leader in sustainable operations and academics.

Over the past few years, Butler has ushered in a new era of leadership and innovation. Butler has welcomed a new president, provost, and leadership in campus facilities operations. The Center for Urban Ecology (CUE) and CUE Farm were established. Butler's student-driven efforts have also coalesced in support of making formal commitments to become a more sustainable institution. Recognizing this burgeoning new era, President Danko signed the American College & University Presidents' Climate Commitment (ACUPCC), which reflects Butler's institutional vision and core values. By signing the ACUPCC, President Danko committed Butler to the following:

1. Eliminate operational GHG emissions by 2050.
2. Provide education, research, and community engagement that enable society to do the same.
3. Publicly report progress on an annual basis.



BACKGROUND

The Butler Sustainability and Climate Action Plan (BUSCA) is a roadmap to meet Butler's ACUPCC commitments. The Butler Sustainability Council collectively wrote its plan during the 2013 calendar year. The Sustainability Council comprises more than 25 students, faculty, and staff. It was formed by uniting existing campus sustainability groups into one large initiative with students at the helm.

After President Danko signed the ACUPCC on April 16, 2012, the council set up a process for developing a climate action plan in a way that channeled Butler's institutional identity and built on the strengths of each member. Collaborative learning and inclusivity drove the process and helped to dispel embedded silos with biweekly group meetings. The team viewed the development of the plan as an opportunity for community building, collective buy-in, and strengthening the culture of sustainability among a diverse group of stakeholders.

The council was divided into topical working groups chaired by a student, faculty member, and staff member. The working groups included: energy and water; purchasing, food, and waste; transportation, grounds, and facilities; and education, research, and outreach. The working groups met regularly to research, write, edit, and make recommendations for the climate action plan. Concomitantly, the CUE worked to form a new position dedicated to campus sustainability. As a result, Butler welcomed its first Sustainability Coordinator in August 2013 to build upon Butler's sustainability efforts, create new initiatives and programs, and support the completion of the climate action plan.

GHG EMISSIONS INVENTORY

Greenhouse gases (GHG) are responsible for trapping the sun's radiation in the atmosphere, thus warming the planet and causing changes in the climate. A greenhouse gas inventory (GGI) is an accounting of these radiation-trapping gases. Once a baseline GGI is completed, an organization can develop strategies to mitigate these emissions. This forms the basis of climate action planning and is a requirement of the ACUPCC. The Butler GGI was conducted in 2011 using the CACP Campus Carbon Calculator™ (see Appendix A). The calculator divides emissions into three different scopes of emissions defined in Table 1:

Table 1—Scopes of Greenhouse Gas Emissions

SCOPE	MEANS OF EMISSION	EXAMPLE
1	Direct	On-campus heating/cooling, vehicle fleet
2	Indirect	Purchased electricity/steam
3	Indirect	Commuting, air travel, waste disposal

In the 2011 calendar year, the University emitted 28,841.2 MTCDE. Results indicated that in 2011 scope 1 emissions accounted for 22 percent of total emissions, scope 2 emissions accounted for 61 percent, and scope 3 emissions attributed 18 percent of total emitted pollution.

PLAN HIGHLIGHTS

The publication of BUSCA represents Butler's commitment to environmental stewardship, sustainability leadership, and its formal commitment to achieve climate neutrality. The plan is divided into six sections including:

1. Introduction and Background
2. Campus Greenhouse Gas Emissions
3. Ongoing Initiatives
4. GHG Emissions Mitigation Strategies and Sustainability Goals
5. Education, Research, and Outreach
6. Conclusion and Ongoing Assessment

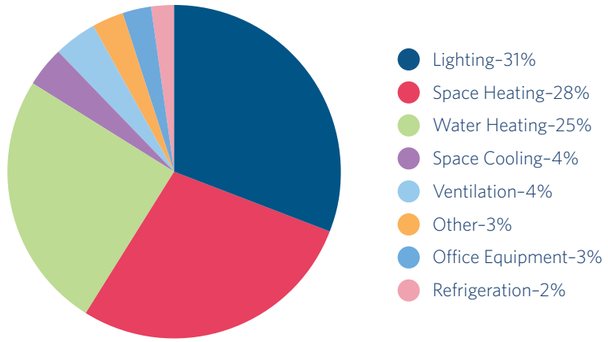
The ultimate goals of the plan include the following:

- Achieve institutional climate neutrality by 2050 through mitigating the emissions associated with energy consumption of the University's built environment, campus fleet, outsourced travel, and material purchasing.

- Ensure total compliance with the ACUPCC by maintaining policies committing Butler to offset the remaining emissions not eliminated by energy conservation or efficiency measures.
- Demonstrate Butler's commitment to sustainability not directly tied to greenhouse gas emissions through the adoption of strategies across the following areas: energy, water, transportation, grounds, facilities, waste, purchasing, and food.

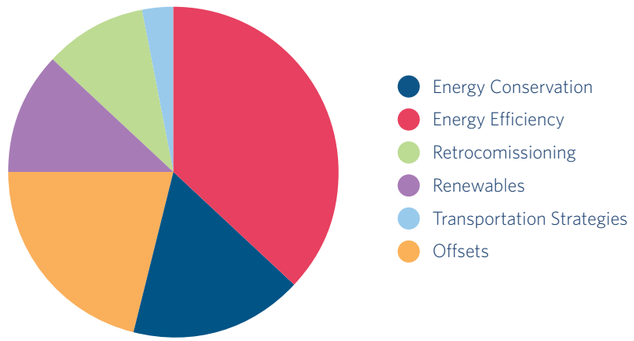
In order to achieve climate neutrality, the Sustainability Council focused heavily on emissions mitigation strategies for purchased electricity—the largest portion of Butler's GHG emissions. Many buildings on Butler's campus do not have individual meters that measure how electricity is consumed. Over the next six years, Butler's goal is to invest in utility submetering for all major campus academic, administrative, recreational, and residential facilities in which the cost of submetering installation is justified. All newly installed submetering will be fully integrated into a wireless Building Automation System (BAS), allowing the Facilities and Building Services departments to better monitor and make use of data acquired. A 2003 U.S. EIA survey estimated end-use electricity consumption for U.S. college and university education buildings[1] (see Figure 1).

Figure 1—U.S College and Universities Energy Consumption by End Use



Based on these data, the Sustainability Council recommends a mitigation portfolio focused first on energy efficiency and consumption reduction. Long-term, the Sustainability Council recommends incorporating renewable energy and using carbon offsets as a means to bridge any gaps that are not achieved through these measures. Butler's construction specifications and guidelines already include a goal of purchasing 100 percent "green power," which are carbon offsets, from the local utility by 2021. With greater efficiency and conservation, needed offsets will be greatly reduced. Figure 2 shows the breakdown of mitigation strategies.

Figure 2—Butler Greenhouse Gas Emissions Source Reductions: 2011-2050



[1] U.S. Energy Information Administration. (2003). Overview of Commercial Buildings. Retrieved from http://www.eia.gov/consumption/commercial/data/archive/cbecs/cbecs2003/overview.pdf

Highlights of the major mitigation strategies that have the biggest impact on GHG reductions are broken down according to short-term, mid-term, and long-term goals, as shown in Table 2.

Table 2—Butler University GHG Mitigation Strategies

MITIGATION STRATEGIES	ENERGY EFFICIENCY	ENERGY CONSERVATION	RETRO-COMMISSIONING	RENEWABLES
Short-Term Goals (2020)	• Automatic sleep mode for campus computers • LED and occupancy sensor purchasing policies • Purchase smart strips	• Purchase sub-meters for all buildings • Occupancy curtailment • Behavioral programs and competitions	• Implement a rolling 10-year cycle, in which 10 percent of campus is retrocommissioned each year	
Mid-Term Goals (2030)	• LEED Gold Construction Policy	• Centralized thermo-stat management • Smart thermostat technology		
Long-Term Goals (2050)	• HVAC and function-al efficiency upgrades			• Develop on-campus renewables, capable of supplying 12 percent of total campus energy consumption

In addition to the GHG emissions mitigations strategies, the plan also outlines goals for greater institutional sustainability and continued education, research, and outreach. Embedding sustainability within the curricular and co-curricular components of the University is central to creating a campus culture that values and operates toward shared sustainability goals.

ONGOING ASSESSMENT

The Sustainability Coordinator, in conjunction with the Sustainability Council, will track progress toward these goals through annual GHG reporting, submitting regular progress reports to ACUPCC, and participating in the Association for the AASHE STARS™ program. Five-year climate action plan reviews will also take place to ensure the relevancy of the strategies set forth; the plan will be updated as needed.

LIST OF ACRONYMS

AASHE Association for the Advancement of Sustainability in Higher Education
AASHE STARS Sustainability Tracking, Assessment, and Rating System™
ACUPCC American College & University Presidents' Climate Commitment
ASHRAE American Society of Heating, Refrigerating, and Air Conditioning Engineers
BAC Butler Awards Committee
BAS Building Automation System
BURN Butler University Resale Network
BUPD Butler University Police Department
BUSCA Butler University Sustainability and Climate Action Plan
CACP Clean Air Cool Planet
CBECS Commercial Buildings Energy Consumption Survey
CDE Carbon Dioxide Equivalent
CFL Compact Fluorescent Light Bulbs
CUE Center for Urban Ecology
CO2 Carbon Dioxide
eCO2 Equivalent Carbon Dioxide
EIA Energy Information Administration
ECO Environmental Concerns Organization
EPA Environmental Protection Agency
EPV Electric Powered Vehicle
FSC Forest Stewardship Council
FY Fiscal Year
GHG Greenhouse Gas
GGI Greenhouse Gas Inventory
GSA General Services Administration
HAC Holcomb Awards Committee
HVAC Heating, Ventilation, and Air Conditioning
IPL Indianapolis Power & Light Co.
kWh Kilowatt Hour
LAS College of Liberal Arts and Sciences
LED Light Emitting Diode
LEED Leadership in Energy & Environmental Design
MMBTU One Million British Thermal Unit (BTU)
MTCDE Metric Tons CO2 Equivalent
NWF National Wildlife Federation
NREL National Renewable Energy Laboratory
OECD Organization of Economic Cooperation and Development
PACS Peace and Conflict Studies
PV Photovoltaic
ROI Return on Investment
SFI Sustainable Forestry Initiative
SGA Student Government Association
STS Science, Technology, and Society
VAV Variable Air Volume
WTE Waste to Energy

SECTION 1
INTRODUCTION AND BACKGROUND

Butler University is a four-year private liberal arts master's granting university located on a 295-acre campus in Indianapolis, Indiana. From the time of its founding by Ovid Butler, an outspoken abolitionist in the 19th century, the University has been a part of innovative movements and a leader in a variety of major cultural shifts. It was the first university in Indiana to admit both men and women and the first American university to grant an endowed chair to a female professor.

Butler University's ongoing strategic and infrastructure planning envisions a campus that provides environmentally responsible residential and co-curricular facilities, engages students in learning experiences with local impact and global reach, and sustains excellence in natural science curriculum. Adopting a climate action plan and taking steps to incorporate sustainability into the curriculum and the built environment will help propel Butler to national prominence among higher education institutions.

