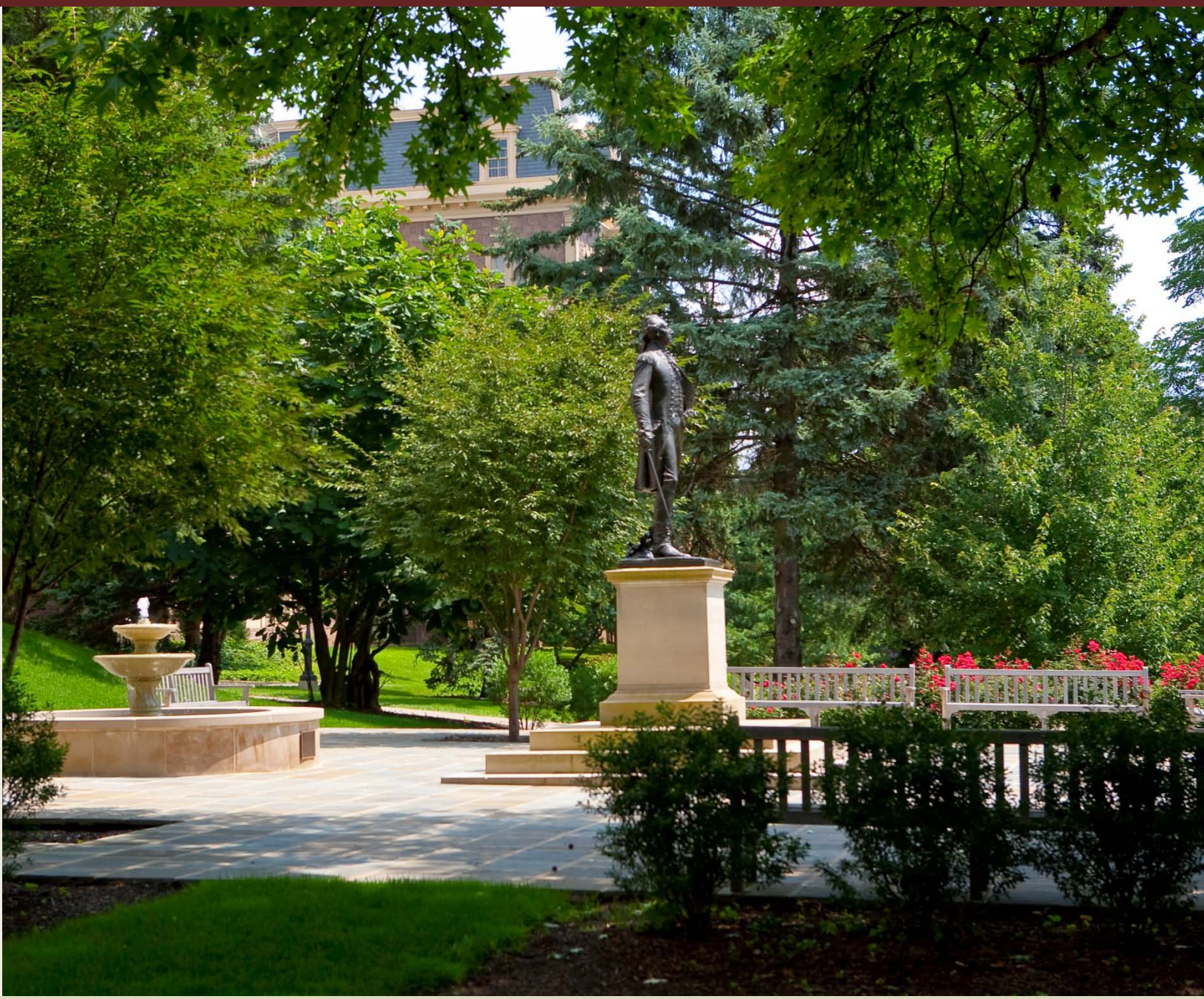
Climate Action Plan

November 2011



LAFAYETTE COLLEGE

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EXECUTIVE SUMMARY

Recognizing the opportunity to improve the efficiency and sustainability of the College, in January 2008 Lafayette College committed to minimize its effect on the environment by signing the American College and University's Presidents' Climate Commitment (ACUPCC). The ACUPCC is an effort by many colleges and universities to reduce deleterious greenhouse gas (GHG) emissions and address global climate disruption. Signatories have agreed to work towards the ultimate goal of climate neutrality as soon as possible. The ACUPCC provides a framework and guidance for institutions to develop interim goals as they pursue climate neutrality.

The Presidents' Climate Commitment

The Presidents' Climate Commitment aims to reduce GHG emissions and better prepare future generations to protect the environment by integrating sustainability into research, operations and the curriculum. Upon signing the Presidents' Climate Commitment, Lafayette College has agreed to the following:

- Within 2 months of signing, create institutional structures to guide the development and implementation of an emissions reduction process.

- Within 1 year of signing, complete a comprehensive inventory of all GHG emissions.

- Within 2 years of signing, develop an institutional Climate Action Plan for becoming climate neutral that includes:
    - A target date for achieving climate neutrality,
    - Interim target goals and actions that will lead to climate neutrality,
    - Actions to make climate neutrality and sustainability part of the curriculum,
    - Actions to expand research or other efforts to achieve climate neutrality,
    - Mechanisms for tracking progress, and
    - Making the plan publically available.

Lafayette's Climate Action Plan

The most significant goal is the issuance of the Lafayette College's Climate Action Plan (CAP), contained herein. This CAP is a comprehensive plan outlining specific strategies that the College will employ to reduce GHG emissions and ultimately achieve climate neutrality. It is understood, however, that it will take time to achieve climate neutrality; therefore, Lafayette College has established the following immediate goals:

- Implement a selected set of energy conservation measures (ECMs) as part of the Campus Emissions Reduction Plan to reduce GHG emissions 20% from 2007 levels by 2021.

- By 2012, develop a monitoring and verification program to compare the predicted GHG emissions reduction from the implementation of the ECMs with the actual results.

The ECMs recommended for implementation as part of Lafayette's CAP are actions with quantifiable results; the anticipated reductions in emissions can be accurately calculated to help the College plan and implement sustainable projects. With the completion of this Climate Action Plan, Lafayette is in compliance with the American College and University Presidents' Climate Commitment.

Prior to creating its Climate Action Plan, Lafayette College also conducted a GHG Inventory, in accordance with the ACUPCC, and a comprehensive energy audit. The inventory allowed the College to establish a baseline against which to track a reduction in emissions. Lafayette College's baseline year is 2007, the year prior to the signing of the Presidents' Climate Commitment. The results of the GHG inventory showed that Lafayette College emitted 31,750 Metric Tonnes of CO_2 equivalents in 2007 and over 80% of those emissions were from heating and electrical consumption.

To craft its Climate Action Plan, Lafayette College invited students, staff and faculty to participate in three CAP Subcommittees tasked with identifying the College's accomplishments, recommending new initiatives and establishing short-term goals. Following the Association for the Advancement of Sustainability in Higher Education (AASHE) guidelines, the subcommittees addressed issues of sustainability in three areas:

1. Education
2. Research
3. Operations

Each subcommittee summarized and presented its suggestions for incorporation into this Climate Action Plan. The Education and Research Subcommittees are primarily responsible for integrating sustainable projects into the curriculum, promoting ongoing environmental research at the College and educating the campus community about current and future sustainable initiatives. The Operations Subcommittee examines more tangible changes to campus procedures and systems, such as transportation services, dining practices and, most importantly, building initiatives. Based on the group's discussions, each subcommittee identified the following action items.

Education Subcommittee's Commitments and Goals

- Students and faculty will continue to work to promote local sustainability projects.
- Faculty and administration will continue to incorporate sustainable concepts into required coursework.
- Students in environmental activism groups will continue to advocate for sustainable policies on campus.

Research Subcommittee's Commitments and Goals

- Faculty members and students already engaged in sustainability research will continue to reach out to other disciplines.
- Faculty and students will promote environmental research initiatives and advertise known grants on campus.

Operations Subcommittee's Commitments and Goals

- The Operations Subcommittee will continue to promote the Campus Energy Policy guidelines and educate building maintenance workers about the policies, and to track progress as part of subsequent Climate Action Plans.

- The Operations Subcommittee, in conjunction with the administration, will incorporate elements of the Campus Master Plan into subsequent Climate Action Plans to track and better understand the impact of new campus construction on the College's total emissions.

- The Operations Subcommittee will propose changes to the Lafayette College Area Transportation fleet to include the most efficient and appropriately sized vehicles available.

All three Subcommittees have also agreed to continue to meet at least yearly to evaluate progress and recommend new initiatives to the College's Board of Trustees.

Campus Emissions Reduction Plan

Building initiatives include the aforementioned ECMs, which are projects and strategies to reduce heating and electrical consumption. 485 ECMs were developed from the results of a 2007 campus energy audit and were transferred to an online database, the *Energy Planner*. The *Energy Planner* provides an economic analysis of each ECM to facilitate project prioritization and scheduling.

Using the *Energy Planner* to analyze possible emissions reduction scenarios, the College developed an Emissions Reduction Plan to reduce its emission 20% from 2007 levels by 2021. The Plan includes an initial 9% reduction in 2008 that was the result of switching from oil to natural gas in the campus's boiler. The remaining 11% reduction will be achieved by implementing the ECMs recommended in the energy audit and schedule in the Energy Planner.

The College has committed to invest $400,000 per year for 10 years (2010 through 2020) to finance the scheduled ECMs. The scheduled ECMs are those projects with the shortest payback period and largest $MtCO_2e$ reductions, thus allowing the College to quickly realize the expected cost savings and reinvest those savings if desired. Some of the more important ECMs are the installation of building utility meters, which provide valuable feedback about building energy consumption and a means to verify the anticipated reductions in energy use. Utility meter installation ECMs are therefore scheduled in the first half of the 10 year plan.

Moving Forward

Lafayette College anticipates achieving a 20% emissions reduction goal by 2021 solely by increasing electric, water and fuel efficiencies. The Emissions Reduction Plan does not include the installation of renewable energy sources or the purchase of renewable energy credits. In order to continue to reduce its greenhouse gas emissions, Lafayette College has established the following short-term goals:

- Within 6 months of issuance to the ACUPCC, develop a plan, with direction from the subcommittees, to unveil and communicate the College's Climate Action Plan to the campus population.

- By December 2013, evaluate, in more detail, the technical and economic feasibility to install renewable energy or cogeneration, including the benefits of different types of renewable energy systems.

- By December 2013, review the Campus Master Plan to determine the impact that planned capital improvement and capital construction will have on GHG emissions. Explore possible modifications to the Campus Master Plan which can reduce GHG emissions.

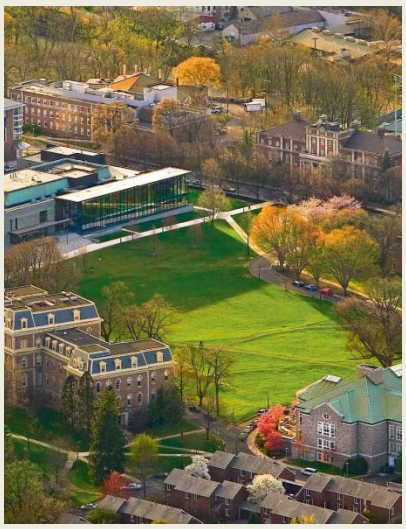
- By December 2013, update the Campus Facility Condition Assessment to identify scheduled deferred maintenance and capital renewal projects. Identify opportunities to improve energy efficiency in these systems and estimate the subsequent GHG emissions reductions.

- Update the Climate Action Plan in 2013 to reflect the decisions and progress made after completing the short-term goals.

- Update the Climate Action Plan every two years using the *Energy Planner.*

INTRODUCTION

BACKGROUND



Located on a hill overlooking the City of Easton in the Lehigh Valley, Lafayette College has steep slopes, green spaces and many historic buildings that are as much a part of the surrounding community as they are the College. The 185 year old campus consists of 60 buildings on 340 acres, including a 230-acre athletic campus. The City of Easton is located at the confluence of the Lehigh and Delaware Rivers, and the College is on the north edge of the city across the Bushkill Creek. Given the region's natural and historical assets, it is no surprise that the College has developed a culture of environmental stewardship.

In 2008, Lafayette College's President Daniel Weiss signed the American College and University Presidents' Climate Commitment (ACUPCC). Recently, organizations like the Association for the Advancement of Sustainability in Higher Education (AASHE) and initiatives like the ACUPCC have begun to provide guidance and accountability for institutions pursuing sustainable changes. ACUPCC's goal is to address "global climate disruption" by eliminating net greenhouse gas emissions and advancing environmental education and awareness by helping institutions to create a framework of long- and short-term goals. The most significant goal is the issuance of an institution's Climate Action Plan (CAP). The creation of a CAP is intended to be a highly visible effort meant to demonstrate the multitude of strategies that institutions may employ as they work towards eliminating greenhouse gas emissions.

THE CLIMATE COMMITMENT

The Presidents' Climate Commitment aims to reduce greenhouse gas (GHG) emissions and to integrate sustainability and environmental awareness into the higher education curriculum to better prepare future generations to protect the environment.

Upon signing the ACUPCC, the College has agreed to the following:

Within 2 months of signing:

- Create institutional structures to guide the development and implementation of the plan.

Within 1 year of signing:

- Complete a comprehensive inventory of all greenhouse gas emissions.

Within 2 years of signing:

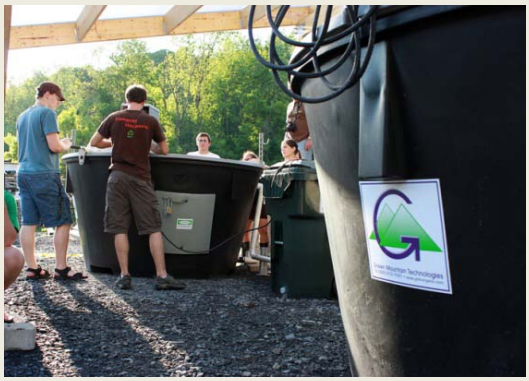
- Develop an institutional Climate Action Plan for becoming climate neutral which will include:
  - ☑ A target date for achieving climate neutrality as soon as possible,
  - ☑ Interim target goals and actions that will lead to climate neutrality,
  - ☑ Actions to make climate neutrality and sustainability a part of the curriculum and other educational experiences for all students,
  - ☑ Actions to expand research or other efforts necessary to achieve climate neutrality,
  - ☑ Mechanisms for tracking progress on goals and actions, and
  - ☑ Making the plan and its process publically available.

The commitment requires the College to develop a comprehensive plan to achieve climate neutrality as soon as possible; however, it is understood that it will take time to reach such a goal. Therefore, Lafayette College's immediate goals are the following:

IMMEDIATE GOALS

- Implement energy conservation measures as part of a Campus Emissions Reduction Plan to reduce GHG emissions 20% from 2007 levels by 2021.

- By 2012, develop a monitoring and verification program to compare the predicted GHG emissions reduction with the measured reduction.



The Climate Commitment, as outlined by the ACUPCC directives, provides good guidance to achieve this goal, but to be feasible, these actions must result in quantifiable changes. Lafayette College's administration believes that for the goals of its Climate Action Plan to be achievable and realistic, the College should know the cost, payback and GHG savings of each measure it chooses to employ. At this early point in the process, the College has chosen to work toward climate neutrality by first focusing on reducing its energy consumption rather than purchasing renewable energy credits to offset all of its emissions.

A healthy environment does not have to come at the expense of the institution's financial performance; these two aims are not mutually exclusive. Not only can these two goals be reconciled, but often GHG reduction measures double as cost saving measures by reducing the amount of energy the institution consumes. For example, a 1998 study of energy and water conservation projects at 15 postsecondary institutions across the United States showed that every project also provided monetary savings. Many of the projects were as simple as campus-wide recycling or public transportation campaigns.[1] In addition to directly reducing detrimental greenhouse gases, each signatory of the Presidents' Climate Commitment is also improving the health and wellness of their community and demonstrating leadership by example.[2]

[1] *Green Investment, Green Return: How Practical Conservation Projects Save Millions on America's Campuses.* Egan, David J., & Julian Keniry, National Wildlife Federation: 1998.

[2] *American College & University Presidents' Climate Commitment: The Commitment.*

Lafayette's Early Environmental Actions

President Weiss called for the creation of a Campus Sustainability Committee in 2007, a precursor to the current Climate Action Plan (CAP) Committee, tasked with devising and implementing environmental initiatives. With the full support of the administration, the Department of Facilities Planning and Construction recommends campus-wide sustainability initiatives related to both the built environment and continuous education of the campus community.

In addition to these administrative groups, the students of Lafayette College have formed many groups such as SEES (Society of Environmental Scientists and Engineers), TREEhouse, a dormitory community dedicated to low-impact living, and LEAP – Lafayette Environmental Awareness and Protection, the College's student environmental advocacy group. Formally recognized by the administration in 1999, LEAP includes representatives from all class years and works with regional organizations such as the Lehigh Valley Progressive Student Alliance, Mid-Atlantic Renewable Energy Association and the Sierra Student Coalition. LEAP's mission is to make Lafayette a more sustainable campus through real action. The group is composed of an executive board that oversees six committees: Carbon, Organic Gardening, Events, Composting, Recycling and Community Outreach.

SEES is one of the most active environmental groups on campus and is integral to implementing many sustainable initiatives. To date, SEES has secured over $150,000 in grants for the development and implementation of highly visible projects across campus, such as the organic garden, composting efforts and the installation of solar arrays. SEES works closely with other student groups and the administration. Currently, four student representatives from LEAP and SEES hold permanent positions on the Campus Sustainability Committee. Other departments have also implemented or promoted sustainable projects, such as Residence Life's Green Move-Out, an effort to collect and reuse furniture, clothing, books and personal items and minimize landfill waste as student clean out their rooms at the end of the year.

Measuring Greenhouse Gas Emissions

To track a reduction in emissions, it is necessary to first establish a baseline. The Climate Commitment stipulates that the signatory institution conduct a greenhouse gas inventory within one year of signing. The GHG inventory illustrates the College's "Carbon Footprint," or the simplified quantification of the impact of the College's activities. Quantifying the effects of everyday activities provides greater impetus to convince individuals to change their behaviors and helps to develop more effective strategies for reducing their emissions. In 2008, Lafayette College completed its initial campus-wide greenhouse gas inventory for the year 2007. In 2010, the College pursued inventories for the years 2005 through 2009 in order to gauge its progress.

Lafayette's Greenhouse Gas Inventory Report uses the Clean Air–Cool Planet Calculator recommended by ACUPCC to track emissions sources. The Inventory accounts for more greenhouse gases than just carbon dioxide. The calculator converts the values of other greenhouse gases to "equivalent carbon" values to

keep reporting consistent. Each greenhouse gas has a calculated Global Warming Potential (GWP) with a relative measure of how much heat a gas traps in the atmosphere. The Kyoto Protocol identifies harmful greenhouse gases by their GWPs. The results of the inventory are measured in Metric Tonnes of CO_2 equivalents, or $MtCO_2e$, by equating different quantities of greenhouse gases to the amount of CO_2 that would have the same GWP (Fig. 1). Aside from carbon dioxide, other significant greenhouse gases to consider are methane and nitrous oxide, which have a greater global warming potential than CO_2. One Mt of methane is as damaging as 23 Mt of CO_2, however, CO_2 is produced in much higher quantities than other gases with greater global warming potentials.

Internationally, greenhouse gases are characterized by source, known as Scopes 1, 2, and 3, which are described below. Scopes 1 and 2 are usually obvious and more easily measured, and so are required by the ACUPCC to be reported. Scope 3 is more difficult to track and usually contributes the least to overall emissions, therefore its reporting is not mandatory. Lafayette College, however, chose to include Scope 3 in its greenhouse gas inventory to gain the most accurate measurement possible.

Global Warming Potentials

Greenhouse Gas	2001 IPCC Global Warming Potential[3]
Carbon Dioxide	1
Methane, CH4	23
Nitrous Oxide, N2O	296
HFC-23	12,000
HFC-125	3,400
HFC-134a	1,300
HFC-143a	4,300
HFC-152a	120
HFC-227ea	3,500
HFC-236fa	9,400
Perfluoromethane (CF4)	5,700
Perfluoroethane (C2F6)	11,900
Sulfur Hexafluoride (SF6)	22,200

Figure 1. List of Greenhouse Gases and Corresponding Global Warming Potentials

Definition of Emissions by Scope Type[4]

1. **Scope 1** emissions are from "direct sources"; or emissions from sources that are owned or controlled by the institution, including:
   - the production of heat (steam) from the campus's central boiler plant,
   - the transportation of people, products and waste to, from and around campus,

[3] Global Warming Potential values from the Intergovernmental Panel on Climate Change: Third Assessment Report, Chapter 6, table 6.7.

[4] *ISO 14064-1: Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals. 2006.* Scope types as defined by the World Resources Institute (WRI)/World Business Council for Sustainable Development's (WBCSD) Greenhouse Gas Protocol.

- fugitive emissions from refrigerants and chemicals, and
- agricultural sources such as fertilizers and manure decomposition.

2. **Scope 2** emissions are from "indirect sources" or emissions that are not directly generated by the institution but are associated with the production of energy consumed by the institution.
   - Lafayette's Scope 2 emissions are a product of electricity produced by the electrical utility provider, First Energy.

3. **Scope 3** emissions are "other indirect sources" or emissions from outsourced activities, including:
   - emissions from landfill waste off-site,
   - air travel by faculty and students, and
   - transmission and distribution (T&D) losses of purchased Scope 2 electricity.

Greenhouse Gas Inventory Results

The results of the GHG inventory show that Lafayette College emitted 31,720 $MtCO_2e$ in 2007, the baseline year. The inventory also identified the largest contributors of emissions: heating and electrical consumption accounts for over 80% of the College's emissions. Figure 2 below illustrates the percent of greenhouse gas emissions by scope type for the year 2007. All emissions measurements refer to carbon dioxide equivalents.

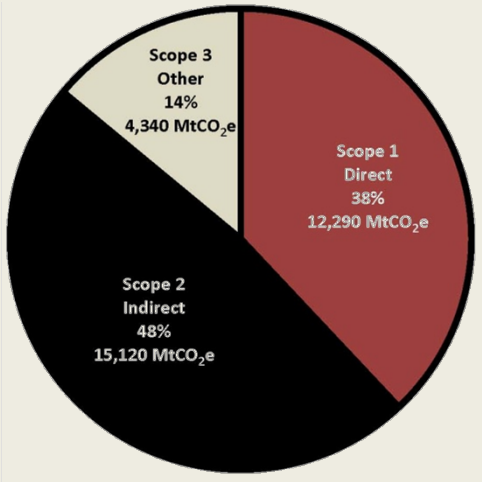


Figure 2. Greenhouse Gas Emissions for 2007, by Scope

Scope Type	Scope 1	Scope 2	Scope 3
Emissions $MtCO_2e$	12,290	15,120	4,340

The GHG emissions for the past five years are shown in Figure 3. The year 2007 was chosen as the baseline year because it is the year prior to Lafayette's signing of the Climate Commitment. Data for years 2005 and 2006 is included and shows 2007 was a typical year. Emissions for 2008 and 2009 were later tracked to chart the progress the College had already made since the signing of the Climate Commitment in 2007. The 3,120 $MtCO_2e$ reduction in emissions from 2007 to 2009 was mainly due to the discontinued use of No. 6 fuel oil in the Central Boiler Plant. The College now uses primarily natural gas, which produces fewer emissions compared to fuel oil.

Lafayette College's Annual GHG Emissions ($MtCO_2e$/Year)

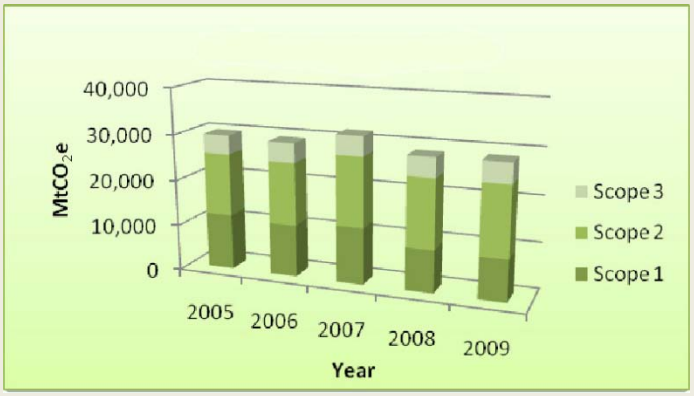


Figure 3. Greenhouse Gas Emissions for Years 2005-2009

Year	Emissions $MtCO_2e$
2005	29,730
2006	29,130
2007	31,750
2008	28,650
2009	28,630

Preparing the Climate Action Plan

After inventorying its total emissions from 2005-2009 and establishing its baseline emissions for 2007, the College proceeded to create this Climate Action Plan (CAP). The CAP outlines proposed actions to reduce GHG emissions and make sustainability efforts more visible across the campus. One initiative is to engage and educate the community to raise awareness of the importance of mitigating emissions and to change people's behaviors. The strategies include offering college courses focused on sustainability, as well as community outreach initiatives, and the creation of strategic partnerships. Through education, Lafayette College can influence individuals to be more aware of their impact on the environment; changes that individuals make to their regular routine can have a large cumulative impact. Individuals can apply sustainable practices beyond the boundaries of the College, thus increasing the benefits beyond the campus to the larger community as a whole. The other more tangible approach to reducing emissions is to upgrade buildings, building systems and other operations on campus to reduce the amount of energy the College consumes. Reducing energy use directly reduces Scopes 1 & 2 emissions. Because the College has recently completed a comprehensive energy audit of the whole campus, proposed emissions reduction measures can be estimated with reliable accuracy. The strategies and proposed changes of Lafayette's Climate Action Plan are further broken down into three target areas, following AASHE guidelines:

- Education
- Research
- Operations

In May of 2011, the College had Entech Engineering, Inc. (Entech) facilitate a "sustainability roundtable" consisting of a representative group of students, staff and faculty who formed the College's CAP Subcommittees. The CAP Subcommittees identified sustainable projects, completed or underway, in each of these three target plan areas and suggested future sustainable projects and policies. The roundtable group included representatives from Dining, Athletics, Communications, Planning and Plant Operations, as well as students and faculty engaged in research on sustainability. After reviewing a presentation explaining the Climate Commitment's purpose and framework, the participants broke out into three work groups representing the Education, Research and Operations aspects of the plan. Each subcommittee addressed three basic questions regarding their assigned topic:

1. What are the College's accomplishments to date?
2. Where are the opportunities for improvement?
3. What are some of the interim goals and action items reducing campus emissions?

Each work group summarized their findings and recommendations, which were then presented to the whole group. These findings have been incorporated into this Climate Action Plan.

THE CLIMATE ACTION PLAN

Lafayette College has developed this Climate Action Plan such that it can be a dynamic document that addresses the requirements of the Climate Commitment. This plan will continue to develop and evolve over time and this document represents the first step in the process. It examines both educational initiatives and operational changes in the three areas of Education, Research and Operations. The Education and Research portions of the Plan focus primarily on encouraging behavioral changes in the local community, however, some projects may have a quantifiable reduction of emissions. The Operations portion relies heavily on changes to campus facilities which can be updated with more efficient components and operated more efficiently.

EDUCATION

The CAP Education Subcommittee focused on making climate change and sustainability part of the curriculum and educational experience for all students. Lafayette College offers an Environmental Science minor that investigates the interaction of human activities and natural phenomena. The program is interdisciplinary, requiring courses from three of the College's four academic divisions, and is apportioned into three components: "core, technical and policy/issues" components. The "core" and "technical" components are from the engineering or natural sciences academic divisions. Students must also take at least one course in either the humanities or social sciences divisions to satisfy the "policy" requirement. Though only a minor program, students completing Environmental Science coursework are "strongly encouraged to pursue an environmentally oriented independent study or honors thesis."[5] The course of study generally examines sustainable issues on a broad, global context; however, the CAP Committee student representatives commented that they would like to see a greater emphasis on personal accountability to further underscore the importance of each individual's actions. The students expressed that they would like to work with the faculty and administration to incorporate other concepts into the coursework, and that the College should consider offering Environmental Science as a major field of study.

Corn on the Quad was a companion project to the Fall 2008 first-year's students' orientation reading of Michael Pollan's *The Omnivore's Dilemma: A Natural History of Four Meals (2006).*

Sustainability is prominent in other fields of study as well. Many faculty members actively try to incorporate sustainable practices into their classrooms and recent Freshman Reading requirements and courses have focused on natural resources and sustainability. Opportunities exist to further develop sustainability curriculum requirements for courses that are not directly part of the Environmental Sciences minor.

[5] Environmental Science & Environmental Studies: Program. http://environment.lafayette.edu/program/.

The context of the Environmental Sciences minor and other environmental courses is very hands-on, providing students with real-world experiences. For example, half of the College's two acre organic garden is open to faculty, staff and their families, and half of the garden is student-run. The garden is part of the College's larger "food-loop" project in which waste from the dining halls is used to fertilize organic produce in the garden, which is then harvested by students and served on campus. The sustainable garden eliminates energy consumption and greenhouse gas emissions associated with the transportation of produce, and reduces the amount of pollutants from fertilizer. Direct involvement in the cultivation of food also fosters greater awareness of food production with the added benefit of donating extra produce to the Safe Harbor Shelter in the Easton community. Though already nationally recognized by the EPA as a project "whose innovative technologies are designed to advance economic growth while reducing environmental impact," students are looking to expand the program and act as an example for other institutions to follow. The Education Subcommittee will work to incorporate other emissions reducing projects into the curriculum. The subcommittee will also develop ways to educate the students about the tools and methods used to develop Lafayette's Climate Action Plan to encourage students to pursue their own emissions reduction projects.

Students also have the opportunity to get involved with hands-on projects outside of the immediate campus and programs are open to everyone in the College community. The College has partnered with the Mellon Foundation to gain insight and information on sustainable practices and technologies from organizations outside of the College. The Delaware Watershed group and Bushkill Stream Conservancy also hold regular meetings and lectures on campus that focus on environmental impacts on Lafayette's immediate surroundings as well as sustainable practices related to large watershed protection. LEAP and other groups on campus are hoping to expand these partnerships with outside advocacy groups to ensure students acquire a broad understanding of the subject of sustainability.

Many students at Lafayette College are actively involved in sustainability programs on campus and will continue to pursue new strategies with the support of the College administrators and faculty. The LEAP and SEES organizations and the TREEhouse community will continue to advocate for more environmentally friendly policies, practices and systems in the dormitories and in the classrooms. Lafayette's students have not only developed successful programs to encourage sustainable practices, but they also lead the way through their actions.

Based on the group's discussion, the CAP Education Subcommittee has identified the following action items*:*

- Students and faculty will continue to work to promote local sustainability improvement projects.

- Faculty and administration will continue to incorporate sustainable concepts into required coursework.

- Students in LEAP and TREEhouse will continue to advocate for sustainable policies on campus.

- Students will request that the College administration consider major candidacy for the Environmental Science minor.

- The Education Subcommittee will continue to meet on at least a yearly basis to evaluate progress and recommend initiatives.

RESEARCH

The CAP Research Subcommittee focused on identifying current sustainability related research and actions in order to expand Lafayette's research efforts in support of climate neutrality. This group, like the education committee, identified opportunities for improvement and the next steps to take to broaden sustainability research.

Lafayette College's broad liberal arts curriculum is unique in that it includes extensive engineering studies and research initiatives. Forty percent of Lafayette's students study engineering. The faculty's expertise in science and engineering fields, combined with a rigorous academic program, facilitates extensive research at the undergraduate level. Faculty members are actively engaged in research with students, often supported by external funding, including federal agencies. Many student-faculty endeavors culminate in publications in world-class peer-reviewed journals. National and international attention for recent environmental research includes a grant from the Clinton Global Initiative University and recognition by the EPA.

Student-led sustainable initiatives such as the installation of a solar array on Acopian Engineering Center, which collects data for analysis as part of an Electrical Engineering Department project, and the installation of a second solar array at Metzgar Fields, which powers composting and garden equipment, are examples of student and faculty research collaborations. Currently, several faculty members in the science and engineering fields pursue relevant research with their students. As one faculty representative aptly noted:

"Several projects relate to the understanding of scientific and technological aspects of the processes and [the] outcomes associated with atmospheric CO_2 levels, energy production and utilization."

Understanding, in detail, energy sources, consumption and waste will inform ways to modify current methods of producing and transmitting energy. Additionally, students and faculty are engaged in various projects

examining water quality, pollutants and other general environmental issues. While these areas of study do not necessarily quantify environmental detriment in terms of greenhouse gas emissions, they do significantly contribute to a better understanding and awareness of human impact on the environment. The Research Subcommittee, in conjunction with the Education Subcommittee, will investigate or recommend feasibility studies for alternative methods of reducing CO_2 emissions. Specifically, the subcommittees proposed examining the impact certain species of trees may have on net CO_2 emissions in order to evaluate the benefit of a tree-planting campaign.

Throughout the College, faculty actively write grants and direct the work with student involvement. However, the research subcommittee representatives stated that additional in-house emphasis on, or incentives for, research concerning sustainability might spur the development of additional research projects. The availability of additional specifically-targeted student EXCEL Scholarship and/or Faculty Development Grant support for these projects. Opportunities also exist to enhance interdisciplinary collaboration. Making an effort to advertise pertinent scholarships, grants and fellowships to the entire student body, outside of the sciences, may succeed in engaging even more students.

Based on the group's discussion, the CAP Research Subcommittee has identified the following action items:

- Faculty members and students already engaged in sustainability research will continue to reach out to other disciplines.
- Faculty and students will promote environmental research initiatives and advertise known grants on campus.
- The Research Subcommittee will continue to meet on at least a yearly basis to evaluate progress and recommend initiatives.

OPERATIONS

The CAP Operations Subcommittee analyzed the physical campus assets and the related sources of greenhouse gas emissions, including the boiler plant, facility lighting, building heating and cooling, athlete transportation, grounds maintenance and dining facilities. The operations portion of the CAP is extensive because campus energy use falls under operations. Consequently, this presents the opportunity for the greatest reduction in campus emissions. The operations sub-committee examined how the College will implement operational and building system changes in order to reducing emissions through energy savings and waste reduction. Because the College has recently completed a comprehensive energy audit of the total campus, there is a tremendous amount of information available to plan emissions reductions through energy conservation.

ATHLETIC INITIATIVES

The Athletics department has made strides to reduce the amount of energy its related activities consume. Lafayette's Metzgar Fields Athletic Complex, which includes outdoor athletic fields, is located three miles north of the main campus. The location of the fields requires frequent travel by athletes and students via car. To reduce emissions associated with vehicular travel, the College increased the frequency of its bus shuttle service, Lafayette College Area Transportation (LCAT), to the fields to minimize athlete trips in personal vehicles. The College also instituted a dedicated bus that transports students to Metzgar.

Athletics is also currently evaluating more environmentally friendly alternatives to replace nitrate field fertilizers, including the possible use of the leachate from the "food loop" compost project on campus.

Transportation Initiatives

In addition to assisting athletes, the College is continuing to expand its LCAT service by increasing the service's hours, number of shuttles and number of destinations. LCAT is free of charge to students and a convenient way to access points on campus as well as in the City of Easton, thus minimizing the need for travel in private vehicles. The operations subcommittee representatives proposed that measures be put in place to encourage or require LCAT to use the most energy efficient vehicles available to further reduce emissions. The College has also contracted with a car-sharing company to provide students with flexible transportation options without the need of a personal vehicle and has introduced a pilot program to provide electric car charging stations on campus. The College's Campus Master Plan includes planning and design concepts that will reduce the need for personal vehicles, such as conveniently residence quads to promote walking and perimeter parking to make the campus more pedestrian-friendly.

Dining Services Initiatives

Dining Services has seized many opportunities to reduce its waste and energy consumption in recent years. By buying local produce and fair trade, organic coffees, Dining has reduced emissions associated with long-haul transportation of some foods. Students are also encouraged to bring their own reusable mugs for beverages. The College recycles paper, plastic and aluminum, and composts the food and biodegradable waste the dining halls generate. These recycling efforts succeeded in reducing landfill waste by over 10% from previous years. Emissions from waste that is transported to and decomposes in landfills are calculated in the Cool Planet Calculator. Dining Services also advertises a list of sustainability "best practices" on its website and employs a Sustainable Student Promotions Coordinator to increase awareness of sustainable practices within the dining halls.

Building Initiatives

Water Conservation Initiatives

The College is reducing its water consumption by installing dual-flush, low-flow or waterless fixtures. Keefe Hall was recently outfitted with low-flow fixtures, saving an estimated 40,000 gallons of water a year. The College is working towards replacement of most, if not all, current fixtures with low-flow, dual-flush or waterless fixtures. Additional water savings were realized by implementing operational changes to the steam boiler's cooling towers to reduce the amount of makeup water used by approximately 15%.

Energy Initiatives

The College implemented a Campus Energy Policy in 2009, which can be found on Lafayette's Facilities Planning website: http://facilitiesplanning.lafayette.edu/files/2011/09/LC-Energy-Policies.pdf. The Policy

outlines conservation goals and specific measures related to building occupants' habits and new construction and renovation guidelines. Some of the specific measures include:

- Keeping doors and windows of conditioned spaces closed when systems are running.
- Turning off office equipment when not in use.
- Urging building occupants to avoid the use of personal heaters.
- Promoting use of local public transportation.
- Designing renovations and new construction projects with design features to minimize energy use.
- Consideration of LEED design criteria when possible.

The Operations Subcommittee identified a need to educate the broad base of people encountering and working with building systems on a day-to-day basis, including grounds keepers and maintenance workers, to ensure all building users are aware of the Campus Energy Policy and the impacts that their actions have on the environment. The Operations Subcommittee will also identify other more specific ways to reduce emissions and request funding for feasibility studies.

Based on the group's discussion, the CAP Operations Subcommittee has identified the following action items:

- ☑ Continue to promote the Campus Energy Policy guidelines and educate building maintenance workers about the policies, and to track progress as part of subsequent Climate Action Plans.
- ☑ Incorporate elements of the Campus Master Plan into subsequent Climate Action Plans to track and better understand the impact of new campus construction on the College's total emissions.
- ☑ The Operations Subcommittee will propose changes to the LCAT fleet to include the most efficient and appropriately sized vehicles available.
- ☑ The Operations Subcommittee will continue to meet on at least a yearly basis to evaluate progress, track reductions and develop new projects to reduce campus energy use.

Lafayette's efforts to reduce greenhouse gas emissions are believed to be significant, but the College has not measured GHG reductions from specific actions it has employed. In Figure 3 previously, the GHG emissions inventory for the past five years showed a decrease after 2007. It is primarily the result of on-campus stationary combustion emissions reduction due to switching from fuel oil to natural gas in the Central Boiler Plant.

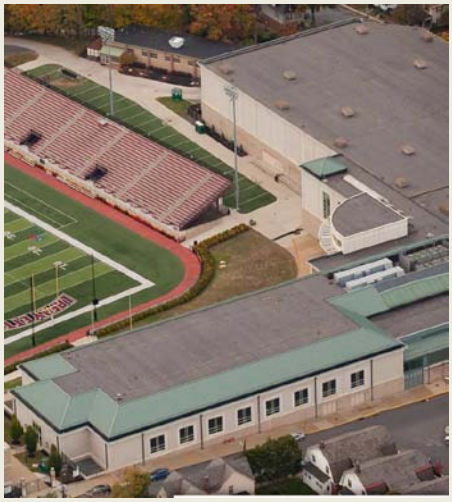
Analysis of each scope in the Greenhouse Gas Inventory in Figure 4 below illustrates that Scope 1 Direct on-campus stationary sources, Scope 2 purchased electricity and Scope 3 transmission & distribution losses from the purchased electricity are the greatest emissions contributors to Lafayette's carbon footprint.

Lafayette College 2007 Emissions Breakdown by Scope Type

Scope	Year	Energy Consumption	Emissions			Totals
	2007		CO_2	CH_4	N_2O	Total CO_2 equivalent
	Source	MMBtu	kg	kg	kg	Metric Tonnes
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	On-Campus Stationary Combustion	**164,890**	**11,882,781**	**1,540**	**80**	***11,940***
	Direct Transportation	3,720	260,850	50	20	270
	Refrigerants & Chemicals	-	-	-	-	80
	Agriculture	-	-	-	3	1
Scope 2	**Purchased Electricity**	**175,090**	**15,042,420**	**140**	**270**	***15,130***
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	21,430	1,502,980	300	100	*1,540*
	Student Commuting	4,440	311,430	60	20	320
	Directly Financed Air Travel	-	-	-	-	-
	Other Directly Financed Travel	-	-	-	-	-
	Study Abroad Air Travel	580	113,510	1	1	110
	Solid Waste	-	-	36,450	-	840
	Wastewater	-	-	1	0	0
	Paper	-	-	-	-	30
	Scope 3 T&D Losses	**17,320**	**1,487,710**	**10**	**30**	***1,500***
Totals	Scope 1	168,610	12,143,630	1,600	100	12,290
	Scope 2	175,090	15,042,420	140	270	15,130
	Scope 3	43,770	3,415,640	36,830	150	4,340
	All Scopes	387,470	30,601,690	38,570	530	31,750
					Net Emissions:	**31,750**

Figure 4. Lafayette College's Emissions Breakdown, by Scope, for the Year 2007

To develop strategies for reduction and to have the ability to more accurately quantify Scope 1 and 2 emissions, the College conducted a campus-wide energy audit. The comprehensive campus energy audit examined 51 of the College's largest on-campus buildings to determine the energy consumption (measured in million BTUs, or MMBtu) and the annual energy cost for each building (See Figure 5). The energy audit did not include additional off-campus facilities, though those properties were accounted for in the Greenhouse Gas Inventory. In 2007, all buildings accounted for over 86% of campus emissions, measured in $MtCO_2e$ and the 51 on-campus buildings accounted for over 50% of campus emissions. Therefore, if the College focuses on campus energy use, they will also be able to determine how much each building contributes to the campus carbon footprint. The results of the energy audit will provide an important tool that can be used as part of the Climate Action Plan. The most significant contributors to Lafayette's emission are the science and engineering buildings, Acopian Engineering Center and Hugel Science Center, and the Kirby Sports Center, which require large volumes of conditioned air. Figure 6 illustrates the energy consumption of buildings on campus. In order to make significant reductions in campus emissions, the College must address its most energy intensive operations, which are primarily the heating, air conditioning and lighting of campus buildings.



Energy Consumption, Cost and Greenhouse Gas Emissions for On-Campus Buildings

Building	Energy Consumption MMBtu/yr	Annual Energy Cost $/yr	GHG Emissions MtCO2e/yr
2 West	1,188	$20,604	101
4 West	984	$20,857	107
Acopian	12,246	$261,686	1,411
Alpha Phi	1,029	$18,079	88
Bailey Health	660	$13,168	65
Bourger Football	2,593	$47,768	234
Colton Chapel	2,144	$35,774	136
Conway House	1,117	$19,608	96
DKE	298	$7,880	48
Easton Hall	1,886	$34,568	153
Farber Hall	1,098	$22,202	110
Farinon Student Center	8,723	$181,897	896
Feather House	1,571	$23,286	103
Fisher Hall East	3,332	$64,924	319
Fisher Hall West	3,337	$65,037	319
Gates Hall	1,834	$30,873	123
Hogg Hall	634	$12,125	50
Hugel Hall	16,477	$312,735	1,525
Kamine	2,472	$55,811	321
Kappa Kappa-Lerch	904	$17,377	80
KDR	961	$16,549	85
Keefe Hall	4,334	$79,167	361
Kirby Hall of Civil Rights	2,534	$48,596	257
Kirby House	5,149	$93,074	409
Kirby Sports Center	31,488	$582,671	2,642
Kunkel Hall	3,943	$83,398	428
Markle Hall	3,486	$64,808	273
Maroon Weight Training	594	$10,967	58
Marquis Hall	4,875	$94,958	500
McCracken-Metzgar Fields	1,462	$28,169	154
McKeen Hall	4,589	$84,050	382
Oechsle Hall	8,130	$172,768	904
Pardee Hall	6,773	$157,127	887
Pfenning	1,827	$38,323	203
Phi Gamma Delta	903	$14,527	72
Pi Beta Phi	933	$16,044	79
Plant Operations	568	$11,133	48
PT Farinon	955	$16,892	83
Ramer Hall	1,384	$27,430	141
Rubin Hall	1,713	$38,261	215
Ruef Hall	2,961	$54,209	251
Scott Hall	732	$17,829	106
Simon Center	1,592	$35,533	194
Skillman Library	9,280	$198,379	1,121
Soles Hall	1,334	$22,698	93
South College	4,794	$97,400	469
Van Wickle Hall	1,813	$38,926	213
Watson Courts	603	$10,119	48
Watson Hall	3,387	$60,171	262
Williams Arts Center	3,671	$90,248	498
Williams Visual Arts	1,972	$45,600	277

Figure 5. Energy Consumption, Energy Cost and Emissions by On-Campus Building

Energy Consumption, Energy Cost and Emissions by On-Campus Building (MMBtu/year)

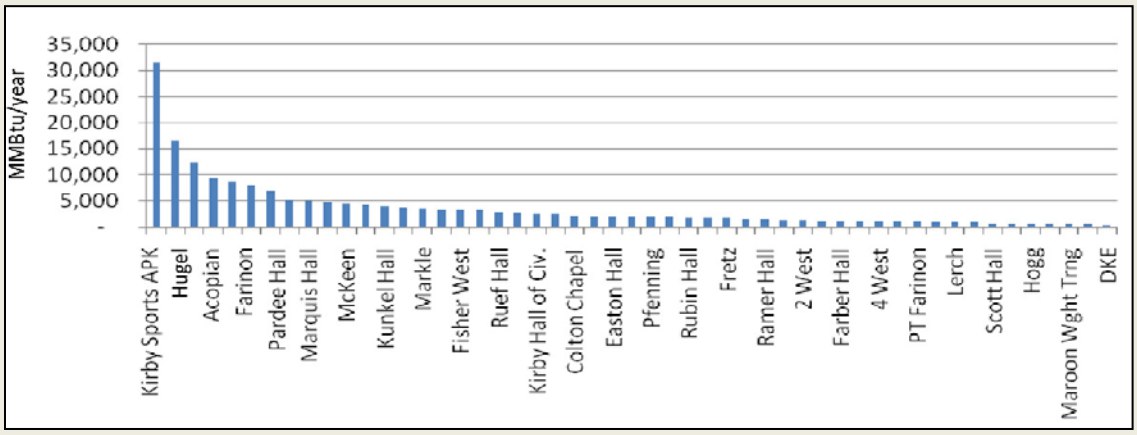


Figure 6. Energy Consumption by Building

Mitigation Planning and Tracking Progress

The energy audit identified strategies to reduce energy usage in each of the 51 buildings audited. A total of 485 Energy Conservation Measure (ECM) projects were recommended. The College could identify additional ECMs through an energy audit of the remaining off-campus buildings. All the ECMs have been entered into a database program called the *Energy Planner.* The web-based database allows users to assign current energy rates and easily update project information. Each ECM project aims to reduce emissions by reducing the amount of energy a building system consumes.