The case for embedding sustainability and climate action planning in higher education is one of significant importance. Widespread scientific agreement on the increasing threat of climate change to human health and well-being has caused policymakers to evaluate not just disaster responses but proactive strategies for climate mitigation. Economic opportunities are rapidly emerging for entrepreneurs in alternative energy and creative design solutions that minimize the human impact on the planet. Equitable distribution of costs from environmental degradation introduces significant questions about responsibility now and in the future.

The combination of these and other issues related to the environment, economics, and social equity has resulted in a sustainability framework that has been widely embraced by institutions of higher education in North America and around the world. From 2007 to 2012, 588 new academic programs and initiatives were reported to the Association for the Advancement of Sustainability in Higher Education (AASHE), with recent interest largely focused on general sustainability and renewable energy. In 2012 alone, higher education institutions announced 171 employment positions for sustainability staff and faculty, indicating a significant long-term investment in this area.[2] Butler is committed to serve as a resource that advances and helps the State of Indiana improve this situation.

As a campus within Indiana, Butler must contend with the state's dependence on coal for electricity generation. According to the Energy Information Administration (EIA), coal-fired power plants produced 83 percent of Indiana's electricity in 2011, ranking the Hoosier state eighth in the nation for coal production and CO2 emissions.[3] This figure stands in stark contrast to Indiana's renewable energy generation totals, which accounted for only 3 percent of the total electricity produced in 2010. Indiana's dependence on coal has public health and economic consequences as well as measurable environmental effects. In 2013, the American Lung Association gave Indiana a "D" rating in ozone/smog pollution and a failing grade in air particle pollution.[4] The Clean Air Task Force ranked Indiana fifth in the nation for mortality rates related to air pollution, with 11.4 deaths per 100,000 residents.[5]

Ongoing efforts to make Butler a more sustainable campus have become an institutionalized part of Butler culture over the last decade. Significant initiatives have been under way for years on Butler University's campus including the execution of a robust campus recycling program, the purchase of green cleaning supplies, LEED-certified campus construction, development of an extensive plan to convert all of campus fleet vehicles to University-produced biodiesel, and implementation of robust measures to responsibly manage stormwater runoff.

Student groups have included ECO (Environmental Concerns Organization), BURN (Butler University Resale Network), Earth Charter Butler, and others. In 2011, a student committee called Green Operations (Green Ops) was formed within the Council on Presidential Affairs, which is a student leadership program

[2] AASHE. (2012). 2012: Higher Education Sustainability Review.
Retrieved from http://www.aashe.org/files/publications/he-review/2012/he_sustainability_review_2012.pdf
[3] U.S. Energy Information Administration. (n.d.). Indiana: State Profile and Energy Estimates.
Retrieved from http://www.eia.gov/state/?sid=IN
[4] American Lung Association. (n.d.). State of the Air.
Retrieved from http://www.stateoftheair.org/2013/states/indiana/marion-18097.html
[5] Clean Air Task Force. (2010). The Toll from Coal: An Updated Assessment of Death and Disease from America's Dirtiest Energy Source. Retrieved from http://www.catf.us/resources/publications/files/The_Toll_from_Coal.pdf

of Butler's Student Government Association. Since that time, Green Ops has led initiatives and coordinated with the other student organizations to advance sustainability efforts based on student-led priorities such as the construction of the first green roof on campus, installation of Brita filtration stations, and Earth Week programming.

A self-organized group known as Eco Dawgs made a major organizational push in 2006. Eco Dawgs played a major role in developing the campus's recycling program, providing a forum for sustainability-related discussions, and planning sustainability programming with students, faculty, and staff. Eco Dawgs continued active programming until 2011 when the leadership from Eco Dawgs, environmental student organizations, the CUE, and other Butler faculty joined together to form what is now Butler's Sustainability Council.

On April 16, 2012, Butler President James M. Danko signed the ACUPCC, which formally committed the University to develop a comprehensive plan to achieve climate neutrality by the year 2050. This BUSCA describes the pathway to achieving this pledge and expresses Butler's deep commitment to sustainability.

The Butler Sustainability Council, which is comprised of more than 25 students, faculty, and staff from across campus, developed the BUSCA. In February 2013, the Executive Committee of the Sustainability Council began biweekly meetings to guide the development of BUSCA. The first organizational task was to create working groups based on thematic areas related to sustainability. The five working groups met consistently over spring semester 2013 to brainstorm ideas, collect data, and form outlines for BUSCA.

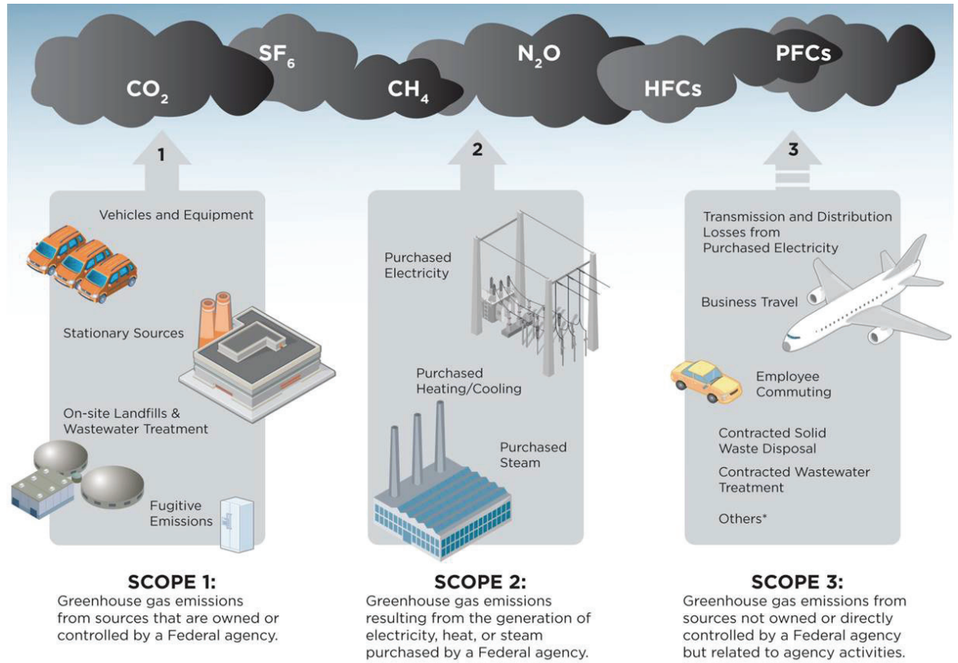
Data were compiled and analyzed in summer 2013 by the CUE, and the full draft was developed in fall semester 2013 in consultation with the Sustainability Council. The final draft of the BUSCA was reviewed and approved by the Butler Executive Council before being submitted to the ACUPCC. Ongoing assessment will be performed by the Sustainability Coordinator in conjunction with the Sustainability Council.

SECTION 2
CAMPUS GREENHOUSE GAS EMISSIONS

Greenhouse gases are responsible for trapping the sun's radiation in the atmosphere, thus warming the planet and causing changes in the climate. A GGI is an accounting of these radiation-trapping gases. Once a baseline GGI is completed, an organization can develop strategies to mitigate these emissions. This forms the basis of climate action planning and is a requirement of the ACUPCC.

The Butler GHG emissions inventory (Appendix A) was conducted in 2011 using the CACP Campus Carbon Calculator™. It should be noted that there are GHG emissions associated with University practices (food miles, manufacturing for purchased products, construction, etc.). However, these were not accounted for in Butler's GGI. The calculator divides emissions into three different scopes of emissions defined in Figure 3.[6]

Figure 3—Common Sources of Federal Greenhouse Gas Emissions



*Additional, significant Scope 3 emission sources exist beyond the examples provided.

[6] National Institutes of Health. (n.d.). [Graphic illustration of different emission types]. Common Sources of Federal Greenhouse Gas Emissions. Retrieved from http://nems.nih.gov/Sustainability/Pages/Scope_1_and_2_GHG.aspx

In the 2011 calendar year, Butler University emitted 28,841.2 MTCDE. The breakdown of Butler's emissions for 2011 is explained in Table 3.

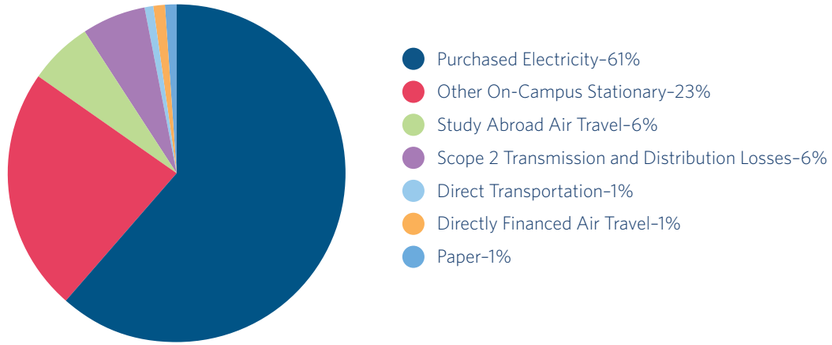
Table 3—Butler University GHG Emission Sources, 2011

SCOPE	SOURCES	DESCRIPTION
1	On Campus Stationary	Heating is provided via several high-efficiency water boilers located throughout campus. Water is chilled on-site to provide air-conditioning for most of the buildings on campus, either via the central chilled-water plant or within each individual building.
	University Fleet	Butler's campus fleet generated approximately 320 MTCDE emissions. This includes all gasoline- or diesel-powered vehicles and grounds-keeping equipment owned by the University.
2	Purchased Electricity	Butler consumed more than 28.9 million kWh of electricity, the equivalent of roughly 15,959 MTCDE.
	Purchased Steam	Butler uses natural gas to power its decentralized steam boiler system. Butler consumed 114,919 MMBTU of natural gas, the equivalent of approximately 6,112 MTCDE. Almost all of this consumption is attributed to heating provided by the high efficiency boilers (see Scope 1); however, some of it is purchased to offset the boilers' production.
3	Commuting	Butler issued 1,832 student residence vehicle permits; 1,007 student commuter permits; and 1,453 faculty/staff permits.
	Financed Outsourced Travel	Butler students, faculty, and staff accumulated 588,282 miles in directly financed outsourced air travel. Directly financed outsourced bus travel approximated 75,000 miles, while mileage for taxis, rental cars, and personal-use vehicle reimbursement totaled more than 17,000 miles. Together, directly financed travel generated approximately 398.9 MTCDE emissions (1.7 percent of Butler's total emissions).
	Study Abroad	Butler students accrued more than 2.8 million miles of air travel related to study abroad, which generated 1553.3 MTCDE emissions.
	Solid Waste	Butler generated approximately 1,296 short tons of routine trash. Recycling accounts for 9.5 percent of the total. All of the non-recycled routine trash is processed by a WTE incineration facility in downtown Indianapolis. The steam produced by the facility is purchased by a local energy company, which uses it to provide approximately 40 percent of the heat consumed by commercial and civic property in downtown Indianapolis. The CACP Campus Carbon Calculator™ credits incinerated waste as a carbon offset which totaled an emissions reduction of 51.8 MTCDE.
	Paper	The Butler community consumed approximately 1,045 tons of plain white copy paper, equal to roughly 20.9 million sheets of paper or 4,477 sheets per student. This consumption generated 285.4 MTCDE emissions, accounting for about 1.1 percent of Butler's total calculated GHG emissions.