For each proposed ECM, the existing conditions and proposed change are described in an ECM report (Figure 7). Each ECM project contains data describing the current energy consumption (MMBtu), the proposed energy consumption, the operational cost, the project cost and the resultant cost savings and emissions reductions ($MtCO_2e$).

The database also provides economic analysis based on the project construction cost and estimated cost savings, including simple payback period, net present value (NPV) and savings to investment ratio (SIR). The *Energy Planner* also includes a capital planning tool. Each ECM can be assigned a planned implementation year. With this tool, the database facilitates the development of a spending plan for projects that will decrease energy use and GHG emissions. The *Energy Planner* projects the resultant savings, which can be compared to actual measured energy use.

ECM ID # 3515 - Carbon Dioxide Control in Large Rooms — **Easton Campus**

Colton Chapel — *D30 | HVAC*

Current Condition

Occupancy in some areas of the Colton Chapel building varies substantially, however outside air quantities supplied to the air handling units are relatively constant. These areas consist of the one main lecture room consisting of a maximum capacity of 200 people. Occupancy in this area varies from heavy to unoccupied with unoccupied being predominant.

Existing	Annual Consumption	Annual Energy (mmBtu)	Cost Rate	Annual Cost	CO_2 (mt/yr)
Electrical Demand	342/kw		$7.38 /kw	$2,524	
Electrical Usage	86,249/kwh	294	$.071/kwh	$6,124	47.1
Heating(Central)	1,583/mlb	1,583	$14.43/mlb	$22,843	68.1
Cooling(Central)	0/mmBtu	0	$20.80/mmBtu	$0	0.0
Natural Gas	0/mcf	0	$12.18/mcf	$0	0.0
Fuel Oil	0/gal	0	$2.52/gal	$0	0.0
Water	0/gal		$0.01/gal	$0	
Existing O&M			$0.00		
Total/yr		**1,877**		**$31,491**	**115.2**

Discussion

Cost is based on $18,980.42 per variable frequency drive on the air handler supply fan and $7,618 for a single carbon dioxide sensor in the return ductwork.

Proposed Energy Conservation Measure

Demand control ventilation adjusts the amount of outside air based on the number of occupants and the ventilation needs of those occupants. It modulates ventilation to maintain target cfm/person ventilation rates based on actual occupancy. CO2 is used as an occupancy indicator to modulate ventilation below the maximum total outdoor air intake rate while maintaining the required ventilation rate per person. It avoids excessive over-ventilation while still maintaining good ventilation and providing required cfm-per-person outside air requirements specified by local codes and standards. This ECM includes applying this technology to 1 unit in the Colton Chapel building. Provide CO2 sensors and controllers to regulate the quantity of outdoor air introduced into the air handling unit and the space it serves. Install CO2 sensors in common areas throughout the building. Reductions in outdoor air quantities will reduce steam requirements in winter and cooling requirements in summer.

Proposed	Annual Consumption	Annual Energy (mmBtu)	Cost Rate	Annual Cost	CO_2 (mt/yr)
Electrical Demand	321/kw		$7.38 /kw	$2,369	
Electrical Usage	100,142/kwh	342	$.071 /kwh	$7,110	54.7
Heating(Central)	777/mlb	777	$14.43 /mlb	$11,212	33.4
Cooling(Central)	0/mmBtu	0	$20.80 /mmBtu	$0	0.0
Natural Gas	0/mcf	0	$12.18 /mcf	$0	0.0
Fuel Oil	0/gal	0	$2.52 /gal	$0	0.0
Water	0/gal		$0.01 /gal	$0	
Proposed O&M			$0.00		
Total/yr		**1,119**		**$20,691**	**88.1**

Cost Estimate

Material	$13,299
Labor	$13,299
OH & Profit	$5,320
Subtotal	$31,918
Prof Fees	$2,926
RCI	1.04
Total Cost	$39,900

Estimated Savings

Savings	Annual Consumption	Annual Energy (mmBtu)	Cost Rate	Annual Cost	CO_2 (mt/yr)
Electrical Demand	21/kw		$7.38 /kw	$155	
Electrical Usage	-13,893/kwh	-47	$.071 /kwh	-$986	-7.6
Heating	806/mlb	806	$14.43 /mlb	$11,631	34.7
Cooling	0/mmBtu	0	$20.80 /mmBtu	$0	0.0
Natural Gas	0/mcf	0	$12.18 /mcf	$0	0.0
Fuel Oil	0/gal	0	$2.52 /gal	$0	0.0
Water	0/gal		$0.01 /gal	$0	
O&M Savings			$0.00		
Total		**759**		**$10,800**	**27.1**

Economic Analysis

Payback (Years): 3.7

Net Present Value: $110,461

Savings Investment Ratio: 4.0

Year Originated 2010 **Latest Revision** 12/21/2010

Figure 7. Sample ECM Report Page

CAMPUS EMISSIONS REDUCTION PLAN

Using the *Energy Planner,* the College has developed the following plan to reduce emissions 20% by 2021. The emissions reduction of 20% accounts for an initial reduction of 9% from 2007 through 2009 that was the result of switching from fuel oil to natural gas in the campus's boiler. The College will further reduce its emissions by an additional 11% from 2011 through 2021 by investing in the ECMs recommended in the campus energy audit.

The College has established a goal to invest $400,000 per year for 10 years (2011 through 2020) toward ECMs and carbon reduction projects that have a positive net present value and large $MtCO_2e$ reduction. If

the College decides to also reinvest the expected energy savings into ECM implementation, the expected savings will be realized in a shorter time frame.

The ten year Campus Emissions Reduction Plan scheduled ECM projects based on payback period and emissions reduction. Starting with projects that have the shortest payback period and the highest emission reduction values, ECM's were selected and sequenced to be completed over the next 10 years. Because some emission reduction projects were started prior to the preparation of the Climate Action Plan, 2010 and 2011 funding levels were recorded as actual expenses or previously allocated amounts. The following ECM projects were either completed between 2008 and 2010 or are currently underway in 2011:

ECM Projects Recently Completed

- Conversion of Boiler from No. 6 oil to Natural Gas.
  - Emissions reduction of 3,199 $MtCO_2e$/yr.

- Variable Frequency Drive Installation on Air Handling Unit #1 in Farinon Hall.
  - The new fan controls will allow slower fan speeds during reduced load times, saving electrical energy.
  - Emissions reduction of 40 $MtCO_2e$/yr.

- Variable Frequency Drive Installation for Pumps in Markle Hall
  - Retrofit constant speed water pumps in the cooling system with variable speed pumps, saving electrical energy.
  - Emissions reduction of 25 $MtCO_2e$/yr.

- Supply and Installation of Oxygen Trim System in the Power Plant
  - New boiler controls reduce excess air in the combustion chambers of the power plant's boilers, saving natural gas.
  - Emissions reduction of 80 $MtCO_2e$/yr.

- Condensate Tank Insulation Installation in Power Plant
  - Insulating the condensate tank reduces heat loss and increases the boiler system efficiency, thus requiring less fuel to heat the campus.
  - Emissions reduction of 25 $MtCO_2e$/yr.

- Power Factor Improvement in the Power Plant
  - Correcting internal programming for one of the electrical capacitors eliminated billing penalties from the electrical provider.
  - 0 emissions reduction value, $7,604 energy cost savings.

- Low Flow Fixture Conversion in Keefe Hall
  - Replacing all the existing plumbing fixtures with low flow fixtures will reduce water consumption as well as reduce hot water heating requirements for showers and sinks.
  - Emissions reduction of 19 $MtCO_2e/yr$.

- HVAC System Occupancy Control in Oechsle Hall
  - Installing a programmable control system to cycle less air when the space is not occupied, saving electrical energy.
  - Emissions reduction of 3 $MtCO_2e/yr$.

- Air Handling Unit Discharge Air Temperature Reset in Acopian Hall
  - Resetting the cooling coil temperature during non-peak hours will save electrical energy.
  - Emissions reduction of 55 $MtCO_2e/yr$.

For the years 2012 through 2021, projects were scheduled with a target funding level of $400,000 per year. The ECMs were grouped by type and building so that each building could be upgraded as efficiently as possible. For example, multiple lighting projects were scheduled in one building in one year along with any other related electrical projects. Installing building utility meters, especially for larger energy intensive buildings, is a high priority, so those projects are slated to be completed during the first five years of the Emissions Reduction Plan. Figure 8 illustrates the ECMs implemented in 2010 and 2011 and the construction cost to implement the ECMs planned through 2020. The 10 year Emissions Reduction Plan that lists the scheduled ECMs by year can be found in Appendix B. The plan does not include the impact of any new construction on campus, which would likely increase energy demand, thus increasing emissions. In Figure 9, the resulting reduction in carbon emissions is shown. It is assumed the savings will be realized the year following the construction funds allocation.

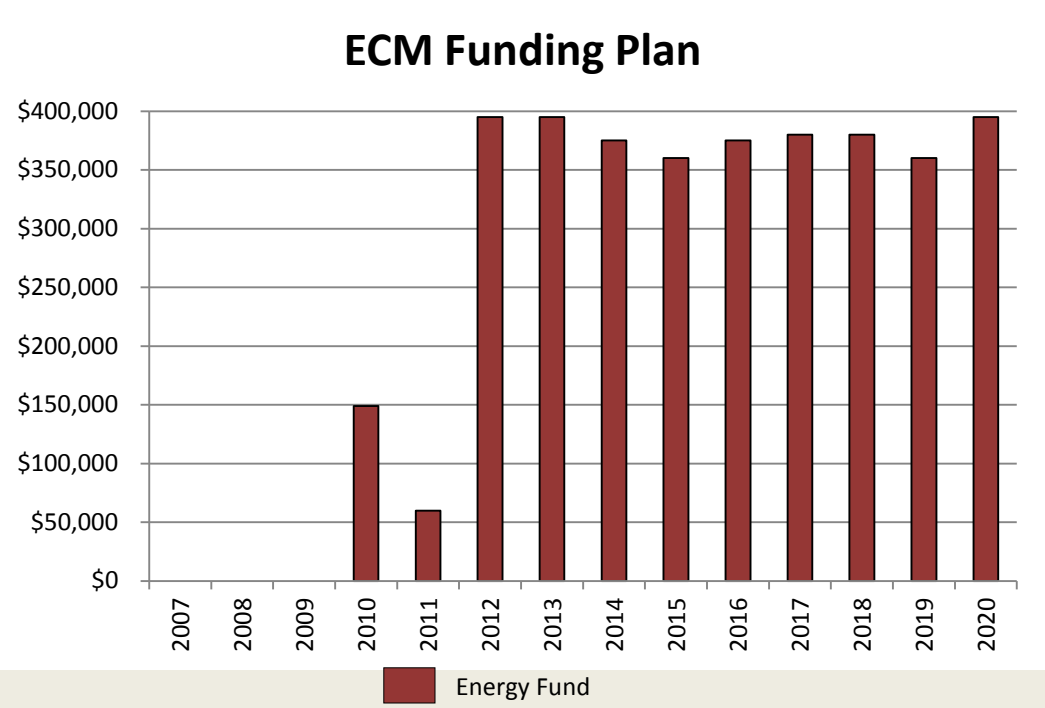


Figure 8. ECMs Implemented in 2010 and 2011

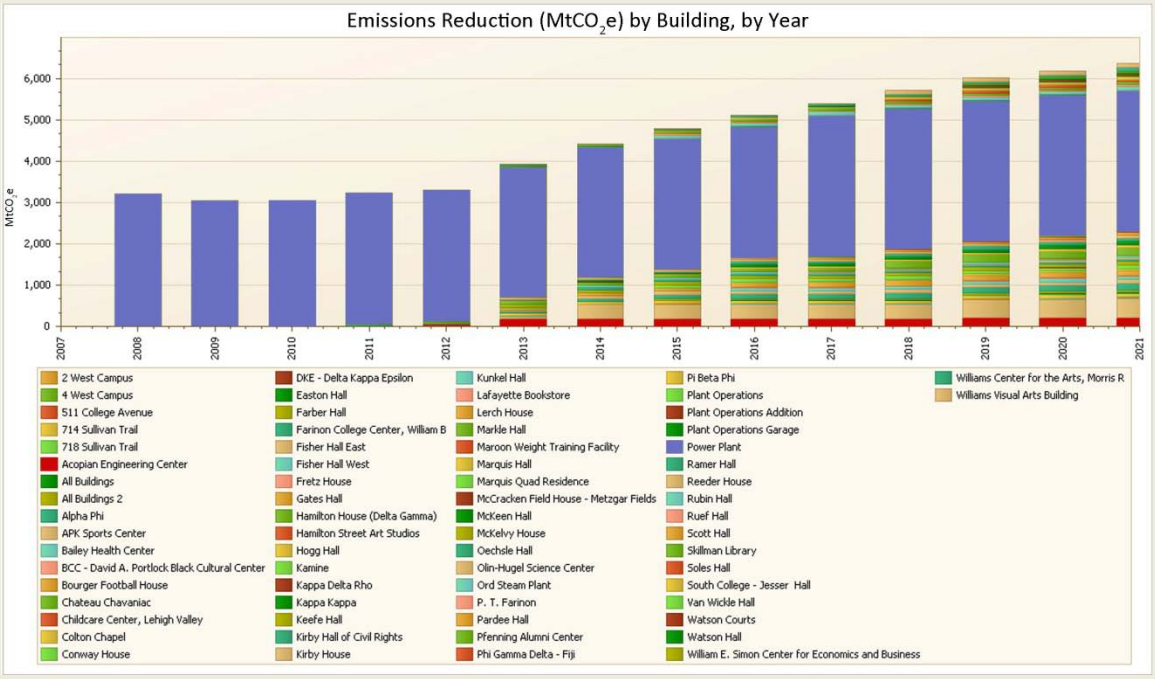


Figure 9. Emissions Reduction ($MtCO_2e$) by Building, by Year

The implementation of the ECM projects will result in new and upgraded systems that will be less expensive to operate than the existing systems. By 2015, Lafayette expects to save approximately $400,000 per year in energy costs (Figure 10). By the end of the 10 year plan in 2021, Lafayette's energy savings will exceed $600,000 per year, based on the College's actual 2010 energy costs. The estimated savings will essentially finance the implementation of the scheduled ECM projects and may provide the opportunity to implement additional energy saving projects beyond the planned $400,000 per year funding level.

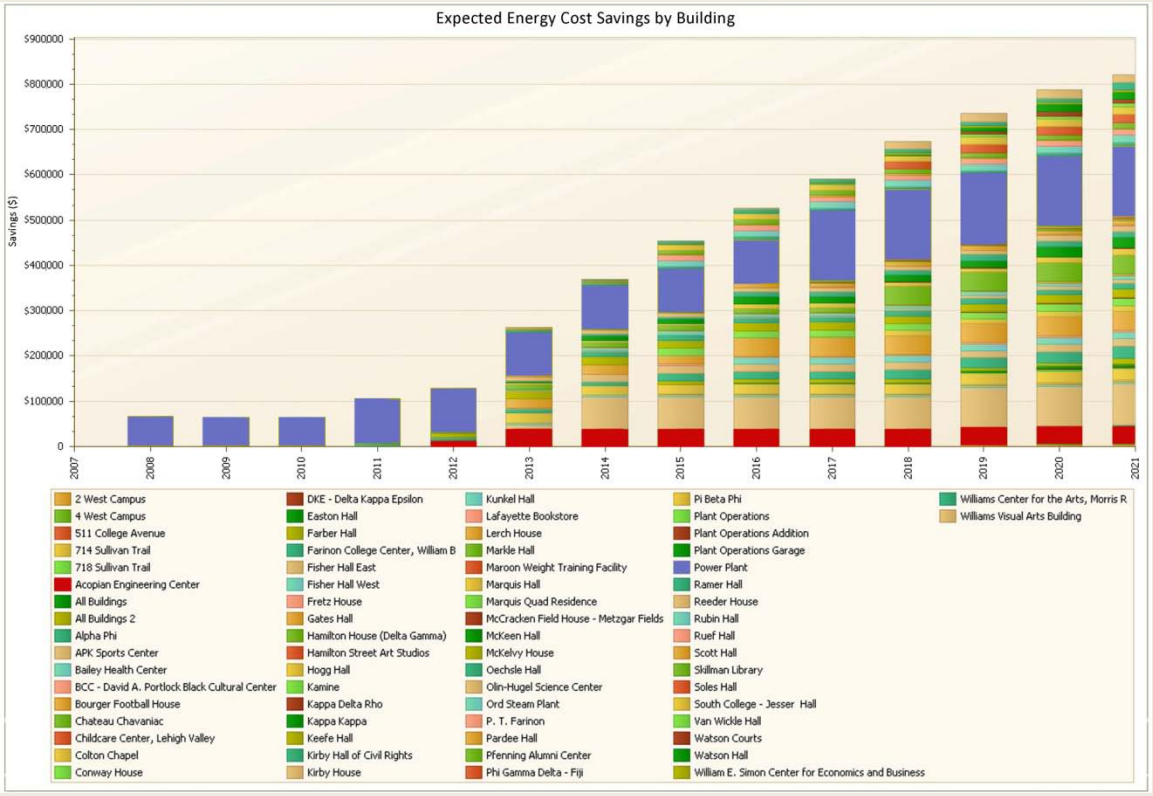


Figure 10. Expected Energy Cost Savings by Building

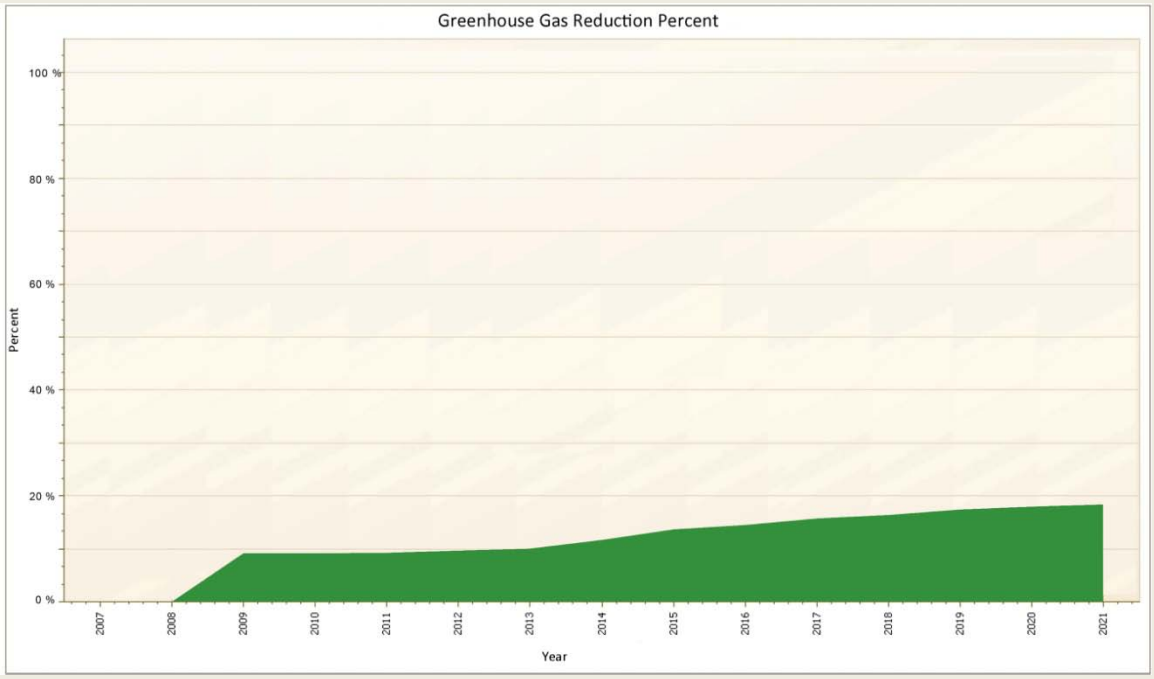


Figure 11. Planned Greenhouse Gas Reduction, 2007 through 2021

The implementation of the 10 year Campus Emissions Reduction Plan will reduce Lafayette's greenhouse gas emissions by a total of 20% (See Figure 11), dropping from 31,758 $MtCO_2e$ in 2007 to 25,402 in 2021.

The *Energy Planner* assumes emissions and cost savings will be realized one year after the ECM project is scheduled and implemented.

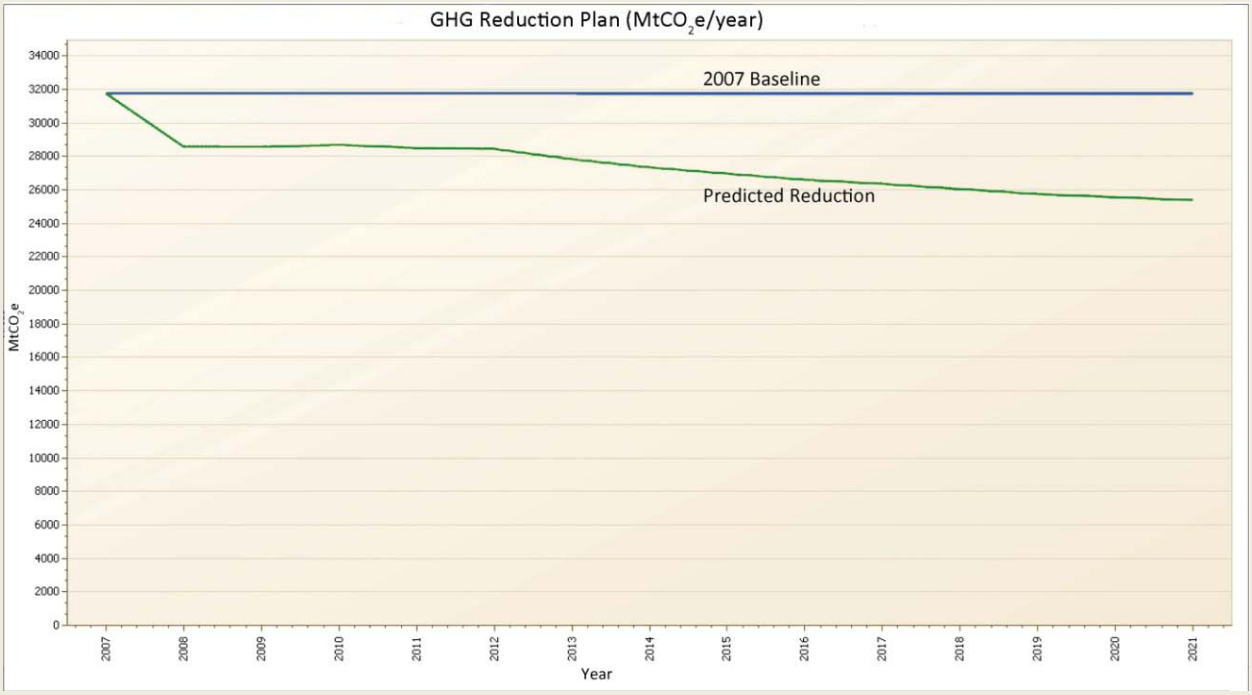


Figure 12. Percent Greenhouse Gas Reduction by 2021

The Campus Emissions Reduction Plan aims for a 20% reduction in emissions by 2021. It is to be expected that the College may adjust the implementation schedule based on the availability of the necessary funds. Using the *Energy Planner*, Lafayette can simply reassign an ECM project to a different year and recalculate the resultant cost savings and emissions reductions. This allows Lafayette to quickly analyze and consider the effects of various ECM funding strategies.

Moving Forward

Some of the most important projects currently scheduled are the installation of utility meters on campus buildings. The value of campus-wide metering is the ability to better determine how campus energy is used, and to monitor results as ECMs are implemented. More importantly, building meters allow the facility managers to find and remedy building problems. It is very difficult to control and make improvements to building systems without first measuring usage. Meters will also provide a means to gauge the effectiveness of the Campus Energy Policy.

Once meters are installed, the College will proceed with establishing interim goals and dates for emissions reduction based on results from the first year of data. These goals can be set for the whole campus, but may also include individual buildings or groups of buildings, such as residence halls or academic buildings.

In addition to building metering, Lafayette will need to take into consideration future construction projects. Using the *Energy Planner,* the emissions and energy impact of new facilities, additions and renovations can be estimated. For example, a new 4-story, 34,000 square foot residence hall that includes elevators, kitchens and laundry facilities could generate 480 $MtCO_2e$ per year. The impact of

new buildings can be estimated by projecting the energy consumption (MMBtu) per square foot based on building type and use. New construction will represent a "negative" reduction since adding square footage of new construction will increase energy consumption and GHG emissions. It will be important for the College to consider the effect campus growth will have on greenhouse gas emissions as the Campus Master Plan is updated.

The Climate Commitment requires the College to develop a comprehensive plan to achieve climate neutrality as soon as possible. The long-term goal is for the College to become climate neutral, however, such a significant change is not likely in the foreseeable future until technologies and US energy resources evolve. Lafayette College is already taking its first steps down this long road by completing a campus energy audit and beginning to implement Energy Conservation Measures. The students and faculty have initiated several programs to focus attention on the important part every individual plays with respect to environmental stewardship. The subcommittees have also agreed on the necessity of a communications plan to promote Lafayette's Climate Action Plan on and off campus. Opportunities exist to incorporate the College's Climate Action Plan into the curriculum and to educate the campus community about visible and not-so-visible changes underway. This Climate Action Plan provides the first step of a more structured approach to meeting long-term energy goals. The College's short-term goals are as follows:

Short-Term Goals

- Establish an energy reduction program where the College will invest approximately $400,000 per year to implement ECMs recommended in the campus energy audit. This investment is expected to reduce GHG emissions by an additional 11% by 2021.

- Continue to have the CAP Subcommittees explore ways to reduce GHG emissions and to promote sustainability through research and education. The committees will evaluate the success of programs on a yearly basis and recommend new initiatives. The committees will also present their concerns and applicable information regarding project prioritization to the trustees for funding and request a Subcommittees budget if deemed necessary.

- In the next 6 months, develop a plan, with direction from the subcommittees, to unveil or communicate the College's Climate Action Plan to the campus population.

- By December 2013, evaluate, in more detail, the technical and economic feasibility to install renewable energy or cogeneration, including the benefits of different types of renewable energy systems.

- By December 2013, review the Campus Master Plan to determine the impact that planned capital improvement and capital construction will have on GHG emissions. Explore possible modifications to the Campus Master Plan which can reduce GHG emissions.

- By December 2013, update the Campus Facility Condition Assessment to identify scheduled deferred maintenance and capital renewal projects. Identify opportunities to improve energy efficiency in these systems and estimate the subsequent GHG emissions reductions.

- Update the Climate Action Plan in 2013 to reflect the decisions and progress made after completing the short-term goals.

- Update the Climate Action Plan every two years using the *Energy Planner.*

CONCLUSION

Through the implementation of educational, research and operational changes described in this Climate Action Plan, Lafayette College can expect to reduce its emissions by 20% by the year 2021 with an average investment in ECM projects of $400,000 per year for the next 10 years. The Energy Conservation Measures that were developed from the results of a campus-wide energy audit provide specific actions and scopes for reducing energy use.

Entech's *Energy Planner* provides a means to schedule and manage ECMs and will provide accurate tracking of emissions as the plan is modified and updated. The installation of utility meters on individual buildings provides a means of verifying the anticipated savings and allows the College to monitor and control energy on a building by building basis.

Lafayette College will also continue to integrate sustainability into its curriculum and encourage related research through the efforts of the Education and Research Subcommittees. The Subcommittees will continue to meet to evaluate the success of past programs and develop future environmental initiatives, including educating the campus community about the Climate Action Plan projects and processes. Lafayette College's Climate Action Plan will be reviewed and updated every two years, in accordance with ACUPCC guidelines. The *Energy Planner* will be updated regularly as projects are funded and completed to better predict and verify the results of this very ambitious program.

APPENDICES

A. ACUPCC Document
B. Scheduled ECMs
C. Complete ECM List

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APPENDIX A

ACUPCC Document

AMERICAN COLLEGE & UNIVERSITY
PRESIDENTS' CLIMATE COMMITMENT

American College & University Presidents' Climate Commitment

We, the undersigned presidents and chancellors of colleges and universities, are deeply concerned about the unprecedented scale and speed of global warming and its potential for large-scale, adverse health, social, economic and ecological effects. We recognize the scientific consensus that global warming is real and is largely being caused by humans. We further recognize the need to reduce the global emission of greenhouse gases by 80% by mid-century at the latest, in order to avert the worst impacts of global warming and to reestablish the more stable climatic conditions that have made human progress over the last 10,000 years possible.

While we understand that there might be short-term challenges associated with this effort, we believe that there will be great short-, medium-, and long-term economic, health, social and environmental benefits, including achieving energy independence for the U.S. as quickly as possible.

We believe colleges and universities must exercise leadership in their communities and throughout society by modeling ways to minimize global warming emissions, and by providing the knowledge and the educated graduates to achieve climate neutrality. Campuses that address the climate challenge by reducing global warming emissions and by integrating sustainability into their curriculum will better serve their students and meet their social mandate to help create a thriving, ethical and civil society. These colleges and universities will be providing students with the knowledge and skills needed to address the critical, systemic challenges faced by the world in this new century and enable them to benefit from the economic opportunities that will arise as a result of solutions they develop.

We further believe that colleges and universities that exert leadership in addressing climate change will stabilize and reduce their long-term energy costs, attract excellent students and faculty, attract new sources of funding, and increase the support of alumni and local communities.

Accordingly, we commit our institutions to taking the following steps in pursuit of climate neutrality:

1. Initiate the development of a comprehensive plan to achieve climate neutrality as soon as possible.

   a. Within two months of signing this document, create institutional structures to guide the development and implementation of the plan.

   b. Within one year of signing this document, complete a comprehensive inventory of all greenhouse gas emissions (including emissions from electricity, heating, commuting, and air travel) and update the inventory every other year thereafter.

   c. Within two years of signing this document, develop an institutional action plan for becoming climate neutral, which will include:

      i. A target date for achieving climate neutrality as soon as possible.

      ii. Interim targets for goals and actions that will lead to climate neutrality.

      iii. Actions to make climate neutrality and sustainability a part of the curriculum and other educational experience for all students.

      iv. Actions to expand research or other efforts necessary to achieve climate neutrality.

      v. Mechanisms for tracking progress on goals and actions.

(continued...)

2. Initiate two or more of the following tangible actions to reduce greenhouse gases while the more comprehensive plan is being developed.

   a. Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent.

   b. Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.

   c. Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by our institution.

   d. Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution.

   e. Within one year of signing this document, begin purchasing or producing at least 15% of our institution's electricity consumption from renewable sources.

   f. Establish a policy or a committee that supports climate and sustainability shareholder proposals at companies where our institution's endowment is invested.

   g. Participate in the Waste Minimization component of the national RecycleMania competition, and adopt 3 or more associated measures to reduce waste.

3. Make the action plan, inventory, and periodic progress reports publicly available by submitting them to the ACUPCC Reporting System for posting and dissemination.

In recognition of the need to build support for this effort among college and university administrations across America, we will encourage other presidents to join this effort and become signatories to this commitment.

Signed,

_____

President/ Chancellor Signature

_____

President/ Chancellor Name

_____

College or University

_____

Date

Please send the signed commitment document to:

Presidents' Climate Commitment
c/o Second Nature
18 Tremont St., Suite 308
Boston, MA 02108

or fax to: 320-451-1612
or scan & email to: ACUPCC@secondnature.org

Lafayette College Climate Action Plan: 2009 Oil to Natural Gas Emissions Reduction

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
5967	Power Plant	Switch from No. 6 Oil to Natural Gas	2008	Not Assigned	Complete	N/A	N/A	3199			

Lafayette College Climate Action Plan: 2010 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
186	Power Plant	Power Factor Improvement	2010	Not Assigned	In Progress	0.41	$3,123	0	$0	$0	$106,755
161	Power Plant	Supply & Installation of Oxygen Trim System	2010	Not Assigned	In Progress	3.47	$68,662	80	$854	$47	$207,874
184	Power Plant	Condensate Tank Insulation Installation	2010	Not Assigned	In Progress	4.06	$24,735	25	$990	$54	$60,267
53	Farinon College Center, William B	VFD Installation on AHU #1	2010	Not Assigned	In Progress	4.89	$29,981	40	$755	$148	$58,993
119	Markle Hall	VFD Installation for Pumps	2010	Not Assigned	In Progress	5.48	$14,990	25	$610	$197	$25,294
	Totals/Averages					**3.66**	**$141,491**	**170**	**$ 642**	**$ 89**	**$ 459,184**

Lafayette College Climate Action Plan: 2011 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
5461	Keefe Hall	Low Flow Fixture Conversion	2011	Not Assigned	Complete	2.28	$17,492	19	$941	$52	$92,561
3464	Acopian Engineering Center	AHU Discharge Air Temperature Reset	2011	Not Assigned	In Progress	2.84	$41,068	55	$753	$44	$161,893
80	Oechsle Hall	HVAC System Occupancy Control	2011	Not Assigned	In Progress	6.10	$3,748	3	$1,483	$92	$4,884
	Totals/Averages					**3.74**	**$62,308**	**76**	**$ 1,059**	**$ 63**	**$ 259,339**

Lafayette College Climate Action Plan: 2012 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
3595	Acopian Engineering Center	Air Handling Unit Controls	2012	Not Assigned	Proposed	0.11	$1,386	60	$23	$2	$171,478
3602	Acopian Engineering Center	Fan Coil Unit Temperature Setback	2012	Not Assigned	Proposed	0.22	$1,386	38	$37	$4	$86,869
5467	Keefe Hall	Air Handling Unit Controls	2012	Not Assigned	Proposed	0.28	$1,386	33	$42	$7	$71,497
6036	Gates Hall	Installation of Steam Meter	2012	O & M	Proposed	0.52	$10,392	60	$174	$7	$269,213
4423	Colton Chapel	Air Handling Unit Controls	2012	Not Assigned	Proposed	0.84	$6,048	26	$233	$13	$95,237
3842	Lerch House	Steam Trap Inspection and Replacement	2012	Not Assigned	Proposed	0.96	$1,736	5	$323	$14	$23,420
3770	Ramer Hall	Steam Trap Inspection and Replacement	2012	Not Assigned	Proposed	1.00	$1,798	5	$335	$14	$23,358
4130	Marquis Hall	Steam Trap Inspection and Replacement	2012	Not Assigned	Proposed	1.00	$1,798	5	$335	$14	$23,358
5474	Keefe Hall	Fan Coil Unit Temperature Setback	2012	Not Assigned	Proposed	1.04	$1,386	7	$186	$19	$17,521
4850	Bailey Health Center	Steam Trap Inspection and Replacement	2012	Not Assigned	Proposed	1.07	$1,921	5	$358	$15	$23,235
3590	Acopian Engineering Center	Steam Trap Inspection and Replacement	2012	Not Assigned	Proposed	1.10	$1,978	5	$368	$16	$23,178
4862	Bailey Health Center	Fan Coil Unit Temperature Setback	2012	Not Assigned	Proposed	1.12	$1,260	4	$299	$17	$14,508
5462	Keefe Hall	Steam Trap Inspection and Replacement	2012	Not Assigned	Proposed	1.14	$2,045	5	$381	$16	$23,111
3550	Markle Hall	Incandescent to Compact Fluorescent Lighting Conversion	2012	Not Assigned	Proposed	1.17	$3,926	22	$181	$29	$44,466
4136	Marquis Hall	Weatherstrip Exterior Doors	2012	Not Assigned	Proposed	1.26	$1,220	3	$383	$19	$12,344
4424	Colton Chapel	Weatherstrip Exterior Doors	2012	Not Assigned	Proposed	1.28	$2,034	5	$387	$19	$20,234
5979	APK Sports Center	Installation of Electric Meter	2012	O & M	Proposed	1.57	$6,928	34	$204	$33	$56,869
3662	Olin-Hugel Science Center	Steam Trap Inspection and Replacement	2012	Not Assigned	Proposed	1.58	$5,368	10	$529	$23	$42,152
4352	South College - Jesser Hall	Weatherstrip Exterior Doors	2012	Not Assigned	Proposed	2.01	$407	1	$609	$30	$2,420
6027	APK Sports Center	Installation of Steam Meter	2012	O & M	Proposed	2.12	$10,392	15	$711	$31	$58,096
5977	Acopian Engineering Center	Installation of Electric Meter	2012	O & M	Proposed	2.21	$6,928	24	$288	$46	$38,330
6006	Olin-Hugel Science Center	Installation of Electric Meter	2012	O & M	Proposed	2.46	$6,928	22	$320	$51	$33,778
6017	Skillman Library	Installation of Electric Meter	2012	O & M	Proposed	2.73	$6,928	20	$354	$57	$29,804
6008	Pardee Hall	Installation of Electric Meter	2012	O & M	Proposed	3.18	$6,928	17	$414	$66	$24,530
21	Markle Hall	Metal Halide to Photocell Lighting Conversion	2012	Not Assigned	Proposed	3.31	$943	2	$434	$69	$3,205
4846	Bailey Health Center	Incandescent to Compact Fluorescent Lighting Conversion	2012	Not Assigned	Proposed	3.37	$3,776	7	$539	$86	$12,400
6005	Oechsle Hall	Installation of Electric Meter	2012	O & M	Proposed	3.51	$6,928	15	$457	$73	$21,553
3515	Colton Chapel	Ventilation Control in Large Rooms	2012	Not Assigned	Proposed	3.69	$39,900	27	$1,474	$53	$110,461
5987	Farinon College Center, William B	Installation of Electric Meter	2012	O & M	Proposed	3.74	$6,928	14	$486	$78	$19,834
3838	Lerch House	Incandescent to Compact Fluorescent Lighting Conversion	2012	Not Assigned	Proposed	3.81	$84	0	$640	$102	$234
3766	Ramer Hall	Incandescent to Compact Fluorescent Lighting Conversion	2012	Not Assigned	Proposed	3.94	$2,434	4	$646	$103	$6,486
5956	Markle Hall	Installation of Occupancy Sensors	2012	Not Assigned	Proposed	4.53	$12,014	15	$776	$124	$26,303
6048	Olin-Hugel Science Center	Installation of Steam Meter	2012	O & M	Proposed	4.68	$10,392	7	$1,569	$67	$20,627
4414	Colton Chapel	Incandescent to Compact Fluorescent Lighting Conversion	2012	Not Assigned	Proposed	5.53	$9,970	12	$818	$131	$16,114
6024	Williams Center for the Arts, Morris R	Installation of Electric Meter	2012	O & M	Proposed	5.73	$6,928	9	$745	$119	$10,557
5458	Keefe Hall	Incandescent to Compact Fluorescent Lighting Conversion	2012	Not Assigned	Proposed	6.37	$3,021	3	$1,050	$168	$3,833
6002	Marquis Hall	Installation of Electric Meter	2012	O & M	Proposed	6.98	$6,928	8	$907	$145	$7,421
6019	South College - Jesser Hall	Installation of Electric Meter	2012	O & M	Proposed	7.50	$6,928	7	$975	$156	$6,424
5998	Kunkel Hall	Installation of Electric Meter	2012	O & M	Proposed	7.69	$6,928	7	$999	$160	$6,092
5975	Acopian Engineering Center	Installation of Steam Meter	2012	O & M	Proposed	8.10	$10,392	4	$2,718	$117	$7,519

Lafayette College Climate Action Plan: 2012 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
6033	Farinon College Center, William B	Installation of Steam Meter	2012	O & M	Proposed	8.57	$10,392	4	$2,877	$124	$6,528
5993	Kamine	Installation of Electric Meter	2012	O & M	Proposed	9.20	$6,928	6	$1,197	$191	$3,953
6025	Williams Visual Arts Building	Installation of Electric Meter	2012	O & M	Proposed	10.37	$6,928	5	$1,347	$216	$2,725
5997	Kirby House	Installation of Electric Meter	2012	O & M	Proposed	10.56	$6,928	5	$1,373	$220	$2,551
6004	McKeen Hall	Installation of Electric Meter	2012	O & M	Proposed	10.64	$6,928	5	$1,384	$221	$2,479
6047	Oechsle Hall	Installation of Steam Meter	2012	O & M	Proposed	10.75	$10,392	3	$3,607	$155	$3,108
6041	Kirby House	Installation of Steam Meter	2012	O & M	Proposed	10.92	$10,392	3	$3,662	$157	$2,898
5989	Fisher Hall West	Installation of Electric Meter	2012	O & M	Proposed	11.30	$6,928	5	$1,469	$235	$1,930
5988	Fisher Hall East	Installation of Electric Meter	2012	O & M	Proposed	11.32	$6,928	5	$1,473	$236	$1,916
6046	McKeen Hall	Installation of Steam Meter	2012	O & M	Proposed	12.21	$10,392	3	$4,096	$176	$1,488
6056	Skillman Library	Installation of Steam Meter	2012	O & M	Proposed	14.12	$10,392	2	$4,739	$204	($117)
6049	Pardee Hall	Installation of Steam Meter	2012	O & M	Proposed	21.16	$10,392	1	$7,108	$306	($3,537)
6042	Kunkel Hall	Installation of Steam Meter	2012	O & M	Proposed	21.83	$10,392	1	$7,323	$315	($3,747)
6034	Fisher Hall East	Installation of Steam Meter	2012	O & M	Proposed	22.49	$10,392	1	$7,552	$325	($3,942)
6045	Marquis Hall	Installation of Steam Meter	2012	O & M	Proposed	22.49	$10,392	1	$7,552	$325	($3,942)
6035	Fisher Hall West	Installation of Steam Meter	2012	O & M	Proposed	23.25	$10,392	1	$7,796	$335	($4,152)
6062	Williams Center for the Arts, Morris R	Installation of Steam Meter	2012	O & M	Proposed	48.11	$10,392	1	$16,111	$693	($7,376)
6038	Kamine	Installation of Steam Meter	2012	O & M	Proposed	79.94	$10,392	0	$26,852	$1,155	($8,577)
	Totals/Averages					**8.17**	**$393,263**	**625**	**$ 2,245**	**$ 136**	**$ 1,502,252**

* Funding strategy of O&M represents the installation of individual utility meters.