For Butler, purchased electricity is by the far largest source of greenhouse gas emissions, accounting for 61 percent of all measured University emissions in 2011. That year, Butler consumed more than 28.9 million kWh of electricity, the equivalent of roughly 15,959 MTCDE. According to the EIA, the average U.S. residential home consumes 10,837 kWh annually.[7] This means Butler consumed enough electricity in 2011 to power 2,667 average U.S. homes. Figure 4 graphically depicts the GHG emissions breakdown.

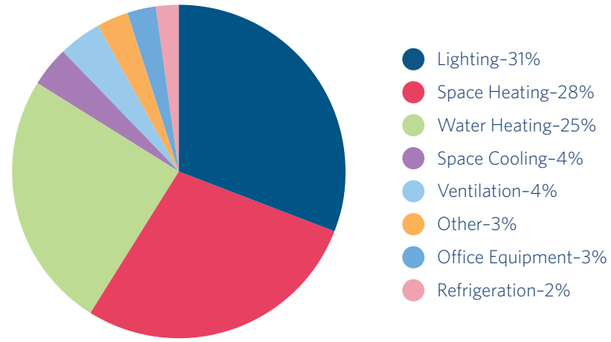
[7] U.S. Energy Information Administration. (n.d.). How much electricity does an American home use? Retrieved from http://www.eia.gov/tools/faqs/faq.cfm?id=97&t=3

Figure 4—Butler 2011 GHG Emissions by Category



To help make more informed decisions on how to reduce electricity use across campus, it is helpful to have an understanding of which sources on campus consume the greatest quantities of the resource. Many of the buildings on Butler's campus do not have individual meters, therefore it is difficult to pinpoint how electricity is consumed. A 2003 survey performed by the EIA estimates end-use electricity consumption for U.S. college and university education buildings.[8] This information was used in determining mitigation strategies. Figure 5 shows the breakdown of energy use.

Figure 5—U.S College and Universities Energy Consumption by End Use



Though these values help to make a number of generalizations, there are several drawbacks to using this data to estimate electricity consumption at Butler. First, the data are based upon information published in 2003. Technological developments since that time have likely altered this distribution, thereby decreasing the applicability of the data. Second, the distribution is based on information collected from universities across the country. American colleges and universities are located in a variety of climates with a wide assortment of energy distributions. Thus, an average energy end use distribution for higher education across the country will not contain the direct equivalent distribution for a small, urban, Midwestern liberal arts college. Nevertheless, in the absence of more accurate measures, the data in Figure 1 has utility for making estimations and projections.

[8] U.S. Energy Information Administration. (2003). *Overview of Commercial Buildings*. Retrieved from http://www.eia.gov/consumption/commercial/data/archive/cbecs/cbecs2003/overview.pdf

SECTION 3
ONGOING INITIATIVES

LIGHTING

Butler construction standards specify that all new construction projects follow the lighting guidelines of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 189.1, which includes the utilization of high efficiency lighting and occupancy sensors whenever appropriate. A strong preference is given to LED lighting for all new construction and renovation of existing buildings, hallways, or rooms, as well as for outdoor lighting projects. Occupancy sensors are gradually being integrated into common areas most likely to result in decreased electricity use (e.g., restrooms, hallways, labs, some classrooms, etc.). Recent projects adhering to the newly adopted building standards, such as of the College of Pharmacy and Health Sciences Addition in 2009 and the construction of the Howard L. Schrott Center for the Arts in 2013, have integrated daylighting harvesting techniques that have decreased the need for artificial lighting while maintaining HVAC efficiency.

ON CAMPUS STATIONARY SOURCES AND HVAC

Heating is provided via several high-efficiency water boilers located throughout campus. Water is chilled on-site to provide air-conditioning for most of the buildings on campus, either via the central chilled-water plant or within each individual building. All of the campus academic, administrative, and residence buildings are heated, while all but two of these buildings (Ross and Schwitzer residence halls) are equipped with air-conditioning.

Butler consumed 114,919 MMBtu of energy through natural gas in the baseline 2011-2012 academic year, which translates to 6,112 MTCDE. Almost all of this natural gas consumption is devoted to physical plant heating. Between 2005 and 2012, Butler underwent the process of replacing the outdated central steam boiler system located throughout campus with several smaller, high efficiency water boilers.

Butler construction and renovation standards specify a strong preference for high efficiency HVAC equipment whenever such equipment is being replaced and/or installed. Recent projects, including the construction of the Schrott Center in 2013, have integrated dual-pane windows designed to reduce heat loss in the winter and heat gain in the summer by up to 50 percent. This saves energy previously expended on heating and air conditioning. In addition, individual offices and classrooms are equipped with VAV boxes and temperature control units, which allows occupants to respond to temperature concerns on a context-specific basis. While these units do not necessarily result in energy savings, their presence offers opportunities for encouraging and enacting positive behavioral change.

FUME HOODS

Campus laboratories consume roughly twice the amount of energy as a standard office or administrative space.[9] To reduce the electricity and natural gas needed to operate laboratories on campus, in 2011 Butler replaced the ducted fume hoods in four of its chemistry labs with ductless, filtered fume hoods. At the time, Butler had the largest application of the technology in the United States.

Prior to this renovation, Butler's physical sciences building (Gallahue Hall), had approximately 49 constant volume ducted fume hoods, which exhaust a constant amount of air at all times. This resulted in 66,000 cubic feet per meter of air annually. The chemistry teaching labs renovation replaced 10 of these fume hoods with 27 green fume hood technology. Green fume hoods use a new filtering technology that allows the exhaust from the fume hoods to be filtered and recirculated back into the lab. Since the indoor air is permitted to remain within the laboratories, temperature within the building can be maintained without additional heating or cooling. As a result, the total building cubic-feet-per-meter required for fume hood exhaust was reduced from 66,000 to approximately 45,200 cubic-feet-per-meter—a 31 percent reduction.

[9] Perkel, Jeffrey M. (2011, July 1). How Green is My Lab? Doing Science Sustainably. The Scientist. Retrieved from http://www.the-scientist.com/?articles.view/articleNo/30697/title/How-Green-Is-My-Lab-/

INFORMATION TECHNOLOGY AND THE UNIVERSITY DATA CENTER

Over the past several years, Butler has implemented a number of strategies focused on increasing the energy efficiency of its computing practices. The vast majority of these strategies have centered on improvements to servers and University desktops. More than 80 percent of Butler's servers are now virtual, further reducing the costs necessary to operate University technology. Solid state storage devices, blade servers, and storage virtualization have also furthered the reduction of electricity used in traditional data centers. More than 100 computers throughout campus have been replaced by Zero Client computers, reducing the electricity consumed by each unit to one-third of that a standard desktop computer. The Butler Data Center, which opened in 2009, recycles much of the heat generated by its servers and other equipment for reuse elsewhere in the building while using high voltage power distribution to improve efficiency.

LEED SILVER CONSTRUCTION POLICY

LEED Silver is the Butler standard for new construction and major renovations, but Gold or higher is attempted whenever possible. Even small renovation projects on campus incorporate the LEED sustainability concepts. Butler has two LEED Gold buildings (Howard L. Schrott Center for the Arts and College of Pharmacy and Health Sciences Addition) and is tracking LEED Silver renovation in updates to Hinkle Fieldhouse, which is on the National Register of Historic Places.

UNIVERSITY APPLIANCES

All University appliances must be Energy Star™ rated. These appliances are estimated to consume 10 to 50 percent less electricity than standard appliances.

BICYCLING INFRASTRUCTURE AND BIKE SHARE PROGRAM

Bicycle racks are provided for students, faculty, staff, and guests' convenience near all major campus buildings and outdoor spaces. The campus is linked to Indianapolis' two most frequented bicycle and pedestrian trails through the Central Canal Towpath: the Indianapolis Cultural Trail and the Monon Trail. This allows the campus cyclist community safe access to the city of Indianapolis. Additionally, the Butler University Student Government Association purchased 100 bikes in 2012 for a campus bike-share program.

HYBRID AND ELECTRIC VEHICLE ACCOMMODATIONS

Indianapolis Power and Light (IPL) installed a free high-voltage charging station at the Butler Service Center as part of its electric powered vehicle grant. IPL also installed two rapid-charging stations. Butler also has eight spots dedicated to hybrid vehicle parking only. The Butler University Police Department has a 100 percent electric truck in its fleet as well as a Flex Fuel vehicle. University Police patrol campus on bicycles and Segways.

POTABLE WATER

Butler's campus consumed 61,415,288 gallons of potable water in 2011. Approximately 12.1 percent of this total was expended through campus irrigation. To reduce the potable water consumed by the campus community, Butler facilities staff has implemented a low-flow water-saving device preference for all new construction and restroom renovations. Low-flow urinals have been installed in four campus buildings. These are estimated to reduce the amount of water consumed by each unit by 87.5 percent. Standard showerheads also have been replaced with low-flow showerheads in the Apartment Village residence complex and the LEED Gold College of Pharmacy and Health Sciences Addition constructed in 2009.

GROUNDS MANAGEMENT AND PERVIOUS SURFACES

Butler has implemented strategies that infiltrate rainwater on campus. Butler constructed a large stormwater bioretention basin in 2006 to address runoff from a newly constructed student residence complex. Both of Butler's LEED Gold buildings host stormwater management features: a green roof and a rain garden. A campus stormwater management and protection plan is also in development. Lastly, Butler composts 100 percent of its grass clippings, leaves, flowers, and tree debris (see Appendix C).

TREE DIVERSITY

As of the 2012 calendar year, a total of 2,014 trees were distributed across Butler's campus—more than half (57 percent) represent species native to the region. Butler is certified as a Tree Campus USA school.

BUTLER PRAIRIE, BUTLER GREENHOUSE, AND FRIESNER HERBARIUM

The Holcomb Research Institute and Butler University established the Butler University Prairie in 1987. Located between the Indianapolis Water Company Canal and the White River on the campus's west side, the prairie serves as an outdoor laboratory for Butler ecology courses. It also serves as a public educational resource and a natural area for birds and wildlife. The Butler University Greenhouse is attached to Gallahue Hall. It includes more than 200 species of tropical to desert plants. Some of the plants are the subjects for research by Biology Department botanists. The Friesner Herbarium is a collection of more than 100,000 dried, pressed, and preserved plant specimens. Although the Herbarium contains plants from around the world, the collection emphasizes Indiana plants. The collection has samples of 96 percent of the approximately 2500 taxa of native Indiana plants.

RECYCLED WASTE

Butler University utilizes a single-stream recycling program that serves to recycle all paper products, plastics #1-7, aluminum, and tin. Items are collected in more than 90 recycle stations located throughout the various building hallways. Paper products and all other recyclables are kept in separate bins at the recycling stations. Currently, Butler houses one external dumpster for recycling glass, as well as two cardboard compactors, which generate revenue for the recycling program when emptied by the local recycling provider. Butler's Building Services collects used batteries, light fixtures and ballasts, empty toner cartridges, telephone books, laptops, tablet batteries, and electronic cabling to be recycled from offices, departments, and residence halls on an as-needed basis.