Lafayette College Climate Action Plan: 2013 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
5786	Fisher Hall East	Steam Trap Inspection and Replacement	2013	Not Assigned	Proposed	1.00	$1,798	5	$335	$14	$23,358
3698	Kunkel Hall	Steam Trap Inspection and Replacement	2013	Not Assigned	Proposed	1.03	$1,859	5	$346	$15	$23,297
4207	Kirby Hall of Civil Rights	Air Handling Unit Controls	2013	Not Assigned	Proposed	1.11	$1,260	6	$214	$26	$15,021
5714	Scott Hall	Steam Trap Inspection and Replacement	2013	Not Assigned	Proposed	1.21	$3,155	8	$407	$17	$33,183
69	McKeen Hall	Outdoor Air Mechanical Room Louver Repairs	2013	Not Assigned	Proposed	1.34	$12,492	28	$450	$19	$117,658
4202	Kirby Hall of Civil Rights	Steam Trap Inspection and Replacement	2013	Not Assigned	Proposed	1.35	$7,047	16	$454	$20	$65,615
5210	APK Sports Center	Steam Trap Inspection and Replacement	2013	Not Assigned	Proposed	1.53	$6,421	13	$513	$22	$52,267
5782	Fisher Hall East	Incandescent to Compact Fluorescent Lighting	2013	Not Assigned	Proposed	2.30	$14,686	41	$360	$58	$77,733
5206	APK Sports Center	Incandescent to Compact Fluorescent Lighting	2013	Not Assigned	Proposed	2.40	$5,539	15	$363	$58	$27,836
5791	Fisher Hall East	Air Handling Unit Controls	2013	Not Assigned	Proposed	2.75	$6,048	15	$403	$89	$25,960
5785	Fisher Hall East	Low Flow Fixture Conversion	2013	Not Assigned	Proposed	3.21	$12,497	10	$1,232	$68	$43,083
5209	APK Sports Center	Low Flow Fixture Conversion	2013	Not Assigned	Proposed	3.43	$47,243	35	$1,358	$75	$150,138
5208	APK Sports Center	Metal Halide to High Efficiency T8 Lighting Conversion	2013	Not Assigned	Proposed	3.70	$114,849	183	$627	$100	$333,999
3694	Kunkel Hall	Incandescent to Compact Fluorescent Lighting	2013	Not Assigned	Proposed	4.18	$15,468	24	$649	$104	$38,024
5207	APK Sports Center	Metal Halide to Compact Fluorescent Lighting	2013	Not Assigned	Proposed	6.03	$56,103	45	$1,237	$198	$79,414
4198	Kirby Hall of Civil Rights	Incandescent to Compact Fluorescent Lighting	2013	Not Assigned	Proposed	6.08	$25,341	25	$1,020	$163	$34,930
5995	Keefe Hall	Installation of Electric Meter	2013	O & M	Proposed	11.32	$6,928	5	$1,472	$236	$1,916
6003	McCracken Field House - Metzgar Fields	Installation of Electric Meter	2013	O & M	Proposed	11.86	$6,928	4	$1,542	$247	$1,511
5996	Kirby Hall of Civil Rights	Installation of Electric Meter	2013	O & M	Proposed	13.17	$6,928	4	$1,713	$274	$673
6039	Keefe Hall	Installation of Steam Meter	2013	O & M	Proposed	13.86	$10,392	2	$4,647	$200	$78
6020	Van Wickle Hall	Installation of Electric Meter	2013	O & M	Proposed	14.37	$6,928	4	$1,870	$299	$37
6023	William E. Simon Center for Economics	Installation of Electric Meter	2013	O & M	Proposed	15.50	$6,928	3	$2,015	$322	($469)
6009	Pfenning Alumni Center	Installation of Electric Meter	2013	O & M	Proposed	15.64	$6,928	3	$2,034	$325	($527)
6040	Kirby Hall of Civil Rights	Installation of Steam Meter	2013	O & M	Proposed	28.79	$10,392	1	$9,667	$416	($5,352)
	Totals/Averages					**6.96**	**$394,156**	**501**	**$ 1,455**	**$ 140**	**$ 1,139,383**

Lafayette College Climate Action Plan: 2014 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
4346	South College - Jesser Hall	Steam Trap Inspection and Replacement	2014	Not Assigned	Proposed	0.96	$1,736	5	$323	$14	$23,420
5858	Bourger Football House	Steam Trap Inspection and Replacement	2014	Not Assigned	Proposed	0.96	$1,736	5	$323	$14	$23,420
3734	Farber Hall	Steam Trap Inspection and Replacement	2014	Not Assigned	Proposed	1.06	$1,910	5	$356	$15	$23,246
4382	Ruef Hall	Steam Trap Inspection and Replacement	2014	Not Assigned	Proposed	1.06	$1,910	5	$356	$15	$23,246
5750	Rubin Hall	Steam Trap Inspection and Replacement	2014	Not Assigned	Proposed	1.06	$1,910	5	$356	$15	$23,246
5926	Kamine	Incandescent to Compact Fluorescent Lighting Conversion	2014	Not Assigned	Proposed	1.58	$13,595	57	$238	$38	$110,440
4274	Skillman Library	Steam Trap Inspection and Replacement	2014	Not Assigned	Proposed	1.59	$6,667	13	$532	$23	$52,020
5746	Rubin Hall	Incandescent to Compact Fluorescent Lighting Conversion	2014	Not Assigned	Proposed	1.63	$14,350	59	$245	$39	$112,748
5948	Williams Center for the Arts, Morris R	Metal Halide to Compact Fluorescent Lighting Conversion	2014	Not Assigned	Proposed	1.64	$8,519	28	$301	$48	$66,734
5749	Rubin Hall	Low Flow Fixture Conversion	2014	Not Assigned	Proposed	1.91	$4,656	6	$809	$44	$30,258
5930	Kamine	Steam Trap Inspection and Replacement	2014	Not Assigned	Proposed	1.97	$3,155	5	$661	$28	$19,209
4699	Fretz House	Installation of Roof Insulation	2014	Not Assigned	Proposed	2.13	$5,275	10	$518	$29	$29,293
4702	Fretz House	Incandescent to Compact Fluorescent Lighting Conversion	2014	Not Assigned	Proposed	2.33	$1,202	3	$393	$63	$6,271
3730	Farber Hall	Incandescent to Compact Fluorescent Lighting Conversion	2014	Not Assigned	Proposed	2.78	$13,591	31	$434	$69	$57,136
4594	Farinon College Center, William B	Incandescent to Compact Fluorescent Lighting Conversion	2014	Not Assigned	Proposed	3.57	$15,643	28	$566	$91	$47,770
4345	South College - Jesser Hall	Low Flow Fixture Conversion	2014	Not Assigned	Proposed	4.26	$39,272	20	$1,955	$108	$93,522
5929	Kamine	Low Flow Fixture Conversion	2014	Not Assigned	Proposed	4.26	$16,053	9	$1,828	$101	$38,046
4596	Farinon College Center, William B	Metal Halide to High Efficiency T8 Lighting Conversion	2014	Not Assigned	Proposed	4.32	$16,883	20	$844	$135	$40,025
4381	Ruef Hall	Low Flow Fixture Conversion	2014	Not Assigned	Proposed	4.72	$40,085	19	$2,103	$116	$82,079
6044	Markle Hall	Installation of Steam Meter	2014	O & M	Proposed	14.70	$10,392	2	$4,932	$212	($522)
6060	Watson Hall	Installation of Steam Meter	2014	O & M	Proposed	15.33	$10,392	2	$5,142	$221	($927)
6000	Markle Hall	Installation of Electric Meter	2014	O & M	Proposed	15.89	$6,928	3	$2,066	$330	($628)
6015	Ruef Hall	Installation of Electric Meter	2014	O & M	Proposed	15.96	$6,928	3	$2,075	$332	($657)
6014	Rubin Hall	Installation of Electric Meter	2014	O & M	Proposed	16.30	$6,928	3	$2,119	$339	($787)
6022	Watson Hall	Installation of Electric Meter	2014	O & M	Proposed	16.90	$6,928	3	$2,198	$352	($1,003)
5981	Bourger Football House	Installation of Electric Meter	2014	O & M	Proposed	17.58	$6,928	3	$2,285	$366	($1,235)
6054	Ruef Hall	Installation of Steam Meter	2014	O & M	Proposed	20.58	$10,392	2	$6,905	$297	($3,342)
5990	Fretz House	Installation of Electric Meter	2014	O & M	Proposed	22.06	$6,928	2	$2,867	$459	($2,391)
6013	Ramer Hall	Installation of Electric Meter	2014	O & M	Proposed	24.57	$6,928	2	$3,189	$510	($2,853)
6016	Scott Hall	Installation of Electric Meter	2014	O & M	Proposed	26.24	$6,928	2	$3,413	$546	($3,113)
5985	Easton Hall	Installation of Electric Meter	2014	O & M	Proposed	27.38	$6,928	2	$3,561	$570	($3,272)
5986	Farber Hall	Installation of Electric Meter	2014	O & M	Proposed	31.49	$6,928	2	$4,091	$655	($3,749)
5976	4 West Campus	Installation of Electric Meter	2014	O & M	Proposed	32.83	$6,928	2	$4,270	$683	($3,879)
5982	Colton Chapel	Installation of Electric Meter	2014	O & M	Proposed	44.99	$6,928	1	$5,830	$933	($4,703)
5991	Gates Hall	Installation of Electric Meter	2014	O & M	Proposed	44.99	$6,928	1	$5,830	$933	($4,703)
6031	Easton Hall	Installation of Steam Meter	2014	O & M	Proposed	48.11	$10,392	1	$16,111	$693	($7,376)
6050	Pfenning Alumni Center	Installation of Steam Meter	2014	O & M	Proposed	48.11	$10,392	1	$16,111	$693	($7,376)
5969	2 West Campus	Installation of Electric Meter	2014	O & M	Proposed	49.13	$6,928	1	$6,391	$1,023	($4,890)
6059	Van Wickle Hall	Installation of Steam Meter	2014	O & M	Proposed	55.28	$10,392	1	$18,590	$799	($7,767)
6052	Ramer Hall	Installation of Steam Meter	2014	O & M	Proposed	65.36	$10,392	0	$21,970	$945	($8,172)
6053	Rubin Hall	Installation of Steam Meter	2014	O & M	Proposed	102.89	$10,392	0	$34,524	$1,485	($8,982)
	Totals/Averages					**5.55**	**$388,272**	**374**	**$ 1,267**	**$ 351**	**$ 819,804**

Lafayette College Climate Action Plan: 2015 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
5678	Fisher Hall West	Steam Trap Inspection and Replacement	2015	Not Assigned	Proposed	1.10	$1,978	5	$368	$16	$23,178
4094	Easton Hall	Steam Trap Inspection and Replacement	2015	Not Assigned	Proposed	1.36	$3,538	8	$456	$20	$32,800
4460	Pardee Hall	Weatherstrip Exterior Doors	2015	Not Assigned	Proposed	1.38	$1,790	4	$420	$21	$16,336
4454	Pardee Hall	Steam Trap Inspection and Replacement	2015	Not Assigned	Proposed	1.44	$3,741	8	$482	$21	$32,597
5026	Oechsle Hall	Incandescent to Compact Fluorescent Lighting Conversion	2015	Not Assigned	Proposed	1.50	$1,740	8	$231	$37	$15,021
5674	Fisher Hall West	Incandescent to Compact Fluorescent Lighting Conversion	2015	Not Assigned	Proposed	2.22	$13,847	40	$346	$55	$76,201
4450	Pardee Hall	Incandescent to Compact Fluorescent Lighting Conversion	2015	Not Assigned	Proposed	2.97	$10,730	24	$456	$73	$41,497
3769	Ramer Hall	Low Flow Fixture Conversion	2015	Not Assigned	Proposed	2.97	$7,856	6	$1,308	$72	$30,155
4814	Gates Hall	Steam Trap Inspection and Replacement	2015	Not Assigned	Proposed	3.01	$57,768	57	$1,010	$43	$210,152
5683	Fisher Hall West	Air Handling Unit Controls	2015	Not Assigned	Proposed	3.23	$6,653	14	$459	$108	$23,426
5677	Fisher Hall West	Low Flow Fixture Conversion	2015	Not Assigned	Proposed	4.18	$14,145	8	$1,768	$97	$34,386
78	Oechsle Hall	Recommission VFD Chilled Water Pump	2015	Not Assigned	Proposed	4.25	$18,738	31	$605	$107	$45,199
4126	Marquis Hall	Incandescent to Compact Fluorescent Lighting Conversion	2015	Not Assigned	Proposed	4.72	$24,898	30	$825	$132	$51,297
4813	Gates Hall	Low Flow Fixture Conversion	2015	Not Assigned	Proposed	4.75	$8,713	3	$2,637	$145	$17,821
4270	Skillman Library	Incandescent to Compact Fluorescent Lighting Conversion	2015	Not Assigned	Proposed	4.89	$15,777	20	$789	$126	$30,837
5137	Williams Center for the Arts, Morris R	Low Flow Fixture Conversion	2015	Not Assigned	Proposed	5.33	$8,619	6	$1,372	$152	$14,819
5029	Oechsle Hall	Low Flow Fixture Conversion	2015	Not Assigned	Proposed	6.17	$8,780	3	$3,189	$175	$11,792
70	McKeen Hall	Chilled/Hot Water Pump VFD Retrofit	2015	Not Assigned	Proposed	6.84	$29,981	34	$873	$204	$33,975
6030	Colton Chapel	Installation of Steam Meter	2015	O & M	Proposed	20.58	$10,392	2	$6,905	$297	($3,342)
6057	Soles Hall	Installation of Steam Meter	2015	O & M	Proposed	48.11	$10,392	1	$16,111	$693	($7,376)
5999	Lerch House	Installation of Electric Meter	2015	O & M	Proposed	48.45	$6,928	1	$6,290	$1,006	($4,862)
5983	Conway House	Installation of Electric Meter	2015	O & M	Proposed	50.20	$6,928	1	$6,533	$1,045	($4,934)
5980	Bailey Health Center	Installation of Electric Meter	2015	O & M	Proposed	52.88	$6,928	1	$6,891	$1,103	($5,035)
6018	Soles Hall	Installation of Electric Meter	2015	O & M	Proposed	54.55	$6,928	1	$7,068	$1,131	($5,093)
5978	Alpha Phi	Installation of Electric Meter	2015	O & M	Proposed	54.98	$6,928	1	$7,151	$1,144	($5,107)
6029	Bourger Football House	Installation of Steam Meter	2015	O & M	Proposed	55.28	$10,392	1	$18,590	$799	($7,767)
5984	DKE - Delta Kappa Epsilon	Installation of Electric Meter	2015	O & M	Proposed	55.87	$6,928	1	$7,270	$1,163	($5,136)
6007	P. T. Farinon	Installation of Electric Meter	2015	O & M	Proposed	56.79	$6,928	1	$7,367	$1,179	($5,165)
6011	Pi Beta Phi	Installation of Electric Meter	2015	O & M	Proposed	62.41	$6,928	1	$8,091	$1,295	($5,324)
6043	Lerch House	Installation of Steam Meter	2015	O & M	Proposed	65.36	$10,392	0	$21,970	$945	($8,172)
6001	Maroon Weight Training Facility	Installation of Electric Meter	2015	O & M	Proposed	67.92	$6,928	1	$8,828	$1,413	($5,454)
6032	Farber Hall	Installation of Steam Meter	2015	O & M	Proposed	72.17	$10,392	0	$24,167	$1,039	($8,382)
6010	Phi Gamma Delta - Fiji	Installation of Electric Meter	2015	O & M	Proposed	79.63	$6,928	1	$10,407	$1,665	($5,671)
6012	Plant Operations	Installation of Electric Meter	2015	O & M	Proposed	83.47	$6,928	1	$10,852	$1,736	($5,729)
6051	Plant Operations	Installation of Steam Meter	2015	O & M	Proposed	102.89	$10,392	0	$34,524	$1,485	($8,982)
	Totals/Averages					**31.25**	**$377,849**	**324**	**$ 6,475**	**$ 593**	**$ 639,960**

Lafayette College Climate Action Plan: 2016 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
4918	Hogg Hall	Incandescent to Compact Fluorescent Lighting Conversion	2016	Not Assigned	Proposed	1.85	$1,834	6	$287	$46	$12,494
5950	Plant Operations	Incandescent to Compact Fluorescent Lighting Conversion	2016	Not Assigned	Proposed	1.88	$346	1	$317	$51	$2,317
4954	Phi Gamma Delta - Fiji	Incandescent to Compact Fluorescent Lighting Conversion	2016	Not Assigned	Proposed	2.25	$2,549	7	$384	$61	$13,895
4546	Plant Operations	T8 to High Efficiency T8 Lighting Conversion	2016	Not Assigned	Proposed	2.79	$1,649	4	$456	$73	$6,892
4942	Phi Gamma Delta - Fiji	T8 to High Efficiency T8 Lighting Conversion	2016	Not Assigned	Proposed	4.26	$545	1	$809	$129	$1,311
4957	Phi Gamma Delta - Fiji	Low Flow Fixture Conversion	2016	Not Assigned	Proposed	4.89	$6,243	5	$1,366	$159	$12,347
160	Power Plant	Supply & Installation of Boiler Feedwater Economizers	2016	Not Assigned	Proposed	5.12	$301,814	241	$1,251	$69	$521,913
6058	South College - Jesser Hall	Installation of Steam Meter	2016	O & M	Proposed	15.65	$10,392	2	$5,254	$226	($1,122)
6037	Hogg Hall	Installation of Steam Meter	2016	O & M	Proposed	28.79	$10,392	1	$9,667	$416	($5,352)
6061	William E. Simon Center for Economics	Installation of Steam Meter	2016	O & M	Proposed	72.17	$10,392	0	$24,167	$1,039	($8,382)
5994	Kappa Delta Rho	Installation of Electric Meter	2016	O & M	Proposed	84.49	$6,928	1	$10,927	$1,748	($5,743)
5992	Hogg Hall	Installation of Electric Meter	2016	O & M	Proposed	85.53	$6,928	1	$11,099	$1,776	($5,757)
6028	Bailey Health Center	Installation of Steam Meter	2016	O & M	Proposed	102.89	$10,392	0	$34,524	$1,485	($8,982)
6021	Watson Courts	Installation of Electric Meter	2016	O & M	Proposed	117.42	$6,928	0	$15,248	$2,440	($6,075)
6055	Scott Hall	Installation of Steam Meter	2016	O & M	Proposed	358.34	$10,392	0	$120,835	$5,196	($9,987)
	Totals/Averages					**59.22**	**$387,722**	**270**	**$ 15,773**	**$ 994**	**$ 519,769**

Lafayette College Climate Action Plan: 2017 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
4922	Hogg Hall	Steam Trap Inspection and Replacement	2017	Not Assigned	Proposed	2.69	$26,741	30	$901	$39	$112,259
4886	Soles Hall	Steam Trap Inspection and Replacement	2017	Not Assigned	Proposed	2.98	$46,544	47	$999	$43	$171,818
5494	Williams Visual Arts Building	Incandescent to Compact Fluorescent Lighting Conversion	2017	Not Assigned	Proposed	3.35	$48,031	75	$638	$102	$159,339
6066	Williams Visual Arts Building	Installation of Occupancy Sensors	2017	Not Assigned	Proposed	4.44	$9,180	9	$984	$157	$20,704
3553	Markle Hall	Low Flow Fixture Conversion	2017	Not Assigned	Proposed	5.32	$8,965	7	$1,342	$148	$15,448
3538	Markle Hall	T8 to High Efficiency T8 Lighting Conversion	2017	Not Assigned	Proposed	5.39	$8,459	9	$919	$147	$14,278
185	Markle Hall	DOAS System Installation	2017	Not Assigned	Proposed	6.32	$175,592	85	$2,060	$94	$213,013
56	Farinon College Center, William B	VFD Installation on Pumps	2017	Not Assigned	Proposed	6.82	$29,981	34	$891	$245	$34,433
4490	William E. Simon Center for Economics	Steam Trap Inspection and Replacement	2017	Not Assigned	Proposed	6.93	$24,959	11	$2,324	$100	$25,353
183	Kirby House	Kitchen Exhaust Energy Mgmt System Installation	2017	Not Assigned	Proposed	6.99	$12,407	10	$1,236	$139	$13,073
	Totals/Averages					**5.12**	**$390,858**	**316**	**$ 1,230**	**$ 121**	**$ 779,720**

Lafayette College Climate Action Plan: 2018 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
4882	Soles Hall	Incandescent to Compact Fluorescent Lighting Conversion	2018	Not Assigned	Proposed	2.31	$924	2	$387	$62	$4,868
4013	2 West Campus	Incandescent to Compact Fluorescent Lighting Conversion	2018	Not Assigned	Proposed	2.44	$923	2	$377	$60	$4,555
3910	Conway House	Incandescent to Compact Fluorescent Lighting Conversion	2018	Not Assigned	Proposed	2.58	$3,424	9	$396	$63	$15,771
4990	Kirby House	Incandescent to Compact Fluorescent Lighting Conversion	2018	Not Assigned	Proposed	2.71	$2,915	6	$463	$74	$12,671
4306	Van Wickle Hall	Incandescent to Compact Fluorescent Lighting Conversion	2018	Not Assigned	Proposed	3.23	$6,759	13	$539	$86	$23,482
4885	Soles Hall	Low Flow Fixture Conversion	2018	Not Assigned	Proposed	3.97	$7,482	7	$1,040	$115	$19,857
4021	2 West Campus	Low Flow Fixture Conversion	2018	Not Assigned	Proposed	4.01	$10,899	6	$1,844	$101	$28,250
4870	Soles Hall	T8 to High Efficiency T8 Lighting Conversion	2018	Not Assigned	Proposed	4.25	$132	0	$691	$111	$317
5818	4 West Campus	Incandescent to Compact Fluorescent Lighting Conversion	2018	Not Assigned	Proposed	4.38	$6,712	10	$693	$111	$15,422
4993	Kirby House	Low Flow Fixture Conversion	2018	Not Assigned	Proposed	4.46	$11,158	10	$1,165	$129	$25,175
4630	Watson Courts	Incandescent to Compact Fluorescent Lighting Conversion	2018	Not Assigned	Proposed	5.22	$28,106	33	$840	$134	$49,772
3658	Olin-Hugel Science Center	Incandescent to Compact Fluorescent Lighting Conversion	2018	Not Assigned	Proposed	5.37	$7,172	8	$927	$148	$12,130
3610	Watson Hall	T8 to High Efficiency T8 Lighting Conversion	2018	Not Assigned	Proposed	6.11	$1,411	1	$1,083	$173	$1,941
5755	Rubin Hall	Air Handling Unit Controls	2018	Not Assigned	Proposed	6.48	$6,653	6	$1,073	$172	$8,187
4987	Kirby House	Installation of Roof Insulation	2018	Not Assigned	Proposed	6.59	$4,581	2	$2,133	$100	$5,151
4418	Colton Chapel	Steam Trap Inspection and Replacement	2018	Not Assigned	Proposed	6.76	$20,307	9	$2,269	$98	$21,615
4762	McKeen Hall	T8 to High Efficiency T8 Lighting Conversion	2018	Not Assigned	Proposed	6.77	$6,125	5	$1,180	$189	$6,992
5563	Kappa Delta Rho	Installation of Roof Insulation	2018	Not Assigned	Proposed	7.23	$4,975	3	$1,685	$102	$4,663
6067	Oechsle Hall	Installation of Occupancy Sensors	2018	Not Assigned	Proposed	7.24	$18,244	16	$1,129	$181	$18,222
3626	Watson Hall	Steam Trap Inspection and Replacement	2018	Not Assigned	Proposed	7.40	$57,760	23	$2,482	$107	$51,239
5224	APK Sports Center	Variable Primary Flow on Chilled Water Pumps	2018	Not Assigned	Proposed	7.42	$124,108	97	$1,273	$204	$117,539
4330	South College - Jesser Hall	T8 to High Efficiency T8 Lighting Conversion	2018	Not Assigned	Proposed	7.87	$24,575	19	$1,312	$210	$20,656
4310	Van Wickle Hall	Steam Trap Inspection and Replacement	2018	Not Assigned	Proposed	8.02	$35,329	13	$2,692	$116	$26,165
	Totals/Averages					**5.34**	**$390,674**	**302**	**$ 1,203**	**$ 124**	**$ 494,642**

Lafayette College Climate Action Plan: 2019 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
5569	Kappa Delta Rho	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	2.91	$3,711	5	$812	$94	$14,878
3946	Alpha Phi	Incandescent to Compact Fluorescent Lighting Conversion	2019	Not Assigned	Proposed	2.99	$2,014	4	$467	$75	$7,729
3982	Pi Beta Phi	Incandescent to Compact Fluorescent Lighting Conversion	2019	Not Assigned	Proposed	2.99	$2,014	4	$467	$75	$7,729
4597	Farinon College Center, William B	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	4.07	$7,986	3	$2,436	$134	$20,445
3802	DKE - Delta Kappa Epsilon	Incandescent to Compact Fluorescent Lighting Conversion	2019	Not Assigned	Proposed	4.18	$6,887	10	$684	$109	$16,953
3874	P. T. Farinon	Incandescent to Compact Fluorescent Lighting Conversion	2019	Not Assigned	Proposed	4.27	$3,441	5	$678	$108	$8,212
4777	McKeen Hall	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	4.95	$19,239	7	$2,748	$151	$37,000
3841	Lerch House	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	5.52	$9,628	4	$2,395	$132	$15,421
4921	Hogg Hall	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	6.26	$2,324	1	$1,672	$180	$3,054
5495	Williams Visual Arts Building	Metal Halide to Compact Fluorescent Lighting Conversion	2019	Not Assigned	Proposed	6.45	$1,019	1	$1,515	$242	$1,284
4705	Fretz House	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	6.60	$1,939	1	$1,714	$200	$2,333
4093	Easton Hall	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	6.69	$18,367	6	$2,984	$164	$21,113
4906	Hogg Hall	T8 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	6.97	$1,714	1	$1,277	$204	$1,853
5857	Bourger Football House	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	7.07	$11,510	3	$4,532	$249	$12,145
4129	Marquis Hall	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	7.10	$19,731	6	$3,083	$170	$20,157
3913	Conway House	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	7.31	$9,659	3	$3,613	$199	$9,399
5935	Kamine	Air Handling Unit Controls	2019	Not Assigned	Proposed	7.49	$6,048	5	$1,234	$197	$5,613
3625	Watson Hall	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	7.62	$52,984	14	$3,768	$207	$47,296
5027	Oechsle Hall	Metal Halide to Compact Fluorescent Lighting Conversion	2019	Not Assigned	Proposed	7.64	$4,571	2	$2,096	$335	$4,182
177	Farinon College Center, William B	Kitchen Exhaust Energy Mgmt System Installation	2019	Not Assigned	Proposed	7.68	$9,932	9	$1,141	$183	$8,821
3985	Pi Beta Phi	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	7.95	$7,911	2	$4,075	$224	$6,460
5957	McKeen Hall	Installation of Occupancy Sensors	2019	Not Assigned	Proposed	8.01	$7,120	6	$1,261	$202	$5,754
3659	Olin-Hugel Science Center	Metal Halide to Compact Fluorescent Lighting Conversion	2019	Not Assigned	Proposed	8.15	$18,066	8	$2,148	$344	$14,324
5821	4 West Campus	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	8.25	$10,899	3	$4,009	$221	$8,149
4633	Watson Courts	Low Flow Fixture Conversion	2019	Not Assigned	Proposed	8.36	$31,178	8	$4,130	$227	$22,633
5134	Williams Center for the Arts, Morris R	Incandescent to Compact Fluorescent Lighting Conversion	2019	Not Assigned	Proposed	8.43	$15,500	8	$1,899	$304	$11,275
4951	Phi Gamma Delta - Fiji	Installation of Roof Insulation	2019	Not Assigned	Proposed	8.44	$5,848	3	$2,047	$113	$3,828
5806	4 West Campus	T8 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	8.44	$1,790	1	$1,461	$234	$1,282
5805	4 West Campus	T12 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	8.68	$1,736	1	$1,477	$236	$1,158
5959	Pfenning Alumni Center	Installation of Occupancy Sensors	2019	Not Assigned	Proposed	8.89	$9,344	6	$1,623	$260	$5,861
4879	Soles Hall	Installation of Roof Insulation	2019	Not Assigned	Proposed	8.97	$5,177	2	$3,010	$129	$2,878
5662	Fisher Hall West	T8 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	9.23	$9,539	6	$1,607	$257	$5,445
4977	Kirby House	T12 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	9.26	$2,953	2	$1,592	$255	$1,666
4366	Ruef Hall	T8 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	9.39	$8,132	5	$1,711	$274	$4,426
3898	Conway House	T8 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	9.57	$3,016	2	$1,702	$272	$1,549
4078	Easton Hall	T8 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	9.62	$6,572	4	$1,717	$275	$3,325
4797	Gates Hall	T12 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	9.68	$1,830	1	$1,517	$243	$904
4811	Gates Hall	Metal Halide to Compact Fluorescent Lighting Conversion	2019	Not Assigned	Proposed	9.91	$476	0	$2,077	$332	$225
4905	Hogg Hall	T12 to High Efficiency T8 Lighting Conversion	2019	Not Assigned	Proposed	10.05	$11,154	7	$1,679	$269	$4,908
	Totals/Averages					**7.33**	**$352,957**	**168**	**$ 2,053**	**$ 207**	**$ 371,664**

Lafayette College Climate Action Plan: 2020 ECM Projects

ECM ID	Building	Project Title	Scheduled For	Funding Strategy*	Status	Pay Back	Estimated Construction Cost	MT CO2e Saved	$/MTCO2e Saved	$/mmbtu Saved	NPV
5914	Kamine	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	9.98	$11,264	6	$1,759	$281	$5,099
6068	Rubin Hall	Installation of Occupancy Sensors	2020	Not Assigned	Proposed	10.28	$7,247	5	$1,562	$250	$2,941
5389	McCracken Field House - Metzgar Fields	Low Flow Fixture Conversion	2020	Not Assigned	Proposed	10.34	$14,690	3	$4,670	$257	$5,750
3922	Conway House	Installation of Occupancy Sensors	2020	Not Assigned	Proposed	10.36	$3,866	2	$1,599	$256	$1,525
5770	Fisher Hall East	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	10.40	$11,249	6	$1,834	$293	$4,434
5734	Rubin Hall	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	10.45	$8,265	5	$1,834	$293	$3,200
4561	Plant Operations	Low Flow Fixture Conversion	2020	Not Assigned	Proposed	10.48	$3,229	1	$2,719	$301	$1,239
3516	Kirby Hall of Civil Rights	Discharge Air Temperature Reset	2020	Not Assigned	Proposed	10.54	$9,126	6	$1,442	$215	$3,359
5446	Keefe Hall	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	10.57	$9,260	5	$1,839	$294	$3,436
3622	Watson Hall	Incandescent to Compact Fluorescent Lighting Conversion	2020	Not Assigned	Proposed	10.59	$6,776	4	$1,832	$293	$2,484
3733	Farber Hall	Low Flow Fixture Conversion	2020	Not Assigned	Proposed	10.71	$30,643	7	$4,550	$250	$10,434
4006	2 West Campus	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	10.77	$1,249	1	$1,844	$295	$433
5963	Williams Center for the Arts, Morris R	Installation of Occupancy Sensors	2020	Not Assigned	Proposed	10.83	$20,025	12	$1,715	$274	$6,734
3862	P. T. Farinon	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	10.88	$3,102	2	$1,942	$311	$1,030
64	Williams Center for the Arts, Morris R	VFD Installation for Pumps	2020	Not Assigned	Proposed	11.11	$49,968	31	$1,600	$291	$15,240
4775	McKeen Hall	Metal Halide to Compact Fluorescent Lighting Conversion	2020	Not Assigned	Proposed	11.18	$537	0	$2,344	$375	$164
5063	Pfenning Alumni Center	Metal Halide to Compact Fluorescent Lighting Conversion	2020	Not Assigned	Proposed	11.31	$10,960	4	$3,077	$492	$3,164
5951	Farinon College Center, William B	Installation of Occupancy Sensors	2020	Not Assigned	Proposed	11.39	$21,805	10	$2,101	$336	$6,016
3742	Farber Hall	Installation of Occupancy Sensors	2020	Not Assigned	Proposed	11.55	$8,213	5	$1,789	$286	$2,062
4258	Skillman Library	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	11.75	$14,617	7	$2,119	$339	$3,420
5374	McCracken Field House - Metzgar Fields	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	11.83	$7,985	3	$2,303	$369	$1,803
3877	P. T. Farinon	Low Flow Fixture Conversion	2020	Not Assigned	Proposed	11.88	$12,609	2	$5,843	$321	$2,695
5698	Scott Hall	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	11.93	$4,080	2	$2,100	$336	$879
4293	Van Wickle Hall	T12 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	12.17	$6,886	4	$1,917	$307	$1,302
4869	Soles Hall	T12 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	12.22	$1,332	1	$1,987	$318	$245
5065	Pfenning Alumni Center	Low Flow Fixture Conversion	2020	Not Assigned	Proposed	12.23	$3,058	0	$6,526	$359	$557
4201	Kirby Hall of Civil Rights	Low Flow Fixture Conversion	2020	Not Assigned	Proposed	12.71	$2,872	0	$7,072	$613	$436
4978	Kirby House	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	12.73	$10,056	4	$2,274	$364	$1,416
3586	Acopian Engineering Center	Incandescent to Compact Fluorescent Lighting Conversion	2020	Not Assigned	Proposed	12.81	$410	0	$2,029	$325	$53
3682	Kunkel Hall	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	12.83	$4,015	2	$2,622	$420	$531
4114	Marquis Hall	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	12.85	$11,272	5	$2,367	$379	$1,448
5194	APK Sports Center	T8 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	12.85	$57,431	25	$2,317	$371	$7,344
3789	DKE - Delta Kappa Epsilon	T12 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	12.91	$942	0	$2,303	$368	$114
6069	4 West Campus	Installation of Occupancy Sensors	2020	Not Assigned	Proposed	13.05	$1,931	1	$1,988	$318	$208
4113	Marquis Hall	T12 to High Efficiency T8 Lighting Conversion	2020	Not Assigned	Proposed	13.34	$22,573	10	$2,189	$350	$1,910
	Totals/Averages					**11.54**	**$393,545**	**181**	**$ 2,572**	**$ 329**	**$ 103,104**

Year	Estimated Construction Cost	MT CO2e Saved
2008	Funded	3199
2009	N/A	-149
Pre-CAP Subtotal	$ 141,491	3050
2010	$ 141,491	170
2011	$ 62,308	76
2012	$ 393,263	625
2013	$ 394,156	501
2014	$ 388,272	374
2015	$ 377,849	324
2016	$ 387,722	270
2017	$ 390,858	316
2018	$ 390,674	302
2019	$ 352,957	168
2020	$ 393,545	181
CAP Subtotal	$ 3,531,605	3,306
Plan Total	$ 3,814,588	6,356

2007 Emissions:	31,758
2021 Emissions:	25,402
Percent Reduction 2007 - 2021:	20%

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
21	Markle Hall	Electrical Systems	Metal Halide to Photocell Lighting Conversion	3.31	2.17	$942.53	$285.00	$433.88
53	Farinon College Center, William B	HVAC	VFD Installation on AHU #1	4.89	39.72	$29,980.80	$6,127.00	$754.78
56	Farinon College Center, William B	HVAC	VFD Installation on Pumps	6.82	33.64	$29,980.80	$4,399.00	$891.21
58	Farinon College Center, William B	HVAC	Reciprocating Chiller Replacement	67.10	15.99	$287,316.00	$4,282.00	$17,972.91
61	Williams Center for the Arts, Morris R	HVAC	Chiller Replacement	33.60	48.90	$274,824.00	$8,179.00	$5,619.70
62	Williams Center for the Arts, Morris R	HVAC	Demand Control Ventilation	5.61	1.70	$9,993.60	$1,781.00	$5,868.68
64	Williams Center for the Arts, Morris R	HVAC	VFD Installation for Pumps	11.11	31.23	$49,968.00	$4,497.00	$1,600.01
69	McKeen Hall	HVAC	Outdoor Air Mechanical Room Louver Repairs	1.34	27.79	$12,492.00	$9,323.00	$449.58
70	McKeen Hall	HVAC	Chilled/Hot Water Pump VFD Retrofit	6.84	34.33	$29,980.80	$4,381.00	$873.20
78	Oechsle Hall	HVAC	Recommission VFD Chilled Water Pump	4.25	31.00	$18,738.00	$4,412.00	$604.54
80	Oechsle Hall	HVAC	HVAC System Occupancy Control	6.10	2.53	$3,747.60	$614.00	$1,482.79
89	Kappa Delta Rho	HVAC	Air Source Heat Pump Installation	23.91	-0.29	$49,968.00	$2,090.00	($173,139.15)
97	Grossman House-Phi Gamma Delta - Fiji	HVAC	Air Source Heat Pump Installation	21.07	9.02	$74,952.00	$3,558.00	$8,310.38
117	Markle Hall	HVAC	Chiller Replacement	56.60	4.42	$126,169.20	$2,229.00	$28,566.43
118	Markle Hall	HVAC	VFD Installation for Tower Fan	69.40	0.68	$12,492.00	$180.00	$18,418.49
119	Markle Hall	HVAC	VFD Installation for Pumps	5.48	24.59	$14,990.40	$2,736.00	$609.61
160	Power Plant	HVAC	Supply & Installation of Boiler Feedwater Economizers	5.12	241.35	$301,813.59	$58,993.00	$1,250.52
161	Power Plant	HVAC	Supply & Installation of Oxygen Trim System	3.47	80.44	$68,662.28	$19,796.00	$853.53
162	Williams Center for the Arts, Morris R	HVAC	AHU #1 System VAV Modification w/VFD control	23.93	40.05	$187,380.00	$7,829.00	$4,678.53
167	Markle Hall	HVAC	Direct Digital Control Installation for HVAC	27.33	55.64	$323,667.72	$11,845.00	$5,816.98
171	Williams Center for the Arts, Morris R	HVAC	Direct Digital Control Installation for HVAC	38.64	40.28	$294,811.20	$7,629.00	$7,318.41
174	Fretz House	HVAC	Air Source Heat Pump Installation	28.09	0.83	$74,952.00	$2,668.00	$90,168.01
177	Farinon College Center, William B	HVAC	Kitchen Exhaust Energy Mgmt System Installation	7.68	8.71	$9,932.39	$1,293.00	$1,140.68
183	Kirby House	HVAC	Kitchen Exhaust Energy Mgmt System Installation	6.99	10.04	$12,407.05	$1,775.00	$1,235.86
184	Power Plant	HVAC	Condensate Tank Insulation Installation	4.06	25.00	$24,734.99	$6,089.00	$989.59
185	Markle Hall	Comprehensive Renovation	DOAS System Installation	6.32	85.22	$175,591.72	$27,789.00	$2,060.49
186	Power Plant	HVAC	Power Factor Improvement	0.41	0.00	$3,123.00	$7,604.00	$0.00
3464	Acopian Engineering Center	HVAC	AHU Discharge Air Temperature Reset	2.84	54.56	$41,068.30	$14,448.00	$752.69
3468	APK Sports Center	HVAC	Air Handling Unit Economizer Programming	26.25	14.37	$53,496.56	$2,038.00	$3,723.19
3476	Olin-Hugel Science Center	HVAC	Carbon Dioxide Control in Lecture Halls	28.06	1.36	$19,191.42	$684.00	$14,090.70
3489	Kirby Hall of Civil Rights	HVAC	Carbon Dioxide Control in Large Rooms	19.23	19.21	$101,473.68	$5,276.00	$5,283.53
3490	Kirby Hall of Civil Rights	HVAC	Hot Water Pump VFD Installation	123.34	4.93	$48,594.16	$394.00	$9,856.91
3497	Scott Hall	HVAC	Carbon Dioxide Control in Large Rooms	67.23	0.78	$10,555.28	$157.00	$13,581.22
3513	APK Sports Center	HVAC	Glycol Heat Recovery Loop Installation	7.89	146.67	$407,766.62	$51,674.00	$2,780.09
3514	Easton Hall	HVAC	Ventilation Reclaim Wheel Installation	22.24	10.84	$82,317.60	$3,701.00	$7,591.34
3515	Colton Chapel	HVAC	Ventilation Control in Large Rooms	3.69	27.07	$39,899.78	$10,800.00	$1,473.88
3516	Kirby Hall of Civil Rights	HVAC	Discharge Air Temperature Reset	10.54	6.33	$9,126.29	$866.00	$1,441.59
3517	Olin-Hugel Science Center	HVAC	Lab Supply/Exhaust Constant Volume Box Control Upgrades	11.45	161.74	$443,382.72	$38,728.00	$2,741.38
3531	APK Sports Center	HVAC	Natatorium Heat Recovery Installation	8.95	289.32	$726,039.21	$81,110.00	$2,509.46
3537	Markle Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	16.01	10.73	$30,072.50	$1,878.00	$2,803.58
3538	Markle Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	5.39	9.20	$8,459.17	$1,570.00	$919.44
3550	Markle Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	1.17	21.65	$3,925.58	$3,347.00	$181.28
3553	Markle Hall	Plumbing Systems	Low Flow Fixture Conversion	5.32	6.68	$8,964.68	$1,684.00	$1,342.10
3555	Markle Hall	HVAC	Window Replacement	31.15	14.15	$135,085.84	$4,337.00	$9,547.67
3573	Acopian Engineering Center	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	138.45	0.02	$415.35	$3.00	$19,285.12
3574	Acopian Engineering Center	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	13.29	17.29	$41,994.62	$3,160.00	$2,428.48
3586	Acopian Engineering Center	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	12.81	0.20	$409.85	$32.00	$2,029.46
3589	Acopian Engineering Center	Plumbing Systems	Low Flow Fixture Conversion	31.18	0.66	$15,246.82	$489.00	$22,952.25
3590	Acopian Engineering Center	HVAC	Steam Trap Inspection and Replacement	1.10	5.37	$1,977.59	$1,802.00	$368.31
3595	Acopian Engineering Center	HVAC	Air Handling Unit Controls	0.11	59.76	$1,385.57	$12,209.00	$23.18

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
3598	Acopian Engineering Center	Electrical Systems	Installation of Occupancy Sensors	35.93	5.95	$34,784.45	$968.00	$5,841.63
3602	Acopian Engineering Center	HVAC	Fan Coil Unit Temperature Setback	0.22	37.65	$1,385.57	$6,179.00	$36.80
3604	Acopian Engineering Center	HVAC	Variable Primary Flow on Chilled Water Pumps	35.71	18.75	$114,733.59	$3,213.00	$6,118.17
3609	Watson Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	26.51	3.43	$15,799.51	$596.00	$4,612.22
3610	Watson Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	6.11	1.30	$1,411.38	$231.00	$1,082.51
3622	Watson Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	10.59	3.70	$6,776.45	$640.00	$1,831.86
3625	Watson Hall	Plumbing Systems	Low Flow Fixture Conversion	7.62	14.06	$52,984.24	$6,951.00	$3,768.45
3626	Watson Hall	HVAC	Steam Trap Inspection and Replacement	7.40	23.27	$57,760.28	$7,808.00	$2,482.42
3627	Watson Hall	HVAC	Window Replacement	66.79	12.86	$255,928.94	$3,832.00	$19,900.94
3628	Watson Hall	HVAC	Package Terminal Air Conditioning Installation	65.58	28.04	$616,298.17	$9,397.00	$21,978.45
3629	Watson Hall	HVAC	Ground Source Heat Pump Installation	79.54	39.07	$910,067.06	$11,441.00	$23,291.94
3630	Watson Hall	HVAC	Air Source Heat Pump Installation	53.40	40.12	$616,297.12	$11,541.00	$15,360.34
3634	Watson Hall	Electrical Systems	Installation of Occupancy Sensors	22.90	1.47	$5,313.91	$232.00	$3,624.68
3646	Olin-Hugel Science Center	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	17.29	18.34	$63,176.81	$3,654.00	$3,445.11
3658	Olin-Hugel Science Center	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	5.37	7.74	$7,172.34	$1,335.00	$927.24
3659	Olin-Hugel Science Center	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	8.15	8.41	$18,065.63	$2,217.00	$2,147.99
3661	Olin-Hugel Science Center	Plumbing Systems	Low Flow Fixture Conversion	48.24	0.29	$10,275.67	$213.00	$35,600.64
3662	Olin-Hugel Science Center	HVAC	Steam Trap Inspection and Replacement	1.58	10.14	$5,367.51	$3,404.00	$529.21
3670	Olin-Hugel Science Center	Electrical Systems	Installation of Occupancy Sensors	22.04	14.78	$52,177.48	$2,367.00	$3,529.84
3676	Olin-Hugel Science Center	HVAC	Variable Primary Flow on Chilled Water Pumps	18.30	41.20	$112,336.56	$6,140.00	$2,726.86
3681	Kunkel Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	14.09	26.00	$61,956.82	$4,397.00	$2,382.70
3682	Kunkel Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	12.83	1.53	$4,015.45	$313.00	$2,622.28
3694	Kunkel Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	4.18	23.84	$15,468.25	$3,700.00	$648.72
3695	Kunkel Hall	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	7.49	0.79	$1,527.89	$204.00	$1,923.75
3697	Kunkel Hall	Plumbing Systems	Low Flow Fixture Conversion	92.76	0.23	$15,677.11	$169.00	$68,159.18
3698	Kunkel Hall	HVAC	Steam Trap Inspection and Replacement	1.03	5.37	$1,859.36	$1,802.00	$346.29
3706	Kunkel Hall	Electrical Systems	Installation of Occupancy Sensors	23.68	6.61	$25,247.74	$1,066.00	$3,818.75
3717	Farber Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	7.04	8.40	$9,102.17	$1,293.00	$1,083.62
3730	Farber Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.78	31.30	$13,591.04	$4,893.00	$434.28
3733	Farber Hall	Plumbing Systems	Low Flow Fixture Conversion	10.71	6.73	$30,643.29	$2,862.00	$4,550.11
3734	Farber Hall	HVAC	Steam Trap Inspection and Replacement	1.06	5.37	$1,909.88	$1,802.00	$355.70
3736	Farber Hall	HVAC	Package Terminal Air Conditioning Installation	66.46	9.09	$220,449.41	$3,317.00	$24,257.32
3737	Farber Hall	HVAC	Ground Source Heat Pump Installation	84.27	11.36	$325,530.29	$3,863.00	$28,650.40
3738	Farber Hall	HVAC	Air Source Heat Pump Installation	56.19	11.88	$220,449.42	$3,923.00	$18,557.11
3742	Farber Hall	Electrical Systems	Installation of Occupancy Sensors	11.55	4.59	$8,213.29	$711.00	$1,788.67
3753	Ramer Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	18.12	0.61	$1,884.43	$104.00	$3,083.69
3766	Ramer Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	3.94	3.77	$2,433.63	$617.00	$646.13
3769	Ramer Hall	Plumbing Systems	Low Flow Fixture Conversion	2.97	6.01	$7,856.19	$2,645.00	$1,307.76
3770	Ramer Hall	HVAC	Steam Trap Inspection and Replacement	1.00	5.37	$1,797.81	$1,802.00	$334.82
3789	DKE - Delta Kappa Epsilon	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	12.91	0.41	$942.22	$73.00	$2,303.05
3802	DKE - Delta Kappa Epsilon	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	4.18	10.07	$6,887.31	$1,649.00	$683.98
3805	DKE - Delta Kappa Epsilon	Plumbing Systems	Low Flow Fixture Conversion	17.08	0.23	$13,423.41	$786.00	$58,634.01
3807	DKE - Delta Kappa Epsilon	HVAC	Window Replacement	29.95	2.21	$73,208.30	$2,444.00	$33,147.57
3808	DKE - Delta Kappa Epsilon	HVAC	Package Terminal Air Conditioning Installation	33.42	-0.13	$154,182.49	$4,613.00	($1,152,591.35)
3809	DKE - Delta Kappa Epsilon	HVAC	Ground Source Heat Pump Installation	43.84	2.49	$227,676.14	$5,193.00	$91,440.91
3810	DKE - Delta Kappa Epsilon	HVAC	Air Source Heat Pump Installation	29.92	2.48	$154,182.49	$5,154.00	$62,254.29