SALVAGING, REPURPOSING, AND REUSING

Through policies adopted by Butler's Operations/Facilities and Building Services departments, the University is able to save materials that would be sent to the landfill:

- For new construction and renovations, 90 percent of construction debris is diverted from landfills, including scrap metal, bricks, and old/unused wood.
- Used and outdated dorm mattresses and furniture are donated to Indianapolis's local branch of the St. Vincent DePaul Catholic Charitable Organization.
- Any usable older computers, printers, fax machines, copiers, and monitors are sold through Christy's Auction House.
- All landscaping waste is kept out of campus waste receptacles.
- All old carpeting removed during building renovation is recycled.

BUTLER BIODIESEL

Butler Biodiesel is a student-initiated and student-run program that takes waste vegetable oil from the main dining hall and converts it to biodiesel. Butler's Innovation Fund awarded the initiative $30,000 to purchase equipment to produce the biodiesel on a large scale. Ultimately, Butler's diesel fleet will run on this biodiesel. The first batch was produced in December 2013.

FOOD

ARAMARK Higher Education operates dining services at Butler. As part of the ARAMARK global network, dining services benefit from all of the sustainable management and purchasing policies included in ARAMARK'S Green Thread™ program.[10] These include:

- Rescuing all "waste" fryer oil, which is being used to fuel Butler's campus fleet. These vehicles are being converted to run exclusively on biodiesel made from waste oil.
- Removing trays from both of Butler's dining halls to conserve water and energy while eliminating the necessary production and maintenance processes .
- Purchasing only paper products with recycled content.
- Incrementally increasing the percentage of sustainable foods served on campus by at least 5 percent each year.
- Gradually ensuring purchased seafood adheres to the highest standards of Monterey Bay Aquarium's Seafood Watch's sustainable seafood procurement classification systems.

[10] ARAMARK. (n.d.). *Protecting the Earth's Resources for Future Generations*. Retrieved from http://www.aramarkhighered.com/social-responsibility/environment.aspx

CUE FARM

Located on an acre of land near the Butler Prairie and intramural fields, the CUE Farm concept arose from student interest in local organic foods, sustainability, environmental justice, and food security. CUE Farm was initially proposed to the CUE by the student organization Earth Charter Butler in fall 2009. It began its first harvest in spring 2010 and hired its first full-time farm manager in fall 2011. Since then, the farm has tripled in size and diversified its crops to include perennial plants such as fruit trees, berries, and herbs. A bee project first implemented in May 2011 introduced honeybees to the farm to better facilitate healthy pollination. In addition to supplying produce to Butler's dining services for catering events, the CUE Farm sells its harvest to community members and to several local restaurants in Indianapolis. Through education and volunteer programs at the farm, Butler students, K-12 school students, and community members are able to gain valuable insight into sustainable food production.

PURCHASING

Two of Butler's purchasing policies are designed specifically to uphold the University's commitment to sustainable procurement: the Butler Way Construction Specifications and Guidelines and the Butler University Green Cleaning Policy (Appendix B). Some notable standards enumerated within these two policies include:

- Energy Star purchasing for all new appliances.
- Regional priority (within 500 miles) for construction, restoration, and maintenance goods and services.
- Filtered water bottle-filling stations for all new water fountains.
- All of the carpeting and furniture meets Cradle-to-Cradle certification standards.
- Every cleaning product employed by custodial and maintenance staff meets one of the standards set by either the EPA or the independent nonprofit certification company, Green Seal, Inc.

PAPER

Nearly all of Butler's copy paper is Forest Stewardship Council- or Sustainable Forestry Initiative-certified. Approximately 15 percent of the paper used is made of 30 percent post-consumer recycled materials. For students, beginning in fiscal year 2010, Butler implemented a print allotment program, currently non-binding, which permits students a limited printing balance. Students printed approximately 1.6 million fewer pages in 2011 than they did in the last year before the program was implemented (2009), a 31.4 percent reduction.

SECTION 4
GHG EMISSIONS MITIGATION STRATEGIES AND SUSTAINABILITY GOALS

4.1. GHG Emissions Mitigation Strategies

The single most important sector for achieving climate neutrality at Butler is the mitigation of emissions from electricity and natural gas consumption. Within this section, there is a framework through which the institution can simultaneously implement strategies with short-term social, economic, and environmental returns on investment and begin preparation for those requiring more substantial University expenditures. This framework provides Butler with the flexibility needed to act quickly while maintaining adaptive capacity for new technologies. Mitigation strategies and approximated percent reductions were determined by adapting the AASHE guide for University climate action planning.[11]

Butler has identified emissions reduction targets from the 2011 GGI baseline according to the following milestones: short-term (by 2020), mid-term (by 2030), and long-term (by 2050). These reduction targets are listed in Table 4.

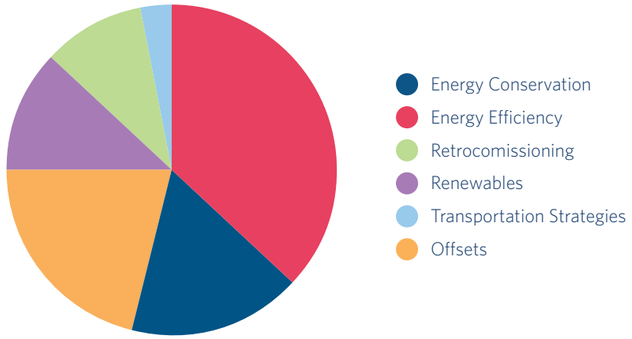
Table 4—Butler University GHG Reduction Targets Through 2050

YEAR	PERCENT REDUCTION
2020	15
2030	45
2050	100

Low- and no-cost projects will be prioritized in the short-term while capital projects will be prioritized over the mid- and long-term. RECs will be purchased to bridge any percentage reduction gaps at the milestone dates. Regular GGIs will be conducted to measure progress toward these emissions reduction targets.

The majority of the emissions reductions will be achieved through energy efficiency and conservation measures. The remaining reductions will be achieved through retrocommissioning, purchasing offsets (RECs), renewable energy, and transportation strategies (see Figure 6 for an approximated breakdown). The following sections outline suggested strategies that will help meet the short-, mid-, and long-term emissions reduction targets.

Figure 6—Butler's Projected GHG Emissions Source Reductions by 2050



[11] Simpson, Walter. (n.d.). *Cool Campus! A How-To Guide for College and University Climate Action Planning*. Retrieved from http://www.aashe.org/files/resources/cool-campus-climate-planning-guide.pdf

4.1.1. Energy Efficiency

Energy efficiency stands unequivocally as the largest single potential source of emissions reductions on Butler's campus at present. For each of the following efficiency categories, energy intensive spaces (e.g., laboratories, pools, dining spaces, etc.) will be addressed first. As a result of the disproportionate consumption of energy within these spaces, they are more likely to result in more significant savings. The most viable short-term energy efficiency strategy is to focus on lighting—the largest use of energy for average American colleges and universities.

Short-Term Goal: Develop an LED Light Fixture Purchasing Policy

Light emitting diode, or LED, light bulbs have been around for more than 50 years. Their use has significantly increased over the past several years, driven primarily by consumer awareness and legislation regulating the minimum efficiency of lighting. LEDs are projected to make up 52 percent of the commercial building market by 2021 as costs decrease by 80 to 90 percent over the next decade.[12]

Additionally, LEDs consume just 20 to 25 percent of the electricity needed for their incandescent counterparts, but last up to 20 times longer. Though they are presently more expensive than compact fluorescent light bulbs (CFLs), it is believed that LEDS will surpass CFLs as the most economically sound option over a short-term payback period within the decade. Furthermore, LEDs do not have to be replaced as often and do not require the use of mercury to operate, thus preventing the use of unnecessary raw materials and potentially harmful chemicals. If adopted, the LED purchasing policy would further ground Butler Facilities Department's preference for LED lighting, mandating that all new fixtures purchased be LEDs by 2020, to coincide with industry-projected savings estimates. The policy would further specify that all remaining incandescent lighting on campus be replaced by the same year, in order to ensure accurate estimations of HVAC functioning.

Short-Term Goal: Develop an Occupancy Sensor Purchasing Policy

Occupancy sensors detect the presence of individuals within a room via one of three mechanisms: passive-infrared lighting, ultrasounds, or a combination of the two. While the most efficient choice between the three types of sensors varies, it is unequivocally clear that motion sensor lighting is an effective way of reducing electricity consumption, greenhouse gas emissions, and energy costs, especially in rooms in which occupancy varies throughout the day.

One important factor to consider when deciding whether or not to install occupancy sensors is the frequency with which individuals using the space already turn lights off when not in use. It is quite possible that in certain sectors, such as students' personal living spaces and maintenance closets, installing occupancy sensors may actually increase electricity consumption by encouraging individuals to allow the lights to remain on for the duration of the preset time-out period. Thus, the installation of these sensors should be prioritized so that those building spaces with the highest projected savings estimations receive them first. Such a policy would likely include a plan ensuring that sensors are eventually installed across all University common spaces with projected energy savings.

Short-Term Goal: Address Vampire Plug Loads Through Smart Power Strips

Plug loads serve as a major source of energy consumption in university and college buildings. They account for roughly 25 percent of energy consumption in commercial office buildings across the country.[13] Plug loads are energy loads from equipment plugged in to a socket. Even when equipment is switched off or in standby mode, it still draws energy, or "vampire" energy, to power memory, timers, clocks, etc.

Unlike most power strips, which require users to manually cut off power, smart power strips operate by shutting off devices utilizing one of three mechanisms:

1. Load-based sensors, which monitor power strip energy consumption and turn off when the power usage crosses below a predetermined threshold. These prove particularly effective when primary sources of plug load consumption (e.g., television displays and computers) with an effective sleep mode are accompanied by a number of secondary sources (e.g., printers and speakers).
2. Scheduled timers, which allow office managers or administrators to schedule power strips to automatically turn off and on at preset times.
3. Motion-based sensors, which can detect occupancy, usually at work stations, and cease power strip electricity consumption accordingly.

[12] Navigant Research. (2011, November 22). *LED Lighting to Capture 52% of the Commercial Building Market by 2021.* Retrieved from http://www.navigantresearch.com/newsroom/led-lighting-to-capture-52-of-the-commercial-building-market-by-2021

[13] U.S. General Services Administration. (2012, September). *Plug Load Control.* Retrieved from http://www.navigantresearch.com/newsroom/led-lighting-to-capture-52-of-the-commercial-building-market-by-2021

The U.S. General Services Administration and the National Renewable Energy Laboratory estimate that appliances plugged into load-based or scheduled timer power strips reduce their electrical consumption by 26 percent on average, with printers and kitchen appliances averaging the largest percent savings by device type. Occupancy-based sensors average similar results. These power strips could result in significant electric and economic savings if implemented across Butler's campus, with the most noticeable benefits likely occurring in offices, computer laboratories, and dining facilities.

Mid-Term Goal: Implement a LEED Gold Construction Policy

Butler's goal is to implement a LEED Gold construction policy by 2025. The benefits of building to these sustainable standards include a decrease in building energy and water use, increase in indoor air quality, and improved stormwater retention. Butler's construction standard currently employs LEED Silver guidelines.

Long-Term Goal: Invest in HVAC Efficiency and Functional Efficiency Improvements

HVAC systems are a critical area from which the University can achieve long-term energy savings. The National Wildlife Federation estimates that institutions of higher education can achieve between 2 and 30 percent in energy savings by upgrading the systems used to distribute air throughout their physical plants.[14] Upgrading this equipment further serves the benefit of improving the air quality of institutional building space, which can have a substantial impact on the physical health and well-being of campus residents, employees, and guests.

There are a number of strategies Butler could employ in order to improve the air distribution systems across its academic, recreational, residential, and administrative buildings. They fall into two categories: system maintenance best practices and equipment upgrades.

The introduction of system maintenance best practices, such as regular thermostat recalibration and damper maintenance, into business-as-usual building maintenance serves as a low-cost alternative to more expensive equipment investments, although they may be more challenging to identify initially. Replacing outdated or inefficient components of the HVAC systems, such as non-variable speed drives, may require more initial investment but typically results in more substantial energy and monetary savings over time, if properly maintained. Improving air distribution efficiency and focusing first on demand-side efficiency (e.g., restricting or banning portable space heaters or improving room air vents improvements) before examining supply-side maintenance and upgrades is an important first step.

4.1.2. Energy Conservation

Energy conservation is another highly effective measure to reduce energy usage and climate impact. Encouraging behaviors and practices that eliminate unnecessary sources of energy consumption can be achieved in a variety of ways, including policy and behavior change programs. In order to know the impact of these initiatives, it is important to get a baseline to measure against. The following sections will outline proposed metering systems followed by behavioral and policy change campaigns.

Short-Term Goal: Submetering and Building Automation Systems

The majority of Butler's buildings lack sub-meters for one or more utilities, and those that do have often have outdated or unreliable metering technology. None of the campus's sub-meters are mediated by a building automation system (BAS), which means readings are only manually recorded once a week. Until such improvements can be implemented, Butler is relegated to projecting energy savings based upon data published by peer institutions and other research entities.

While the mere installation of submetering does not reduce utility consumption, submetering has a proven track record for increasing an organization's capacity to identify unnecessary utility expenditures and significantly improve institutional efficiency. Increased occupant awareness, managing energy allocation based upon occupancy periods, and making simple operations and maintenance improvements from the available data can produce energy savings of 5 to 45 percent.[15]

Over the next six years, Butler's goal is to invest in utility submetering for all major campus academic, administrative, recreational, and residential facilities in which the cost of submetering installation is justified. All newly installed submetering will be fully integrated into a wireless BAS, which will allow the Facilities and Building Services departments to better monitor and make use of the data acquired.

[14] Eagan, D.J., Keniry, J., Schott, J., Dayananda, P., Jones, K.M., & Madry, L. (2008). *Higher Education in a Warming World*. Retrieved from http://www.nwf.org/pdf/Reports/Higher%20Education%20 in%20a%20Warming%20World%20FINAL%203-31-08.pdf

[15] U.S. General Services Administration. (n.d.). Submetering Business Case: How to calculate cost-effective solutions in the building context. Retrieved from http://www.gsa.gov/portal/mediaId/156791/fileName/Energy_Submetering_Finance_Paper_Knetwork_2012_11_269(508).action

As part of this process, the University will also investigate the feasibility of installing submetering for utility consumption within particular areas of campus buildings where either:

A) Energy and water consumption and space use are estimated to be categorically different from the rest of the building.
B) Submetering would facilitate greater accountability for departments, offices, or individuals with substantial potentials for savings in sectors where such accountability is estimated to result in noteworthy savings.

Promising areas meeting these qualifications include:

- Spaces likely to be classified as energy usage intensive, as defined by the U.S. Energy Information Administration's Commercial Buildings Energy Consumption Survey. These include laboratories, dining facilities, and the Butler Data Center.
- Student apartments on campus in either the University Terrace or Apartment Village. Targeting this particular population has some of the greatest potential for encouraging lifelong behavioral change and awareness of the importance of utility conservation and efficiency.

Short-Term Goal: Develop an Occupancy Curtailment Policy

Best employed simultaneously with a centralized thermostat management system, an occupancy curtailment policy would limit the space available to students, faculty, and staff during times of the day, week, or year when building occupancy is particularly low. While making certain that individuals who need to use specific spaces and resources would still be accommodated, Butler would be able to direct members of the campus community away from spaces inefficiently utilized when classes are not in session. Particular areas of interest would be those with high energy usage, like campus laboratories. This policy would serve as a cost-effective method for conserving energy consumed via lighting, plug loads, and HVAC.

Short-Term Goal: Operate Behavior Change Programs and Competitions

Research has demonstrated that programs directed toward modifying individual and system-wide behaviors can have real effects on energy savings. A 2009 meta-analysis of dozens of scientific publications by Ezra M. Markowitz and Bob Doppelt of the Climate Leadership Initiative concluded that effectively implemented behavioral-driven programs were able to save, on average, between 5 and 30 percent of electricity and natural gas used.[16] It is estimated that behavioral-focused programs and competitions dedicated to encouraging individual and system-wide change, like Campus Conservation Nationals, will reduce electricity consumption by approximately 10 percent. Furthermore, a parallel 10 percent reduction in natural gas consumption is projected, which would reduce emissions by 1.96 percent, the equivalent of 608.1 MTCDE emissions.

Mid-Term Goal: Introduce a Centralized Thermostat Management System

There is currently no standard implementation of thermostat control on Butler's campus. Many offices, classrooms, and residences have direct access to the temperature controls of that particular locale. To reduce unnecessary energy wasted as a result of ineffective heating and cooling, a centralized thermostat management system may prove a cost-effective solution. Implementation of this strategy would require the installation of digital thermostats and integration of the thermostats into a BAS. Such a system would grant Butler's Operations Department the power to remotely control a space's temperature by establishing thermostat set points dependent upon the space's use and the temperature outside the building.

Alternatively, a centralized thermostat management system could be employed so that building inhabitants are able to modify the temperature of their respective rooms within a fixed range. While the former option would be more likely to maximize energy savings, the latter could be utilized to encourage sustainable behavior amongst building inhabitants with only marginal increases in energy consumption.

Mid-Term Goal: Invest in Smart Thermostat Technology

A smart thermostat responds to changes in occupancy status in the room in which it is located. Rather than squandering electricity or natural gas to maintain comfortable air temperatures for unoccupied rooms, smart thermostats are able to determine whether a room is being occupied and curtail energy accordingly. Researchers at New York University estimate that universities that install smart thermostats throughout their residence units can conserve between 25 and 32 percent of the natural gas and electricity needed to heat and cool the unit. If introduced along with a centralized thermostat management system, Butler would likely be able to substantially reduce the consumption of these two utilities across all campus sectors, especially in those locations in which occupancy is difficult to determine.

[16] Doppelt, B. & Markowitz, E.M. (2009, January). *Reducing Greenhouse Gas Emissions Through Behavioral Change: An Assessment of Past Research On Energy Use, Transportation and Water Consumption*. Retrieved from http://hdl.handle.net/1794/8373

4.1.3. Offsets

According to the most recent edition of the Butler Way Construction Specifications and Guidelines document, "Butler University has a goal of purchasing 100 percent green power from our local utility by the year 2021," and has already begun to do so. With purchased electricity and stationary campus heating making up 84 percent of the University's total emissions, this green power purchasing policy will permit us to achieve climate neutrality significantly ahead of the 2050 deadline. However, mitigation strategies offer environmental and economic benefits so the strategies should be pursued together.

4.1.4. Retrocommissioning

According to a publication by Energy Star, retrocommissioning is defined as "the process of ensuring that systems are designed, installed, functionally tested, and capable of being operated and maintained according to the owner's operational needs…[in] existing buildings that have never been commissioned."[17]

Retrocommissioning has been consistently identified as one of the most cost-effective methods for reducing energy and utility use. Retrocommissioning identifies quick wins, which facilitate increased utility efficiency without substantial capital investment and identify the areas with the greatest potential for long-term savings. Furthermore, the process highlights instances where building aesthetics and public health and safety can be improved.

Short-Term Goal: Implement a Rolling Retrocommissioning Cycle

Butler will implement a rolling 10-year cycle for retrocommissioning on campus, in which approximately 10 percent of the campus built environment is retrocommissioned each year. Based upon estimates offered by Energy Star and supported by peer institutions, it is projected that retrocommissioning will generate electricity savings of approximately 15 percent with an estimated ROI of less than one year for each step of the 10-year process. Through this process, the University will further reduce emissions by approximately 9.8 percent (3044.3 MTCDE equivalents).

4.1.5. Renewable Energy

Renewable energy harnesses energy from essentially inexhaustible sources such as the sun, wind, and the thermal energy of the earth. Utilizing these sources of energy will free Butler from relying on finite resources that pollute the environment. Renewable energy also has significant economic benefits and results in increased energy security. According to the EIA, renewable energy accounts for 9 percent of primary energy consumption in the United States.[18] Investing in renewable energy makes a visible commitment to cleaner energy sources. As more universities and leaders in innovation incorporate renewable energy, they will aid in increasing that percentage of renewable energy. Installing a renewable energy demonstration site is a powerful way to raise awareness and educate the public about cleaner ways to produce electricity.

Long-Term Goal: Develop On-Campus Renewables

Beginning no later than 2030, Butler should develop on-campus renewables capable of supplying 12 percent of total campus energy consumption. The strategies for implementing renewable energy on campus vary from solar photovoltaic (PV) to hydropower to wind power and beyond. Currently the most feasible types of renewable energy for Butler's campus are both solar PV and solar thermal. Solar PV directly converts the sun's rays into energy through a panel, while solar thermal uses the sun's light to create heat, which powers a generator for electricity. While these are the most feasible renewable energy sources currently available, the renewable energy market is rapidly advancing. In the near future, renewable energy sources such as wind and other undeveloped strategies may also offer feasible applications for campus.

4.1.6. Transportation

Transportation-related emissions make up the second-largest proportion of greenhouse gas emissions in the United States, behind only the nation's energy sector. More than half of these emissions are the products of passenger cars, SUVs, pickup trucks, and mini-vans. The majority of Butler's fleet consists of pickup trucks and vans that serve as multi-purpose vehicles. The following goals outline Butler's strategies to mitigate this emissions source.

[17] Energy Star. (2007, October). *Energy Star Building Manual*.
Retrieved from http://www.energystar.gov/buildings/sites/default/uploads/tools/EPA_BUM_CH5_RetroComm.pdf
[18] U.S. Energy Information Administration. (2012, September). *Annual Energy Review 2011*.
Retrieved from http://www.eia.gov/totalenergy/data/annual/pdf/aer.pdf

Short-Term Goal: Decrease Single Occupancy Vehicles on Campus

Beginning in 2015, the Sustainability Council will work with the Sustainability Coordinator to implement a variety of programs to decrease the number of student, faculty, and staff vehicles on campus by 25 percent. The strategies may include:

- Pilot a University ride share network.
- Restrict some students from bringing vehicles to campus.
- Implement a faculty/staff commuting opt-out program.
- Pilot more preferred parking for commuters and fuel-efficient vehicles.
- Receive a silver designation from Bicycle Friendly Universities.
- Expand the campus bike share program.
- Expand programs dedicated to increasing pedestrian/cyclist awareness, safety, and traffic on campus.