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
3814	DKE - Delta Kappa Epsilon	Electrical Systems	Installation of Occupancy Sensors	19.82	1.30	$3,865.84	$195.00	$2,971.77
3825	Lerch House	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	31.43	0.12	$628.68	$20.00	$5,308.55
3826	Lerch House	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	13.71	0.85	$2,234.32	$163.00	$2,618.00
3838	Lerch House	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	3.81	0.13	$83.92	$22.00	$639.67
3841	Lerch House	Plumbing Systems	Low Flow Fixture Conversion	5.52	4.02	$9,628.46	$1,744.00	$2,394.53
3842	Lerch House	HVAC	Steam Trap Inspection and Replacement	0.96	5.37	$1,736.26	$1,802.00	$323.36
3843	Lerch House	HVAC	Window Replacement	53.29	5.78	$91,451.85	$1,716.00	$15,816.10
3844	Lerch House	HVAC	Package Terminal Air Conditioning Installation	46.53	7.64	$164,948.53	$3,545.00	$21,583.36
3845	Lerch House	HVAC	Ground Source Heat Pump Installation	46.47	15.47	$243,573.39	$5,241.00	$15,748.65
3846	Lerch House	HVAC	Air Source Heat Pump Installation	36.19	12.31	$164,948.74	$4,558.00	$13,396.29
3850	Lerch House	Electrical Systems	Installation of Occupancy Sensors	36.62	1.81	$10,144.59	$277.00	$5,591.47
3861	P. T. Farinon	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	32.96	0.49	$2,768.47	$84.00	$5,670.88
3862	P. T. Farinon	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	10.88	1.60	$3,101.87	$285.00	$1,941.82
3874	P. T. Farinon	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	4.27	5.07	$3,440.65	$806.00	$677.98
3877	P. T. Farinon	Plumbing Systems	Low Flow Fixture Conversion	11.88	2.16	$12,608.70	$1,061.00	$5,843.23
3879	P. T. Farinon	HVAC	Window Replacement	49.47	5.56	$66,043.23	$1,335.00	$11,874.00
3880	P. T. Farinon	HVAC	Package Terminal Air Conditioning Installation	40.29	11.03	$139,295.57	$3,457.00	$12,630.71
3881	P. T. Farinon	HVAC	Ground Source Heat Pump Installation	43.62	17.31	$205,693.43	$4,716.00	$11,885.03
3882	P. T. Farinon	HVAC	Air Source Heat Pump Installation	32.18	15.17	$139,294.77	$4,328.00	$9,180.06
3886	P. T. Farinon	Electrical Systems	Installation of Occupancy Sensors	13.57	3.43	$7,246.83	$534.00	$2,114.01
3897	Conway House	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	23.34	0.52	$2,054.13	$88.00	$3,974.93
3898	Conway House	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	9.57	1.77	$3,015.54	$315.00	$1,702.45
3910	Conway House	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.58	8.64	$3,424.42	$1,328.00	$396.40
3913	Conway House	Plumbing Systems	Low Flow Fixture Conversion	7.31	2.67	$9,658.69	$1,321.00	$3,612.52
3915	Conway House	HVAC	Window Replacement	33.21	7.72	$60,548.25	$1,823.00	$7,840.61
3916	Conway House	HVAC	Package Terminal Air Conditioning Installation	24.46	15.39	$100,473.89	$4,107.00	$6,530.42
3917	Conway House	HVAC	Ground Source Heat Pump Installation	29.27	19.88	$148,366.44	$5,069.00	$7,461.92
3918	Conway House	HVAC	Air Source Heat Pump Installation	20.72	18.94	$100,473.88	$4,850.00	$5,304.86
3922	Conway House	Electrical Systems	Installation of Occupancy Sensors	10.36	2.42	$3,865.84	$373.00	$1,599.13
3934	Alpha Phi	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	14.87	0.77	$2,274.61	$153.00	$2,956.61
3946	Alpha Phi	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.99	4.32	$2,014.04	$674.00	$466.63
3949	Alpha Phi	Plumbing Systems	Low Flow Fixture Conversion	15.87	1.42	$10,932.16	$689.00	$7,723.33
3951	Alpha Phi	HVAC	Window Replacement	40.19	6.81	$65,632.08	$1,633.00	$9,630.54
3952	Alpha Phi	HVAC	Package Terminal Air Conditioning Installation	37.25	14.76	$160,678.06	$4,313.00	$10,886.34
3953	Alpha Phi	HVAC	Ground Source Heat Pump Installation	45.36	18.83	$237,268.39	$5,231.00	$12,598.96
3954	Alpha Phi	HVAC	Air Source Heat Pump Installation	30.74	19.14	$160,678.83	$5,227.00	$8,395.77
3958	Alpha Phi	Electrical Systems	Installation of Occupancy Sensors	40.78	0.96	$6,280.37	$154.00	$6,550.64
3970	Pi Beta Phi	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	14.87	0.77	$2,274.61	$153.00	$2,957.71
3982	Pi Beta Phi	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.99	4.32	$2,014.04	$674.00	$466.63
3985	Pi Beta Phi	Plumbing Systems	Low Flow Fixture Conversion	7.95	1.94	$7,910.56	$995.00	$4,074.50
3987	Pi Beta Phi	HVAC	Window Replacement	38.23	7.82	$71,521.69	$1,871.00	$9,145.58
3988	Pi Beta Phi	HVAC	Package Terminal Air Conditioning Installation	25.31	17.18	$110,873.46	$4,381.00	$6,454.27
3989	Pi Beta Phi	HVAC	Ground Source Heat Pump Installation	34.63	18.65	$163,724.32	$4,728.00	$8,776.93
3990	Pi Beta Phi	HVAC	Air Source Heat Pump Installation	22.96	19.36	$110,872.96	$4,828.00	$5,725.97
3994	Pi Beta Phi	Electrical Systems	Installation of Occupancy Sensors	40.78	0.96	$6,280.37	$154.00	$6,550.64
4005	2 West Campus	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	23.49	0.61	$2,537.36	$108.00	$4,157.98
4006	2 West Campus	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	10.77	0.68	$1,248.80	$116.00	$1,843.79
4013	2 West Campus	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.44	2.45	$923.10	$379.00	$376.95

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
4021	2 West Campus	Plumbing Systems	Low Flow Fixture Conversion	4.01	5.91	$10,898.90	$2,720.00	$1,844.08
4024	2 West Campus	HVAC	Package Terminal Air Conditioning Installation	35.44	13.54	$122,612.18	$3,460.00	$9,056.54
4025	2 West Campus	HVAC	Ground Source Heat Pump Installation	46.45	15.26	$181,057.95	$3,898.00	$11,861.66
4026	2 West Campus	HVAC	Air Source Heat Pump Installation	31.20	15.73	$122,611.81	$3,930.00	$7,793.18
4030	2 West Campus	Electrical Systems	Installation of Occupancy Sensors	78.77	0.59	$7,246.83	$92.00	$12,288.31
4078	Easton Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	9.62	3.83	$6,572.05	$683.00	$1,716.74
4093	Easton Hall	Plumbing Systems	Low Flow Fixture Conversion	6.69	6.16	$18,367.13	$2,746.00	$2,983.55
4094	Easton Hall	HVAC	Steam Trap Inspection and Replacement	1.36	7.76	$3,537.93	$2,603.00	$456.16
4095	Easton Hall	HVAC	Window Replacement	45.02	6.97	$99,500.74	$2,210.00	$14,279.36
4096	Easton Hall	HVAC	Package Terminal Air Conditioning Installation	124.48	5.71	$373,425.51	$3,000.00	$65,423.93
4097	Easton Hall	HVAC	Ground Source Heat Pump Installation	129.26	11.30	$551,425.01	$4,266.00	$48,812.49
4098	Easton Hall	HVAC	Air Source Heat Pump Installation	92.36	10.49	$373,425.49	$4,043.00	$35,598.90
4102	Easton Hall	Electrical Systems	Installation of Occupancy Sensors	14.24	3.65	$7,730.06	$543.00	$2,119.09
4113	Marquis Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	13.34	10.31	$22,572.80	$1,692.00	$2,189.50
4114	Marquis Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	12.85	4.76	$11,272.32	$877.00	$2,366.91
4126	Marquis Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	4.72	30.16	$24,897.77	$5,270.00	$825.46
4129	Marquis Hall	Plumbing Systems	Low Flow Fixture Conversion	7.10	6.40	$19,730.53	$2,777.00	$3,082.68
4130	Marquis Hall	HVAC	Steam Trap Inspection and Replacement	1.00	5.37	$1,797.81	$1,802.00	$334.82
4131	Marquis Hall	HVAC	Window Replacement	52.41	11.46	$179,194.37	$3,419.00	$15,638.80
4132	Marquis Hall	HVAC	Package Terminal Air Conditioning Installation	54.47	7.48	$136,928.27	$2,514.00	$18,302.09
4133	Marquis Hall	HVAC	Ground Source Heat Pump Installation	44.05	18.85	$202,197.41	$4,590.00	$10,726.80
4134	Marquis Hall	HVAC	Air Source Heat Pump Installation	46.10	9.63	$136,927.52	$2,970.00	$14,216.66
4136	Marquis Hall	Exterior Closure	Weatherstrip Exterior Doors	1.26	3.18	$1,219.76	$969.00	$383.06
4138	Marquis Hall	Electrical Systems	Installation of Occupancy Sensors	32.29	4.73	$24,156.63	$748.00	$5,110.89
4186	Kirby Hall of Civil Rights	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	19.87	0.62	$2,404.09	$121.00	$3,878.30
4198	Kirby Hall of Civil Rights	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	6.08	24.85	$25,341.40	$4,168.00	$1,019.69
4201	Kirby Hall of Civil Rights	Plumbing Systems	Low Flow Fixture Conversion	12.71	0.41	$2,872.12	$226.00	$7,072.46
4202	Kirby Hall of Civil Rights	HVAC	Steam Trap Inspection and Replacement	1.35	15.51	$7,046.66	$5,205.00	$454.28
4207	Kirby Hall of Civil Rights	HVAC	Air Handling Unit Controls	1.11	5.89	$1,259.61	$1,134.00	$213.85
4210	Kirby Hall of Civil Rights	Electrical Systems	Installation of Occupancy Sensors	18.82	4.94	$14,976.89	$796.00	$3,033.13
4258	Skillman Library	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	11.75	6.90	$14,617.33	$1,244.00	$2,119.02
4270	Skillman Library	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	4.89	20.00	$15,776.66	$3,224.00	$788.87
4271	Skillman Library	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	20.64	0.33	$5,325.87	$258.00	$16,003.06
4273	Skillman Library	Plumbing Systems	Low Flow Fixture Conversion	24.06	0.69	$8,494.81	$353.00	$12,243.68
4274	Skillman Library	HVAC	Steam Trap Inspection and Replacement	1.59	12.53	$6,667.34	$4,204.00	$532.18
4282	Skillman Library	Electrical Systems	Installation of Occupancy Sensors	10.29	30.96	$46,863.57	$4,556.00	$1,513.75
4288	Skillman Library	HVAC	Variable Primary Flow on Chilled Water Pumps	39.45	14.41	$97,488.78	$2,471.00	$6,767.43
4293	Van Wickle Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	12.17	3.59	$6,886.43	$566.00	$1,916.88
4294	Van Wickle Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	14.29	4.90	$12,244.90	$857.00	$2,499.93
4306	Van Wickle Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	3.23	12.53	$6,758.76	$2,092.00	$539.23
4309	Van Wickle Hall	Plumbing Systems	Low Flow Fixture Conversion	51.15	0.23	$6,291.88	$123.00	$26,972.47
4310	Van Wickle Hall	HVAC	Steam Trap Inspection and Replacement	8.02	13.13	$35,328.91	$4,405.00	$2,691.66
4311	Van Wickle Hall	HVAC	Window Replacement	33.78	12.29	$94,853.58	$2,808.00	$7,720.23
4318	Van Wickle Hall	Electrical Systems	Installation of Occupancy Sensors	20.26	3.83	$12,562.35	$620.00	$3,278.19
4330	South College - Jesser Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	7.87	18.73	$24,574.67	$3,123.00	$1,312.15
4345	South College - Jesser Hall	Plumbing Systems	Low Flow Fixture Conversion	4.26	20.09	$39,272.12	$9,227.00	$1,954.55
4346	South College - Jesser Hall	HVAC	Steam Trap Inspection and Replacement	0.96	5.37	$1,736.26	$1,802.00	$323.36
4347	South College - Jesser Hall	HVAC	Window Replacement	72.65	7.62	$214,458.54	$2,952.00	$28,137.98
4352	South College - Jesser Hall	Exterior Closure	Weatherstrip Exterior Doors	2.01	0.67	$406.85	$202.00	$608.87

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
4354	South College - Jesser Hall	Electrical Systems	Installation of Occupancy Sensors	25.03	2.49	$9,662.98	$386.00	$3,875.30
4360	South College - Jesser Hall	HVAC	Variable Primary Flow on Chilled Water Pumps	45.03	14.60	$97,488.78	$2,165.00	$6,675.57
4366	Ruef Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	9.39	4.75	$8,131.61	$866.00	$1,710.88
4381	Ruef Hall	Plumbing Systems	Low Flow Fixture Conversion	4.72	19.06	$40,084.57	$8,497.00	$2,103.15
4382	Ruef Hall	HVAC	Steam Trap Inspection and Replacement	1.06	5.37	$1,909.88	$1,802.00	$355.70
4384	Ruef Hall	HVAC	Package Terminal Air Conditioning Installation	42.50	40.18	$536,241.23	$12,618.00	$13,344.64
4385	Ruef Hall	HVAC	Ground Source Heat Pump Installation	52.84	48.35	$791,848.79	$14,985.00	$16,378.06
4386	Ruef Hall	HVAC	Air Source Heat Pump Installation	38.31	46.70	$536,241.22	$13,996.00	$11,482.58
4390	Ruef Hall	Electrical Systems	Installation of Occupancy Sensors	20.18	2.47	$7,730.06	$383.00	$3,130.97
4402	Colton Chapel	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	25.18	0.01	$50.35	$2.00	$6,840.63
4414	Colton Chapel	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	5.53	12.19	$9,969.73	$1,804.00	$817.91
4417	Colton Chapel	Plumbing Systems	Low Flow Fixture Conversion	37.48	0.19	$3,523.13	$94.00	$18,424.00
4418	Colton Chapel	HVAC	Steam Trap Inspection and Replacement	6.76	8.95	$20,306.92	$3,003.00	$2,269.14
4423	Colton Chapel	HVAC	Air Handling Unit Controls	0.84	25.93	$6,048.23	$7,210.00	$233.22
4424	Colton Chapel	Exterior Closure	Weatherstrip Exterior Doors	1.28	5.25	$2,034.27	$1,591.00	$387.49
4426	Colton Chapel	Electrical Systems	Installation of Occupancy Sensors	49.93	0.20	$1,448.07	$29.00	$7,382.81
4438	Pardee Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	14.10	20.89	$56,479.60	$4,006.00	$2,703.82
4450	Pardee Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.97	23.55	$10,729.70	$3,613.00	$455.64
4453	Pardee Hall	Plumbing Systems	Low Flow Fixture Conversion	80.47	0.72	$32,831.11	$408.00	$45,546.79
4454	Pardee Hall	HVAC	Steam Trap Inspection and Replacement	1.44	7.76	$3,741.04	$2,603.00	$482.35
4455	Pardee Hall	HVAC	Window Replacement	38.39	33.54	$359,692.72	$9,369.00	$10,724.30
4460	Pardee Hall	Exterior Closure	Weatherstrip Exterior Doors	1.38	4.26	$1,790.16	$1,295.00	$420.25
4462	Pardee Hall	Electrical Systems	Installation of Occupancy Sensors	42.44	10.20	$70,535.36	$1,662.00	$6,913.87
4473	William E. Simon Center for Economics and Business	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	20.13	3.79	$13,365.58	$664.00	$3,523.08
4486	William E. Simon Center for Economics and Business	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	7.80	1.00	$1,349.19	$173.00	$1,355.97
4487	William E. Simon Center for Economics and Business	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	2.28	0.37	$138.82	$61.00	$377.92
4489	William E. Simon Center for Economics and Business	Plumbing Systems	Low Flow Fixture Conversion	95.81	0.25	$12,168.25	$127.00	$48,038.12
4490	William E. Simon Center for Economics and Business	HVAC	Steam Trap Inspection and Replacement	6.93	10.74	$24,958.89	$3,604.00	$2,324.17
4498	William E. Simon Center for Economics and Business	Electrical Systems	Installation of Occupancy Sensors	50.61	1.98	$15,941.73	$315.00	$8,064.31
4545	Plant Operations	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	18.60	3.04	$9,616.00	$517.00	$3,166.31
4546	Plant Operations	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	2.79	3.61	$1,648.66	$590.00	$456.40
4561	Plant Operations	Plumbing Systems	Low Flow Fixture Conversion	10.48	1.19	$3,228.87	$308.00	$2,719.35
4581	Farinon College Center, William B	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	14.86	30.10	$77,699.41	$5,230.00	$2,581.56
4594	Farinon College Center, William B	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	3.57	27.62	$15,643.31	$4,388.00	$566.31
4596	Farinon College Center, William B	Electrical Systems	Metal Halide to High Efficiency T8 Lighting Conversion	4.32	20.00	$16,882.85	$3,911.00	$844.05
4597	Farinon College Center, William B	Plumbing Systems	Low Flow Fixture Conversion	4.07	3.28	$7,986.04	$1,960.00	$2,436.43
4617	Watson Courts	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	26.33	1.50	$6,794.31	$258.00	$4,516.84
4630	Watson Courts	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	5.22	33.45	$28,105.51	$5,386.00	$840.24
4633	Watson Courts	Plumbing Systems	Low Flow Fixture Conversion	8.36	7.55	$31,177.87	$3,730.00	$4,129.97
4636	Watson Courts	HVAC	Package Terminal Air Conditioning Installation	33.81	69.96	$538,710.01	$15,933.00	$7,700.34
4637	Watson Courts	HVAC	Ground Source Heat Pump Installation	45.18	76.03	$795,494.61	$17,609.00	$10,462.37
4638	Watson Courts	HVAC	Air Source Heat Pump Installation	29.94	79.32	$538,710.22	$17,992.00	$6,791.31
4689	Fretz House	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	22.76	2.20	$10,035.67	$441.00	$4,568.35
4699	Fretz House	Interior Construction	Installation of Roof Insulation	2.13	10.19	$5,274.64	$2,476.00	$517.63
4702	Fretz House	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.33	3.06	$1,202.46	$517.00	$393.49
4705	Fretz House	Plumbing Systems	Low Flow Fixture Conversion	6.60	1.13	$1,939.28	$294.00	$1,714.23

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
4707	Fretz House	HVAC	Window Replacement	23.99	11.72	$68,507.21	$2,856.00	$5,846.96
4762	McKeen Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	6.77	5.19	$6,125.36	$905.00	$1,180.30
4766	McKeen Hall	Electrical Systems	Metal Halide to Photocell Lighting Conversion	11.18	0.23	$536.68	$48.00	$2,343.72
4772	McKeen Hall	Equipment	Gas Clothes Dryer Conversion	11.98	6.23	$8,506.22	$710.00	$1,365.29
4775	McKeen Hall	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	11.18	0.23	$536.68	$48.00	$2,343.72
4777	McKeen Hall	Plumbing Systems	Low Flow Fixture Conversion	4.95	7.00	$19,238.93	$3,885.00	$2,747.88
4779	McKeen Hall	HVAC	Window Replacement	30.74	22.48	$204,241.41	$6,645.00	$9,086.29
4797	Gates Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	9.68	1.21	$1,830.42	$189.00	$1,516.74
4802	Gates Hall	Electrical Systems	Metal Halide to Photocell Lighting Conversion	9.91	0.23	$475.68	$48.00	$2,077.30
4807	Gates Hall	Interior Construction	Installation of Roof Insulation	6.74	3.40	$7,686.95	$1,140.00	$2,262.86
4808	Gates Hall	Equipment	Gas Clothes Dryer Conversion	10.66	3.40	$5,918.92	$555.00	$1,738.92
4811	Gates Hall	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	9.91	0.23	$475.68	$48.00	$2,077.30
4813	Gates Hall	Plumbing Systems	Low Flow Fixture Conversion	4.75	3.30	$8,713.41	$1,833.00	$2,637.37
4814	Gates Hall	HVAC	Steam Trap Inspection and Replacement	3.01	57.19	$57,768.29	$19,192.00	$1,010.11
4815	Gates Hall	HVAC	Window Replacement	35.45	10.02	$119,168.73	$3,362.00	$11,893.63
4834	Bailey Health Center	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	16.28	0.74	$2,507.68	$154.00	$3,406.26
4846	Bailey Health Center	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	3.37	7.00	$3,776.33	$1,119.00	$539.22
4849	Bailey Health Center	Plumbing Systems	Low Flow Fixture Conversion	51.50	0.30	$7,880.12	$153.00	$26,328.32
4850	Bailey Health Center	HVAC	Steam Trap Inspection and Replacement	1.07	5.37	$1,920.91	$1,802.00	$357.75
4855	Bailey Health Center	HVAC	Air Handling Unit Controls	23.35	4.24	$12,096.47	$518.00	$2,855.59
4858	Bailey Health Center	Electrical Systems	Installation of Occupancy Sensors	44.94	1.10	$7,730.06	$172.00	$7,000.00
4862	Bailey Health Center	HVAC	Fan Coil Unit Temperature Setback	1.12	4.22	$1,259.61	$1,123.00	$298.62
4869	Soles Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	12.22	0.67	$1,332.32	$109.00	$1,986.98
4870	Soles Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	4.25	0.19	$131.83	$31.00	$690.85
4879	Soles Hall	Interior Construction	Installation of Roof Insulation	8.97	1.72	$5,177.31	$577.00	$3,010.06
4880	Soles Hall	Equipment	Gas Clothes Dryer Conversion	19.99	3.40	$11,093.52	$555.00	$3,259.17
4882	Soles Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.31	2.39	$923.66	$400.00	$386.82
4885	Soles Hall	Plumbing Systems	Low Flow Fixture Conversion	3.97	7.19	$7,481.74	$1,884.00	$1,040.13
4886	Soles Hall	HVAC	Steam Trap Inspection and Replacement	2.98	46.61	$46,544.31	$15,642.00	$998.55
4887	Soles Hall	HVAC	Window Replacement	40.05	5.93	$79,742.25	$1,991.00	$13,438.19
4905	Hogg Hall	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	10.05	6.64	$11,153.95	$1,110.00	$1,678.99
4906	Hogg Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	6.97	1.34	$1,713.65	$246.00	$1,277.21
4918	Hogg Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	1.85	6.39	$1,834.26	$991.00	$287.18
4921	Hogg Hall	Plumbing Systems	Low Flow Fixture Conversion	6.26	1.39	$2,323.82	$371.00	$1,671.86
4922	Hogg Hall	HVAC	Steam Trap Inspection and Replacement	2.69	29.67	$26,740.69	$9,957.00	$901.27
4923	Hogg Hall	HVAC	Window Replacement	66.45	3.20	$73,488.63	$1,106.00	$22,978.04
4941	Grossman House-Phi Gamma Delta - Fiji	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	15.79	0.79	$2,099.88	$133.00	$2,652.31
4942	Grossman House-Phi Gamma Delta - Fiji	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	4.26	0.67	$545.28	$128.00	$809.21
4951	Grossman House-Phi Gamma Delta - Fiji	Interior Construction	Installation of Roof Insulation	8.44	2.86	$5,847.71	$693.00	$2,046.75
4954	Grossman House-Phi Gamma Delta - Fiji	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.25	6.64	$2,548.72	$1,135.00	$383.87
4957	Grossman House-Phi Gamma Delta - Fiji	Plumbing Systems	Low Flow Fixture Conversion	4.89	4.57	$6,242.63	$1,277.00	$1,365.74
4977	Kirby House	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	9.26	1.85	$2,952.94	$319.00	$1,592.02
4978	Kirby House	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	12.73	4.42	$10,055.91	$790.00	$2,273.59
4983	Kirby House	Electrical Systems	Metal Halide to LED Lighting Conversion	13.67	2.96	$7,912.37	$579.00	$2,675.14
4987	Kirby House	Interior Construction	Installation of Roof Insulation	6.59	2.15	$4,580.50	$695.00	$2,133.42
4988	Kirby House	Equipment	Gas Clothes Dryer Conversion	10.66	3.40	$5,918.92	$555.00	$1,738.92
4990	Kirby House	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.71	6.30	$2,915.32	$1,076.00	$462.91