Short-Term Goal: Pilot Carbon Offset Purchasing Policy for Air Travel

As an institution of higher education, Butler appreciates the value in providing its students, faculty, staff, and visiting guests with the opportunities to engage in research, experiential learning, and information-sharing across the globe. Although this encourages the use of energy-intensive airline travel, the benefits of the knowledge and experience offered by these opportunities far outweigh the costs. Purchasing offsets poses a minimal additional cost so the University will pilot an optional carbon offset purchasing policy for air travel.[19] Most airlines offer the option to purchase the offset when purchasing an airline ticket. This policy pilot would allow Butler students and employees to purchase the offset as part of their covered expenses. One hundred percent compliance with a possible future mandatory policy would result in a reduction of approximately 2,664 MTCDE from 2011 levels, roughly 8.6 percent of University emissions.

Short-Term Goal: Implement a Preferred Ground Travel Policy

Air travel generates more greenhouse gas emissions per person than most forms of ground travel for short or intermediate distance trips (less than 500 miles). Butler's goal is to implement a policy by 2016, giving preference to ground travel over air travel for all directly financed travel totaling less than 300 miles one-way. While the policy will be flexible enough to allow those with time or travel constraints to appeal for exemptions to the policy, it will solidify ground travel as Butler's default preference for those traveling within reasonable distance of Indianapolis. Future policies favoring public transportation over shared or single-occupancy vehicles will also be considered, although such policies must recognize the limited number of options available to campus students, faculty, and staff due to the campus setting.

Mid-Term Goal: Convert Campus Fleet to Run on Non-Fossil Fuels

Over the next 11 years, Butler will begin to convert its campus fleet to run on the fuel produced by its recently developed in-house biodiesel production facility, referenced in Section 3: Ongoing Initiatives, Butler Biodiesel. All current fleet vehicles will be replaced at the end of their lifecycles with newer models capable of operating on 20 percent ethanol (E20) biofuel. Exemptions will be granted for vehicles powered, at least in part, by other alternative sources of fuel such as electric-powered or hybrid vehicles. If properly implemented, the goal is for the conversion to be completed by 2025, at which point it should reduce fleet-generated emissions by an estimated 24.1 percent (75.8 MTCDE) from the 2011 baseline measure.

4.2. Sustainability Goals

Butler University recognizes that sustainability goes beyond greenhouse gas mitigation strategies. Therefore, the Sustainability Council identified sustainability goals for which GHG emissions were not calculated as a part of BUSCA. Goals related to water, land use, waste, food, and purchasing are outlined in the following sections

4.2.1. Water

Water conservation is important in protecting a natural resource, as well as reducing associated GHG emissions. The extraction, treatment, movement, use, and disposal of water require a significant amount of energy. This process is the largest user of energy in many municipalities.[20]

Butler currently has multiple means of consuming potable water on campus—irrigation, restroom use, make-up water for heating and cooling systems, and consumption.

[19] Pacific Carbon Trust. (n.d.). *Carbon Offset Pricing Structure*.
Retrieved from http://pacificcarbontrust.com/propose-a-project/carbon-offset-pricing-structure/
[20] U.S. Environmental Protection Agency. (n.d.). *Water-Energy Connection*.
Retrieved from http://www.epa.gov/region9/waterinfrastructure/waterenergy.html

Short-Term Goal: Submetering
See Section 4.1.2.: Water Conservation for a complete description of the benefits of submetering.

Short-Term Goal: Create Awareness Campaigns
To further reduce water consumption, the public will need to be educated on how to do their part on improving water efficiency. Examples include educating students on the importance of shortening their shower duration or turning the faucets off while brushing teeth.

Mid-Term Goal: Replace All Fixtures with Low- or No-Flow Fixtures
Butler has already begun installing low-flow fixtures as part of all new construction and renovations on campus. The goal is to replace all water fixtures across campus with existing, affordable low-flow or no-flow counterparts by 2025. This will reduce the amount of potable water used for showering, flushing toilets and urinals, hand washing, and more.

Mid-Term Goal: Use Captured Rainwater and Sensor Systems for Irrigation
Butler can limit the need for irrigation water on campus by focusing only on areas where it is required for aesthetic purposes. In all instances, native or adaptive vegetation could be used to reduce or eliminate the amount of potable water needed for irrigation. By 2030, the goal is to incorporate harvested rainwater and irrigation controllers. Irrigation controllers have sensors that can detect soil moisture, weather data, and temperature that help to avoid using potable water and limit the amount of irrigation being used.

Mid-Term Goal: Use Captured Rainwater or Gray Water for Flushing
Potable, treated drinking water is currently the standard to flush toilets and urinals. Capturing rainwater and using greywater systems to recycle water from bathroom sinks and shower drains for flushing will eliminate the need for potable water in this application.

4.2.2. Land Use

Sustainable land use considers all aspects of land management including soil health, water quality, erosion, water movement, and more. If chemicals are applied to land, they might be absorbed into the soil impacting the water table, or they might be washed into nearby waterways. These are just a few of the myriad effects of urban land use. The goals outlined below address stormwater and chemical use on Butler's grounds.

Short-Term Goal: Stormwater Best Management Practices
Paved, impermeable surfaces are designed to direct stormwater to drainage systems. This decreases the amount of water being directed toward city stormwater systems for treatment—a significant energy user. Permeable surfaces, bioretention basins, and rain gardens are viable alternatives. Not only do these alternatives decrease the amount of water flowing into the city sewer, they increase drainage and help abate puddling. They also increase green space on campus, increasing the amount of space that can capture carbon. Butler's goal is to transform 50 percent of Butler's impervious surfaces to surfaces that incorporate stormwater best management practices. This endeavor will be informed by the campus stormwater management and protection plan currently in development.

Short-Term Goal: Decrease Use of De-Icers, Pesticides, and Fertilizers
Thanks to innovations in landscaping and grounds maintenance, a safe and aesthetically pleasing campus is possible without using chemicals, pesticides, and fertilizers that negatively impact the environment. To ensure that only sustainable ground management chemicals are utilized in landscaping upkeep and maintenance, Butler will expand the current green cleaning policy to include the following:

- Identification of sustainable inclement weather management chemicals (de-icers).
- Implementation of a comprehensive integrated pest management plan.
- Preference for organic fertilizers or synthetic fertilizers with the lowest nitrogen content feasible.

4.2.3. Waste

Environmentally responsible purchasing, consumption, and disposal of goods are among the most visible displays of an institution's commitment to sustainability. While emissions linked to these behaviors may not be as straightforward as their counterparts, their potential impact is substantial. According to the Environmental Protection Agency, the United States generated approximately 250 million tons of municipal solid waste in 2011. Approximately 53.6 percent of this waste (134 million tons) flowed into landfills, expending 17.5 percent of the country's total anthropogenic methane emissions that year.[21] For this reason, responsible material, food, and waste management has historically served as one of the most prominent images of dedication to a more sustainable future on Butler's campus.

[21] U.S. Environmental Protection Agency. (n.d.). *Municipal Solid Waste.* Retrieved from http://www.epa.gov/epawaste/nonhaz/municipal/

Short-Term Goal: Implement Waste Aversion Policies
It may seem apparent that the solution to overconsumption requires individuals to consume less; however, many waste management strategies only target the end-use of products, rather than their sources. Butler seeks a total life cycle approach to waste, in which symptom treatment and preventative procedures are administered simultaneously with disposal. The following strategies are proposed as sources of waste aversion on Butler's campus:

- Plastic Bottle Ban: Transition to beverage products that use more environmentally and easily recycled packaging such as aluminum and cardboard. Plastics are harder to recycle and less sustainable to produce.
- Minimal Packaging Requirements: Transition to products that use less packaging and buy bulk products.

Short-Term Goal: Single-Stream Recycling for All Outdoor and Athletics Bins
The benefits of single-stream recycling systems outweigh their disadvantages. Single-stream systems often result in decreased contamination, increased revenues from increased paper quality, and decreased damage to material recycling facility equipment. Such a system is difficult to implement in an outdoor and/or athletics setting. Given that these two environments are the most likely to draw non-affiliated guests to the University, they are the most challenging areas on which to educate all interested stakeholders. Single-stream recycling for Butler's grounds and athletic facilities would ensure convenience and ease-of-understanding. Furthermore, such a measure would increase accessibility to glass recycling in the campus community. (Currently, there is only one location on campus that accepts glass bottles.) To reduce the contamination associated with single-stream recycling, each bin would be placed next to a standard waste bin.

Short-Term Goal: Reduce Trash Bins and Move to Centralized Locations
Non-recycled routine trash bins currently outnumber recycling bins on Butler's campus. By moving trash and recycling bins to centralized locations and eliminating stand-alone trash bins, students, faculty, staff, and guests will be encouraged to rethink how they dispose of their waste. Similar measures at other institutions have shown participation rates in the 99 percentile and increases in recycling rates by more than 50 percent by volume.[22]

Short-Term Goal: Implement Monthly Recycling Challenges
Butler's participation in the national RecycleMania program stimulates campus waste diversion by offering tangible recycling targets based upon institution-to-institution competition. However, the relatively short duration of the program limits its ability to generate durable behavioral change. By developing an internal, goal-driven program with challenges specific to this institution, Butler could better guarantee a consistent incentive for recycling behavior among students, faculty, and staff.

Short-Term Goal: Pilot a Recycling Container Program in Residence Halls
All residence halls on Butler's campus currently have common-area recycling containers. By offering free personal-use recycling bins to a pilot group and assessing this action's impact on recycling, Butler can determine the viability of this measure as a way to increase waste diversion.

Short-Term Goal: Periodically Perform Highly Visible Waste Audits
Understanding what constitutes Butler's waste stream is essential in determining strategies to reduce waste. For example, if there is a high percentage of recyclable material in the non-recycled trash dumpsters, education campaigns about recycling could be implemented to raise awareness. Publicly auditing the waste is an awareness tactic that could include putting the contents of a dumpster in a highly trafficked area. If awareness campaigns are successful over time, this strategy will provide campus stakeholders with a tangible representation of the community's progress in reducing the amount of recyclable materials in the trash.

Short-Term Goal: Investigate Smart-Bin Technology
One of the newest developments in waste management is smart-bin recycling technology, which provides feedback to individuals by tracking the amount of waste recycled from the bin and determining whether the item being placed in the bin is appropriate. Preliminary studies at the University of Georgia found that smart-bins increased the recycling rates by 50 percent when compared with the institution's standard recycling bins.[23] Further research into such technology could determine the feasibility of its use on Butler's campus as a means of increasing recycling behavior.

[22] Binder, Katherine J. (2012). *The Effects of Replacing Dispersed Trash and Recycling Bins with Integrated Waste Receptacles on the Accuracy of Waste Sorting in an Academic Building.* (Master's Thesis). Retrieved from http://www.wmich.edu/sites/default/files/attachments/Kate%20Binder%20Thesis.pdf

[23] Jambeck, J.R., Johnsen, K., Mozo-Reyes, E., & Basu, A. (2013). *UGA Case Study on Apps and the Impact of Eco-Feedback on Recycling* [PowerPoint slides]. Retrieved from http://www.georgiarecycles.org/assets/Uploads/Presentations/2013-Conf-PP-EMReyes.pdf

Short-Term Goal: Pilot a Composting Program

To achieve Zero Waste (described in the next sub-section), Butler will require a comprehensive composting program that addresses compostable material waste both inside dining facilities and around campus. Organic waste poses a particular burden to the nation's waste stream. The EPA identifies food waste as the largest source of waste destined for American landfills or incinerators, accounting for 21 percent of all non-recycled routine trash in the country. Only 4 percent of this waste is diverted via composting, and for Butler, this percentage is likely much lower.

By the end of 2015, Butler's goal is to develop a comprehensive plan to pilot a composting program addressing one or more of the following sources of compostable waste: 1) pre-consumer food waste; 2) post-consumer food waste; 3) compostable waste generated at Hinkle Fieldhouse; 4) compostable waste generated throughout campus outside of the aforementioned sectors.

Mid-Term Goal: Zero Waste

The Butler community seeks to design and implement a plan to achieve Zero Waste by 2030. To realize this goal, however, there must be a working understanding of what Zero Waste is and its implications. Currently, no such universally accepted definition for the concept of "Zero Waste" exists. In fact, by some standards, the University is already on the brink of achieving Zero Waste, as all non-recycled routine trash is sent to a WTE facility. There the trash is incinerated and used to generate energy, leaving the remaining fly ash and bottom ash residue produced by incineration as the only real "waste." However, as previously stated, Butler recognizes that WTE is an imperfect solution to the world's waste crisis.

Butler prefers the following definition of Zero Waste, proffered by the Zero Waste International Alliance, which is as follows:

"Zero Waste is a goal that is ethical, economical, efficient, and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water, or air that are a threat to planetary, human, animal, or plant health." [24]

Under this definition, to be considered a Zero Waste community, Butler University must divert more than 90 percent of its waste from landfills and incinerators. Doing so will require a strong commitment to drastically decreasing consumption, developing innovative methods for reusing hard-to-recycle materials, educating the campus community on the benefits of a waste-bin-free living environment, and ensuring cooperation with and investment from leaders across all sectors of campus.

Upon submission of this document to ACUPCC, the Waste/Purchasing/Food Working Group of Butler University's Sustainability Council pledges to form a subcommittee dedicated to outlining a roadmap to achieving Zero Waste by 2030.

4.2.4. Food

Incorporating environmentally responsible food choices has diverse impacts. Organically grown food has many environmental benefits including increasing soil health, maintaining waterway health, and improving public health. Locally grown food also decreases food travel miles and benefits the local economy. The strategies listed below call for healthier, more sustainable foods and creating a food rescue plan.

Short-Term Goal: Implement a Comprehensive Pre-Consumer Food Rescue Plan

Food accounts for the largest portion of the waste stream in the United States. An estimated 70 billion pounds of food is trashed annually while millions of Americans (one in six, or 50 million) do not have adequate access to food.[25] Universities are estimated to produce approximately 22 million pounds of food waste annually—much of the wasted food qualifies for donation. Butler's goal is develop a plan to rescue pre-consumer food that would otherwise be wasted and donate it to local food shelters and charities.

Short-Term Goal: Increase Real Food to 20 Percent of Total

Real food consists of locally grown, environmentally beneficial, humane, and fairly traded food. Butler's goal is to incorporate real food to account for no less than 20 percent of total food purchased.

[24] Zero Waste International Alliance. (n.d.). *ZW Definition*. Retrieved from http://zwia.org/standards/zw-definition/

[25] Feeding America. (n.d.) *Food Waste*. Retrieved from http://feedingamerica.org/how-we-fight-hunger/programs-and-services/network-programs/foodwaste.aspx?utm_source=internal&utm_medium=redirect&utm_campaign=foodwaste

4.2.5. Purchasing

Sustainable procurement is one of the most public commitments to sustainability an institution can make. Voting with your dollar can have far-reaching effects, and it sends a clear message about an institution's values.

BUSCA does not account for GHG emissions related to the commodity chain, however, Butler recognizes that there are significant emissions generated. Furthermore, Butler acknowledges that the conceivable positive or negative impacts of these products on society go far beyond GHG emissions.

In accordance with the Brundtland Commission's[26] understanding of sustainability, which the Butler community has adopted, goods used now have an effect on the environments, economies, and well-being of societies across the globe, both today and in the future. The mitigation strategies proposed in this section are designed to address GHG emissions as well as the total impact of the University's procurement.

Short-Term Goal: Conduct Procurement Audit

In order to understand where to have the greatest impact, Butler will first conduct research to establish a baseline. This audit should identify which purchased goods have the greatest potential for positive impact on the three pillars of sustainability: environment, economy, and social equity.

Short-Term Goal: Develop Sustainable Procurement Guidelines

Using the audit as a baseline, procurement guidelines will be established for the top 10 most frequently purchased goods.

Short-Term Goal: Become a Fair Trade University

To safeguard the quality-of-life and well-being of farmers, laborers, and artisans across the globe, Butler stands committed to aligning procurement practices with the standards established by the Fair Trade movement. Fair Trade-certified products, as espoused by Fair Trade USA, must adhere to standards developed around empowerment, economic development, social responsibility, and environmental stewardship.

Upon submission of the BUSCA, the Waste/Purchasing/Food Working Group will develop a plan to achieve recognition as a Fair Trade University by following the guidelines established by Fair Trade Colleges and Universities. This organization is dedicated to incorporating the ideals of the Fair Trade movement into higher education by recognizing those institutions with measurable commitments to the procurement and promotion of Fair Trade products.

Short-Term Goal: Reduce Paper Usage and Procurement

While deforestation serves as a prominent example of how paper production can irreparably damage habitats and communities around the globe, it is merely one negative aspect of paper production. The paper industry is the world's third largest industrial energy consumer worldwide. Additionally, it is the largest polluter of the countries that make up the Organization of Economic Cooperation and Development. Paper also accounts for the largest component of American landfills by volume. As a consequence of higher education's traditional dependency on paper, universities are well suited to lead the campaign to reduce the significant negative impact of paper production, consumption, and disposal.

Butler's goals to reduce paper usage and procurement are:

- Conduct a campus-wide printer fleet assessment.
- Transition to 50-100 percent post-consumer recycled content, PCF, responsibly-sourced fiber copy paper.

[26] "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." World Commission in Environment and Development (WCED). (1987). *Our Common Future* (p 43). Oxford: Oxford University Press.

SECTION 5
EDUCATION, RESEARCH, AND OUTREACH

5.1. Overview and Goals

Many of the strategies described in prior chapters for mitigation of Butler's climate impact are focused on the physical and operational components of the University. At the core of the University's mission, however, is a commitment to high-quality education and creating a stimulating intellectual community. Embedding sustainability within the curricular and co-curricular components of the University is central to creating a culture that values and operates towards shared sustainability goals. This section describes both current and future curricular, co-curricular, and outreach efforts related to sustainability.

5.2. Current Sustainability Education, Research, and Outreach Initiatives

Courses

In summer 2013, Butler's course catalog was surveyed for all courses perceived to be "sustainability-focused" or "sustainability related." The Education and Research Working Group agreed to use AASHE's definitions of these terms:

> *"Sustainability-focused courses concentrate on the concept of sustainability, including its social, economic, and environmental dimensions, or examine an issue or topic using sustainability as a lens. Sustainability-related courses incorporate sustainability as a distinct course component or module or concentrate on a single sustainability principle or issue."*

This initial survey identified 23 courses that were sustainability-focused and 78 courses that were sustainability-related, totaling some 46 percent of the courses offered. Further vetting through the colleges will ensure these courses accurately represent what is currently being consistently offered to Butler students.

Curricular Programs

The most direct form of institutional commitment to sustainability in education is in the majors offered. Butler currently has a number of options for students interested in curricular programs that may touch on sustainability themes. The first is the Science, Technology, and Society (STA) major. This is an interdisciplinary program housed within the College of Liberal Arts and Sciences. It offers majors courses such as introduction to science studies, social studies of science and technology, and philosophy of science.

Another interdisciplinary major is Peace and Conflict Studies (PACS), which touches on social justice, economic, and political components of sustainability. A number of PACS internship hosts focus on sustainability, including Sustainable Indiana 2016 and the Borgen Project. The International Studies major is a third interdisciplinary program that could relate to the sustainability curriculum.

In the disciplinary departments, the largest major that contains courses related to sustainability is Biology, which offers courses such as Conservation Biology and Urban Ecology that directly focus on sustainability topics. Additionally, Butler's Center for Urban Ecology (CUE) is housed within the Biology Department and offers internships that are focused on many sustainability topics. Other departments also offer courses (e.g., Environmental Chemistry, The Earth Charter) that focus on sustainability, but there has not been a strong emphasis to promote sustainability courses at the departmental level across the colleges at Butler.

There are currently no faculty workshops or course development programs that explicitly focus on sustainability. There are course development resources and programs available more generally for faculty across the academic spectrum.

Co-Curricular Activities

Co-curricular activities are those that complement but do not fall under the curricular offerings described above. Currently, Butler's co-curricular offerings focused on sustainability are primarily initiated and run by students. The most institutionalized of these offerings is the Green Ops program. Green Ops led efforts to construct Butler's first campus green roof and leads many programmatic efforts during the week leading up to Earth Day. Campus student groups outside of Green Ops that focus on sustainability also have included ECO, BURN, and Earth Charter Butler.

CUE Farm serves as both a curricular and co-curricular space for campus. Interns through the CUE work on the farm through the growing season; many volunteers and other campus groups engage with the farm throughout the year. CUE also led the construction of a large-scale biodiesel production facility that will serve both curricular and co-curricular needs.

Other exposure to sustainability through co-curricular activities has been largely on an ad hoc basis. For example, through a program called Ambassadors of Change, incoming freshmen perform service projects and engage with speakers who, in some cases, are sustainability-focused. Freshmen also have a shared book that they read prior to matriculating and discuss during their Welcome Week. In past years, common reading selections have included books about urban agriculture and entrepreneurship, which directly related to sustainability. Some of the Residence Life directors also have built sustainability programming into their dorms, particularly using the CUE Farm at Butler as a place for volunteerism and service.

Sustainability Research

Butler currently identifies itself largely by its teaching, and the majority of most faculty members' time is spent in the classroom. As such, outside of the CUE, research on campus as it relates to sustainability is not clearly part of any designated program. Faculty experts have been identified in subject areas such as ecology, sustainability and business, conservation psychology, and others that may coalesce around a CUE faculty affiliate program. Butler hosts an annual Undergraduate Research Conference that contains some proposals and presentations with elements of sustainability. Additionally, the Butler Summer Institute is an initiative that provides resources to faculty and students for summer research, but these funds are not explicitly designated for sustainability research.

Sustainability Outreach

Sustainability outreach has largely focused on two main areas: a static website and promotion of programming leading up to Earth Day. Butler's sustainability web presence is found at www.butler.edu/sustainability. This site is being updated to reflect the latest sustainability initiatives on campus. Outreach leading up to Earth Day has been strong, particularly in recent years. Programming during Earth Week has included film viewing, information tables, feedback sessions, and invited speakers. RecycleMania has also been used as a highly visible outreach initiative for campus.

5.3. Education, Research, and Outreach Strategies

Education

The first priority relating to curriculum is to complete a University-wide audit of the current classes that have been reviewed and vetted through each college. This will allow the colleges to reflect on their course offerings and potentially encourage modification for courses that could fit into either sustainability-focused or sustainability-related categories. Additionally, this will allow targeted outreach to all courses that fall under the sustainability umbrella.

New curriculum development and formal adoption of courses is a process initiated and approved by the faculty. There is currently a proposal to establish an Environmental Studies major at Butler within the STS program, which would ensure that the environmental and sustainability components of the current STS program would be more explicitly promoted. Future majors looking at sustainability science or sustainability studies may be discussed through the Education and Research sub-committee of the Sustainability Council with faculty advocates leading any new curricular initiatives. New course development, particularly as electives for the Environmental Studies major, may be encouraged as well through direct outreach and workshop development.

Butler may develop faculty workshops that will provide technical resources and other incentives to encourage participation resulting in new course development. Butler's Sustainability Coordinator may facilitate these workshops. Included in these resources will be presentation templates for faculty to include in their lectures, such as modules focused on the basics of climate change or sustainable development. The sustainability council will work with the Office of the Provost to advance these curricular and academic initiatives.

Co-Curricular Programming

Co-curricular programming can permeate the culture of campus far beyond curricular offerings. In addition to broader outreach engagement identified below, the Sustainability Council is exploring the feasibility of two new co-curricular programs. The first would be a program implemented during Welcome Week that introduces all first-year students to concepts of sustainability. The second would be sustainability-focused student learning community as part of the Residence Life program. The latter might initially focus on a floor of an existing residence hall but could extend into dedicated housing focused on sustainable living and learning practices.

Research

Strategies for increasing sustainability research exist in the short-term to integrate sustainability foci into existing research programs at Butler. This could involve a sustainability session at the Butler's annual Undergraduate Research Conference, which draws student researchers from numerous schools and states.

Additionally, participants in the CUE affiliate program could be required to present research in an annual symposium. This could drive sustainability research across campus depending on the number of affiliate faculty.

As sites on campus such as the CUE Farm, the Butler biodiesel production laboratory, and the campus green roof become established, there will be ongoing outreach to faculty to use these existing University locations to encourage future research at these sites.

The longer-term strategies rely on funding streams generated from internal and external sources to encourage research projects from faculty members. Recognizing and disseminating external funding opportunities could be included as part of the faculty workshop. Travel awards to present sustainability research at national conferences may be encouraged at the college levels as well as part of the internal research funding sources such as the University's Holcomb Awards Committee and Butler Awards Committee.

Outreach

Sustainability outreach has significant potential for expansion that would serve to highlight and augment the curricular and co-curricular activities described above as well as promote sustainability projects across campus. Strategies are proposed for virtual, physical, and programmatic outreach to promote sustainability. First, the Butler sustainability website will be revised to reflect current and future projects related to sustainability. This website will serve as a first stop where much of the static content about Butler's sustainability initiatives will reside on the web.

Social media and other interactive content will be developed in consultation with Butler's Marketing and Communications Department, the Sustainability Coordinator, and other members of the Outreach Committee. A sustainability newsletter will be designed and published on a regular basis throughout the year. This will likely be developed as an e-newsletter and be disseminated to campus and the broader Indianapolis community. Finally, traditional campus, local, and national news media outlets will be engaged to disseminate news items relating to campus sustainability.

A number of strategies will focus on physical outreach opportunities as well. This includes the development of campus signage that highlights physical sites related to sustainability, such as the CUE Farm, the campus green roof, and campus green infrastructure. This signage could be linked with virtual content and will use the current Butler sustainability look as the basis for the design.

As new sustainability sites are developed on campus, strategic signage will be integrated into these areas, which will allow a physical presence of sustainability to proliferate across campus. Programmatic outreach will be developed in a number of areas:

- Development of sustainability guides for campus visitors, including new and current students and their families, audiences at sporting and cultural events, and other campus guests. These guides will be tailored to the appropriate audiences and connect with the physical indicators on campus.
- Extension of Earth Week programming into sustainability competitions and other more formal seasonal outreach campaigns. Energy reduction competitions, for example, have been shown to be highly effective at both raising awareness around energy use and reducing use during the period of the competition. Butler's Sustainability Coordinator will work closely with Residence Life and Greek Life to develop and execute these campaigns.
- Development of a student eco-rep program, a peer-to-peer outreach initiative where students register and are trained to become advocates of sustainability within their residence areas.

SECTION 6
CONCLUSION AND ONGOING ASSESSMENT

Butler University is committed to reducing its ecological footprint and leading by example. This BUSCA serves as a roadmap to achieve climate neutrality by 2050. The goals and strategies outlined in this document are recommendations to achieve climate neutrality. Butler recognizes that technology advancements and financial restrictions might alter the timetable; therefore, the Sustainability Council will conduct BUSCA reviews every five years to ensure the strategies maintain relevancy. Additionally, the Sustainability Coordinator, in conjunction with the Sustainability Council, will track progress toward the goals through annual GHG reporting, submitting regular progress reports to ACUPCC, and participating in the Association for the AASHE STARS™ program.

APPENDIX A
BUTLER GGI

Butler University 2011 Emissions Summary

		ENERGY CONSUMPTION MMBtu	CO_2 kg	CO_2 kg	N_2O kg	eCO_2 Metric Tons
SCOPE 1	CO-GEN ELECTRICITY	-	-	-	-	-
	CO-GEN STEAM	-	-	-	-	-
	OTHER ON-CAMPUS STATIONARY	114,918.5	6,062,610.6	606.2	12.1	6,081.4
	DIRECT TRANSPORTATION	4,356.8	307,049.3	54.3	19.0	314.1
	REFRIGERANTS & CHEMICALS	-	-	-	-	-
	AGRICULTURE	-	-	-	-	-
SCOPE 2	PURCHASED ELECTRICITY	251,487.4	20,794,590.3	223.7	505.3	20,950.7
	PURCHASED STEAM / CHILLED WATER	-	-	-	-	-
SCOPE 3	FACULTY / STAFF COMMUTING	8,685.9	609,061.1	121.8	41.9	624.6
	STUDENT COMMUTING	593.4	41,607.2	8.3	2.9	42.7
	DIRECTLY FINANCED AIR TRAVEL	2,317.8	455,077.1	4.5	5.2	456.7
	OTHER DIRECTLY FINANCED TRAVEL	355.3	25,497.1	2.4	0.9	25.8
	STUDY ABROAD AIR TRAVEL	11,205.7	2,200,090.0	21.7	24.9	2,208.1
	SOLID WASTE	-	(142,586.4)	-	-	(142.6)
	WASTEWATER	-	-	-	-	-
	PAPER	-	-	-	-	200.7
	SCOPE 2 T&D LOSSES	24,872.4	2,056,607.8	22.1	50.0	2,072.1
OFFSETS	ADDITIONAL					-
	NON-ADDITIONAL					(356.3)
TOTALS	SCOPE 1	119,275.3	6,369,659.9	660.5	31.1	6,395.4
	SCOPE 2	251,487.4	20,794,590.3	223.7	505.3	20,950.7
	SCOPE 3	48,030.5	5,245,354.0	180.8	125.8	5,488.1
	ALL SCOPES	418,793.1	32,409,604.1	1,065.0	662.1	32,834.3
	ALL OFFSETS					(356.3)

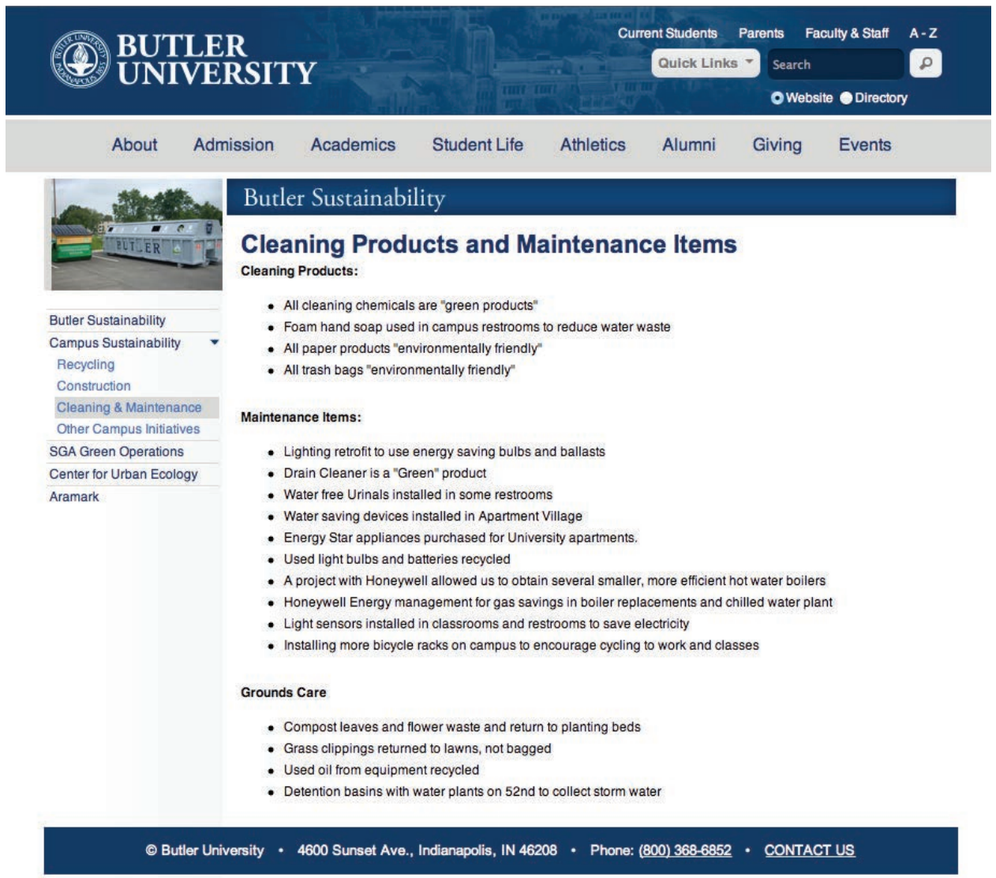
Butler University CO_2 Emission Summary

		2009	2011	% change
SCOPE 1	OTHER ON-CAMPUS STATIONARY	5,691,922.40	6,062,610.60	6%
	DIRECT TRANSPORTATION	238,683.30	307,049.30	22%
SCOPE 2	ELECTRICITY	16,662,250.00	20,794,590.30	20%
SCOPE 3	DIRECTLY FINANCED TRAVEL	535,186.70	480,574.20	-11%
	STUDY ABROAD TRAVEL	1,870,977.20	2,200,090.00	15%
	SOLID WASTE	(123,340.80)	(142,586.40)	13%
	TOTAL	27,237,401.20	32,409,604.10	16%

Butler University Energy Use (MMBtu)

		2009	2011	% change
SCOPE 1	OTHER ON-CAMPUS STATIONARY	107,892.00	114,918.50	6%
	DIRECT TRANSPORTATION	3,393.70	4356.8	22%
SCOPE 2	ELECTRICITY	201,511.40	251,487.40	20%
SCOPE 3	DIRECTLY FINANCED TRAVEL	2,910.00	2,673.10	-9%
	STUDY ABROAD TRAVEL	9,529.40	11,205.70	15%
	TOTAL	355,345.80	418,793.10	15%

APPENDIX B
BUTLER UNIVERSITY CLEANING PRODUCTS AND MAINTENANCE ITEMS



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BUTLER UNIVERSITY

BUTLER SUSTAINABILITY