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
4993	Kirby House	Plumbing Systems	Low Flow Fixture Conversion	4.46	9.58	$11,158.27	$2,504.00	$1,164.75
5014	Oechsle Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	6.33	18.68	$20,752.78	$3,280.00	$1,110.87
5018	Oechsle Hall	Electrical Systems	Metal Halide to Photocell Lighting Conversion	7.64	2.18	$4,570.56	$598.00	$2,095.79
5019	Oechsle Hall	Electrical Systems	Metal Halide to LED Lighting Conversion	14.65	0.27	$791.24	$54.00	$2,961.74
5026	Oechsle Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	1.50	7.55	$1,740.22	$1,159.00	$230.53
5027	Oechsle Hall	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	7.64	2.18	$4,570.56	$598.00	$2,095.79
5029	Oechsle Hall	Plumbing Systems	Low Flow Fixture Conversion	6.17	2.75	$8,780.17	$1,424.00	$3,189.09
5050	Pfenning Alumni Center	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	7.85	3.34	$4,590.45	$585.00	$1,374.64
5054	Pfenning Alumni Center	Electrical Systems	Metal Halide to Photocell Lighting Conversion	11.31	3.56	$10,960.40	$969.00	$3,077.02
5062	Pfenning Alumni Center	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	0.81	0.47	$57.73	$71.00	$123.48
5063	Pfenning Alumni Center	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	11.31	3.56	$10,960.40	$969.00	$3,077.02
5065	Pfenning Alumni Center	Plumbing Systems	Low Flow Fixture Conversion	12.23	0.47	$3,057.63	$250.00	$6,526.48
5121	Williams Center for the Arts, Morris R	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	14.10	20.40	$47,344.87	$3,358.00	$2,320.65
5122	Williams Center for the Arts, Morris R	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	19.61	0.78	$3,490.32	$178.00	$4,451.65
5126	Williams Center for the Arts, Morris R	Electrical Systems	Metal Halide to Photocell Lighting Conversion	1.64	28.34	$8,519.13	$5,179.00	$300.64
5134	Williams Center for the Arts, Morris R	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	8.43	8.16	$15,500.26	$1,839.00	$1,898.96
5137	Williams Center for the Arts, Morris R	Plumbing Systems	Low Flow Fixture Conversion	5.33	6.28	$8,619.48	$1,616.00	$1,372.50
5194	APK Sports Center	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	12.85	24.79	$57,430.59	$4,468.00	$2,316.60
5206	APK Sports Center	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.40	15.27	$5,538.61	$2,309.00	$362.76
5207	APK Sports Center	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	6.03	45.34	$56,102.72	$9,308.00	$1,237.29
5208	APK Sports Center	Electrical Systems	Metal Halide to High Efficiency T8 Lighting Conversion	3.70	183.14	$114,848.99	$31,019.00	$627.12
5209	APK Sports Center	Plumbing Systems	Low Flow Fixture Conversion	3.43	34.80	$47,243.29	$13,789.00	$1,357.68
5210	APK Sports Center	HVAC	Steam Trap Inspection and Replacement	1.53	12.53	$6,421.15	$4,204.00	$512.52
5218	APK Sports Center	Electrical Systems	Installation of Occupancy Sensors	16.66	14.18	$36,937.84	$2,217.00	$2,604.13
5224	APK Sports Center	HVAC	Variable Primary Flow on Chilled Water Pumps	7.42	97.45	$124,108.11	$16,723.00	$1,273.50
5229	Maroon Weight Training Facility	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	13.43	2.86	$6,835.13	$509.00	$2,386.73
5245	Maroon Weight Training Facility	Plumbing Systems	Low Flow Fixture Conversion	22.74	0.10	$1,159.72	$51.00	$12,087.27
5374	McCracken Field House - Metzgar Fields	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	11.83	3.47	$7,984.86	$675.00	$2,303.27
5389	McCracken Field House - Metzgar Fields	Plumbing Systems	Low Flow Fixture Conversion	10.34	3.15	$14,689.82	$1,421.00	$4,670.11
5398	McCracken Field House - Metzgar Fields	Electrical Systems	Installation of Occupancy Sensors	17.11	2.74	$8,213.29	$480.00	$2,994.42
5446	Keefe Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	10.57	5.04	$9,259.56	$876.00	$1,838.83
5458	Keefe Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	6.37	2.88	$3,021.06	$474.00	$1,049.87
5461	Keefe Hall	Plumbing Systems	Low Flow Fixture Conversion	2.28	18.59	$17,491.86	$7,676.00	$941.09
5462	Keefe Hall	HVAC	Steam Trap Inspection and Replacement	1.14	5.37	$2,045.29	$1,802.00	$380.92
5467	Keefe Hall	HVAC	Air Handling Unit Controls	0.28	32.88	$1,385.57	$5,033.00	$42.14
5470	Keefe Hall	Electrical Systems	Installation of Occupancy Sensors	45.32	3.45	$24,156.63	$533.00	$7,002.93
5474	Keefe Hall	HVAC	Fan Coil Unit Temperature Setback	1.04	7.46	$1,385.57	$1,327.00	$185.77
5494	Williams Visual Arts Building	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	3.35	75.29	$48,031.17	$14,346.00	$637.96
5495	Williams Visual Arts Building	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	6.45	0.67	$1,019.03	$158.00	$1,515.47
5497	Williams Visual Arts Building	Plumbing Systems	Low Flow Fixture Conversion	17.55	0.26	$4,247.49	$242.00	$16,196.27
5563	Kappa Delta Rho	Interior Construction	Installation of Roof Insulation	7.23	2.95	$4,974.52	$688.00	$1,685.30
5569	Kappa Delta Rho	Plumbing Systems	Low Flow Fixture Conversion	2.91	4.57	$3,711.06	$1,277.00	$811.89
5662	Fisher Hall West	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	9.23	5.94	$9,538.67	$1,034.00	$1,607.03
5674	Fisher Hall West	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.22	39.97	$13,846.53	$6,230.00	$346.39

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
5677	Fisher Hall West	Plumbing Systems	Low Flow Fixture Conversion	4.18	8.00	$14,145.29	$3,382.00	$1,767.71
5678	Fisher Hall West	HVAC	Steam Trap Inspection and Replacement	1.10	5.37	$1,977.59	$1,802.00	$368.31
5683	Fisher Hall West	HVAC	Air Handling Unit Controls	3.23	14.50	$6,653.05	$2,062.00	$458.95
5686	Fisher Hall West	Electrical Systems	Installation of Occupancy Sensors	24.27	1.88	$7,013.44	$289.00	$3,729.93
5690	Fisher Hall West	HVAC	Fan Coil Unit Temperature Setback	219.82	3.71	$130,134.59	$592.00	$35,043.05
5692	Fisher Hall West	HVAC	Variable Primary Flow on Chilled Water Pumps	52.42	4.36	$38,217.17	$729.00	$8,762.31
5698	Scott Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	11.93	1.94	$4,080.19	$342.00	$2,100.47
5713	Scott Hall	Plumbing Systems	Low Flow Fixture Conversion	4.04	1.55	$2,138.82	$530.00	$1,379.34
5714	Scott Hall	HVAC	Steam Trap Inspection and Replacement	1.21	7.76	$3,154.75	$2,603.00	$406.75
5722	Scott Hall	Electrical Systems	Installation of Occupancy Sensors	66.64	0.89	$9,662.98	$145.00	$10,814.33
5734	Rubin Hall	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	10.45	4.51	$8,265.41	$791.00	$1,833.91
5746	Rubin Hall	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	1.63	58.56	$14,350.04	$8,794.00	$245.03
5749	Rubin Hall	Plumbing Systems	Low Flow Fixture Conversion	1.91	5.76	$4,655.52	$2,433.00	$808.63
5750	Rubin Hall	HVAC	Steam Trap Inspection and Replacement	1.06	5.37	$1,909.88	$1,802.00	$355.70
5755	Rubin Hall	HVAC	Air Handling Unit Controls	6.48	6.20	$6,653.05	$1,027.00	$1,072.57
5762	Rubin Hall	HVAC	Fan Coil Unit Temperature Setback	239.22	3.71	$130,134.59	$544.00	$35,069.87
5764	Rubin Hall	HVAC	Variable Primary Flow on Chilled Water Pumps	53.83	4.44	$38,217.17	$710.00	$8,611.36
5770	Fisher Hall East	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	10.40	6.13	$11,249.31	$1,082.00	$1,833.93
5782	Fisher Hall East	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	2.30	40.85	$14,685.71	$6,394.00	$359.52
5785	Fisher Hall East	Plumbing Systems	Low Flow Fixture Conversion	3.21	10.15	$12,496.59	$3,888.00	$1,231.57
5786	Fisher Hall East	HVAC	Steam Trap Inspection and Replacement	1.00	5.37	$1,797.81	$1,802.00	$334.82
5791	Fisher Hall East	HVAC	Air Handling Unit Controls	2.75	15.02	$6,048.23	$2,198.00	$402.59
5798	Fisher Hall East	HVAC	Fan Coil Unit Temperature Setback	175.27	4.19	$118,304.17	$675.00	$28,247.64
5800	Fisher Hall East	HVAC	Variable Primary Flow on Chilled Water Pumps	47.08	4.33	$34,742.88	$738.00	$8,020.97
5805	4 West Campus	Electrical Systems	T12 to High Efficiency T8 Lighting Conversion	8.68	1.17	$1,735.75	$200.00	$1,477.47
5806	4 West Campus	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	8.44	1.23	$1,789.76	$212.00	$1,460.99
5818	4 West Campus	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	4.38	9.69	$6,712.50	$1,531.00	$692.57
5821	4 West Campus	Plumbing Systems	Low Flow Fixture Conversion	8.25	2.72	$10,898.90	$1,321.00	$4,009.24
5824	4 West Campus	HVAC	Package Terminal Air Conditioning Installation	57.64	11.34	$179,015.73	$3,106.00	$15,789.15
5825	4 West Campus	HVAC	Ground Source Heat Pump Installation	72.80	13.81	$264,346.55	$3,631.00	$19,143.35
5826	4 West Campus	HVAC	Air Source Heat Pump Installation	49.45	13.95	$179,015.77	$3,620.00	$12,830.85
5842	Bourger Football House	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	13.71	4.73	$12,157.13	$887.00	$2,570.18
5857	Bourger Football House	Plumbing Systems	Low Flow Fixture Conversion	7.07	2.54	$11,510.32	$1,628.00	$4,531.76
5858	Bourger Football House	HVAC	Steam Trap Inspection and Replacement	0.96	5.37	$1,736.26	$1,802.00	$323.36
5866	Bourger Football House	Electrical Systems	Installation of Occupancy Sensors	30.45	2.24	$10,627.82	$349.00	$4,744.82
5914	Kamine	Electrical Systems	T8 to High Efficiency T8 Lighting Conversion	9.98	6.41	$11,263.69	$1,129.00	$1,758.50
5926	Kamine	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	1.58	57.20	$13,594.78	$8,582.00	$237.68
5927	Kamine	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	6.07	0.45	$510.17	$84.00	$1,137.69
5929	Kamine	Plumbing Systems	Low Flow Fixture Conversion	4.26	8.78	$16,052.64	$3,768.00	$1,827.71
5930	Kamine	HVAC	Steam Trap Inspection and Replacement	1.97	4.77	$3,154.75	$1,602.00	$660.96
5935	Kamine	HVAC	Air Handling Unit Controls	7.49	4.90	$6,048.23	$807.00	$1,233.93
5938	Kamine	Electrical Systems	Installation of Occupancy Sensors	23.85	3.52	$13,043.97	$547.00	$3,710.61
5942	Kamine	HVAC	Fan Coil Unit Temperature Setback	102.61	8.60	$118,304.17	$1,153.00	$13,761.22
5944	Kamine	HVAC	Variable Primary Flow on Chilled Water Pumps	52.56	4.12	$34,742.88	$661.00	$8,431.26
5948	Williams Center for the Arts, Morris R	Electrical Systems	Metal Halide to Compact Fluorescent Lighting Conversion	1.64	28.34	$8,519.13	$5,179.00	$300.64
5950	Plant Operations	Electrical Systems	Incandescent to Compact Fluorescent Lighting Conversion	1.88	1.09	$346.38	$184.00	$316.95
5951	Farinon College Center, William B	Electrical Systems	Installation of Occupancy Sensors	11.39	10.38	$21,805.20	$1,915.00	$2,101.07

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
5952	Fretz House	Electrical Systems	Installation of Occupancy Sensors	30.19	2.21	$10,234.59	$339.00	$4,623.90
5953	Gates Hall	Electrical Systems	Installation of Occupancy Sensors	14.49	5.58	$11,126.42	$768.00	$1,994.03
5954	Hogg Hall	Electrical Systems	Installation of Occupancy Sensors	25.53	3.70	$19,580.07	$767.00	$5,287.82
5955	Kirby House	Electrical Systems	Installation of Occupancy Sensors	13.68	7.06	$16,465.81	$1,204.00	$2,331.17
5957	McKeen Hall	Electrical Systems	Installation of Occupancy Sensors	8.01	5.65	$7,120.34	$889.00	$1,261.32
5959	Pfenning Alumni Center	Electrical Systems	Installation of Occupancy Sensors	8.89	5.76	$9,344.12	$1,051.00	$1,622.92
5960	Grossman House-Phi Gamma Delta - Fiji	Electrical Systems	Installation of Occupancy Sensors	13.69	1.89	$4,449.96	$325.00	$2,352.53
5961	Plant Operations	Electrical Systems	Installation of Occupancy Sensors	15.73	3.56	$9,344.12	$594.00	$2,627.46
5962	Soles Hall	Electrical Systems	Installation of Occupancy Sensors	17.08	3.07	$8,009.77	$469.00	$2,605.75
5963	Williams Center for the Arts, Morris R	Electrical Systems	Installation of Occupancy Sensors	10.83	11.67	$20,025.30	$1,849.00	$1,715.33
5969	2 West Campus	Electrical Systems	Installation of Electric Meter	49.13	1.08	$6,927.86	$141.00	$6,391.19
5975	Acopian Engineering Center	Electrical Systems	Installation of Steam Meter	8.10	3.82	$10,391.78	$1,283.00	$2,718.44
5976	4 West Campus	Electrical Systems	Installation of Electric Meter	32.83	1.62	$6,927.86	$211.00	$4,270.12
5977	Acopian Engineering Center	Electrical Systems	Installation of Electric Meter	2.21	24.09	$6,927.86	$3,132.00	$287.62
5978	Alpha Phi	Electrical Systems	Installation of Electric Meter	54.98	0.97	$6,927.86	$126.00	$7,151.36
5979	APK Sports Center	Electrical Systems	Installation of Electric Meter	1.57	33.96	$6,927.86	$4,415.00	$204.00
5980	Bailey Health Center	Electrical Systems	Installation of Electric Meter	52.88	1.01	$6,927.86	$131.00	$6,891.10
5981	Bourger Football House	Electrical Systems	Installation of Electric Meter	17.58	3.03	$6,927.86	$394.00	$2,285.04
5982	Colton Chapel	Electrical Systems	Installation of Electric Meter	44.99	1.19	$6,927.86	$154.00	$5,830.20
5983	Conway House	Electrical Systems	Installation of Electric Meter	50.20	1.06	$6,927.86	$138.00	$6,532.71
5984	DKE - Delta Kappa Epsilon	Electrical Systems	Installation of Electric Meter	55.87	0.95	$6,927.86	$124.00	$7,270.21
5985	Easton Hall	Electrical Systems	Installation of Electric Meter	27.38	1.95	$6,927.86	$253.00	$3,560.63
5986	Farber Hall	Electrical Systems	Installation of Electric Meter	31.49	1.69	$6,927.86	$220.00	$4,091.11
5987	Farinon College Center, William B	Electrical Systems	Installation of Electric Meter	3.74	14.24	$6,927.86	$1,852.00	$486.39
5988	Fisher Hall East	Electrical Systems	Installation of Electric Meter	11.32	4.70	$6,927.86	$612.00	$1,472.95
5989	Fisher Hall West	Electrical Systems	Installation of Electric Meter	11.30	4.72	$6,927.86	$613.00	$1,468.69
5990	Fretz House	Electrical Systems	Installation of Electric Meter	22.06	2.42	$6,927.86	$314.00	$2,867.01
5991	Gates Hall	Electrical Systems	Installation of Electric Meter	44.99	1.19	$6,927.86	$154.00	$5,830.20
5992	Hogg Hall	Electrical Systems	Installation of Electric Meter	85.53	0.62	$6,927.86	$81.00	$11,099.32
5993	Kamine	Electrical Systems	Installation of Electric Meter	9.20	5.79	$6,927.86	$753.00	$1,196.73
5994	Kappa Delta Rho	Electrical Systems	Installation of Electric Meter	84.49	0.63	$6,927.86	$82.00	$10,927.24
5995	Keefe Hall	Electrical Systems	Installation of Electric Meter	11.32	4.71	$6,927.86	$612.00	$1,471.92
5996	Kirby Hall of Civil Rights	Electrical Systems	Installation of Electric Meter	13.17	4.04	$6,927.86	$526.00	$1,713.47
5997	Kirby House	Electrical Systems	Installation of Electric Meter	10.56	5.05	$6,927.86	$656.00	$1,372.85
5998	Kunkel Hall	Electrical Systems	Installation of Electric Meter	7.69	6.93	$6,927.86	$901.00	$999.17
5999	Lerch House	Electrical Systems	Installation of Electric Meter	48.45	1.10	$6,927.86	$143.00	$6,289.80
6000	Markle Hall	Electrical Systems	Installation of Electric Meter	15.89	3.35	$6,927.86	$436.00	$2,065.54
6001	Maroon Weight Training Facility	Electrical Systems	Installation of Electric Meter	67.92	0.78	$6,927.86	$102.00	$8,828.48
6002	Marquis Hall	Electrical Systems	Installation of Electric Meter	6.98	7.64	$6,927.86	$993.00	$906.89
6003	McCracken Field House - Metzgar Fields	Electrical Systems	Installation of Electric Meter	11.86	4.49	$6,927.86	$584.00	$1,541.87
6004	McKeen Hall	Electrical Systems	Installation of Electric Meter	10.64	5.01	$6,927.86	$651.00	$1,384.08
6005	Oechsle Hall	Electrical Systems	Installation of Electric Meter	3.51	15.16	$6,927.86	$1,971.00	$457.09
6006	Olin-Hugel Science Center	Electrical Systems	Installation of Electric Meter	2.46	21.67	$6,927.86	$2,817.00	$319.70
6007	P. T. Farinon	Electrical Systems	Installation of Electric Meter	56.79	0.94	$6,927.86	$122.00	$7,367.32
6008	Pardee Hall	Electrical Systems	Installation of Electric Meter	3.18	16.75	$6,927.86	$2,177.00	$413.70
6009	Pfenning Alumni Center	Electrical Systems	Installation of Electric Meter	15.64	3.41	$6,927.86	$443.00	$2,033.75
6010	Grossman House-Phi Gamma Delta - Fiji	Electrical Systems	Installation of Electric Meter	79.63	0.67	$6,927.86	$87.00	$10,407.32
6011	Pi Beta Phi	Electrical Systems	Installation of Electric Meter	62.41	0.86	$6,927.86	$111.00	$8,090.89
6012	Plant Operations	Electrical Systems	Installation of Electric Meter	83.47	0.64	$6,927.86	$83.00	$10,852.46
6013	Ramer Hall	Electrical Systems	Installation of Electric Meter	24.57	2.17	$6,927.86	$282.00	$3,189.17
6014	Rubin Hall	Electrical Systems	Installation of Electric Meter	16.30	3.27	$6,927.86	$425.00	$2,118.66
6015	Ruef Hall	Electrical Systems	Installation of Electric Meter	15.96	3.34	$6,927.86	$434.00	$2,074.66

ECM ID	Building	Project Type	Project Title	Payback (Years)	Annual Carbon Savings	Estimated Construction Total	Total Savings	$ / CO2
6016	Scott Hall	Electrical Systems	Installation of Electric Meter	26.24	2.03	$6,927.86	$264.00	$3,413.11
6017	Skillman Library	Electrical Systems	Installation of Electric Meter	2.73	19.55	$6,927.86	$2,542.00	$354.40
6018	Soles Hall	Electrical Systems	Installation of Electric Meter	54.55	0.98	$6,927.86	$127.00	$7,067.70
6019	South College - Jesser Hall	Electrical Systems	Installation of Electric Meter	7.50	7.11	$6,927.86	$924.00	$974.99
6020	Van Wickle Hall	Electrical Systems	Installation of Electric Meter	14.37	3.70	$6,927.86	$482.00	$1,870.34
6021	Watson Courts	Electrical Systems	Installation of Electric Meter	117.42	0.45	$6,927.86	$59.00	$15,248.22
6022	Watson Hall	Electrical Systems	Installation of Electric Meter	16.90	3.15	$6,927.86	$410.00	$2,197.56
6023	William E. Simon Center for Economics and Business	Electrical Systems	Installation of Electric Meter	15.50	3.44	$6,927.86	$447.00	$2,014.69
6024	Williams Center for the Arts, Morris R	Electrical Systems	Installation of Electric Meter	5.73	9.30	$6,927.86	$1,210.00	$744.60
6025	Williams Visual Arts Building	Electrical Systems	Installation of Electric Meter	10.37	5.14	$6,927.86	$668.00	$1,347.48
6027	APK Sports Center	Electrical Systems	Installation of Steam Meter	2.12	14.62	$10,391.78	$4,906.00	$710.79
6028	Bailey Health Center	Electrical Systems	Installation of Steam Meter	102.89	0.30	$10,391.78	$101.00	$34,524.19
6029	Bourger Football House	Electrical Systems	Installation of Steam Meter	55.28	0.56	$10,391.78	$188.00	$18,589.95
6030	Colton Chapel	Electrical Systems	Installation of Steam Meter	20.58	1.51	$10,391.78	$505.00	$6,904.84
6031	Easton Hall	Electrical Systems	Installation of Steam Meter	48.11	0.65	$10,391.78	$216.00	$16,111.29
6032	Farber Hall	Electrical Systems	Installation of Steam Meter	72.17	0.43	$10,391.78	$144.00	$24,166.94
6033	Farinon College Center, William B	Electrical Systems	Installation of Steam Meter	8.57	3.61	$10,391.78	$1,212.00	$2,877.02
6034	Fisher Hall East	Electrical Systems	Installation of Steam Meter	22.49	1.38	$10,391.78	$462.00	$7,552.17
6035	Fisher Hall West	Electrical Systems	Installation of Steam Meter	23.25	1.33	$10,391.78	$447.00	$7,795.79
6036	Gates Hall	Electrical Systems	Installation of Steam Meter	0.52	59.68	$10,391.78	$20,029.00	$174.11
6037	Hogg Hall	Electrical Systems	Installation of Steam Meter	28.79	1.08	$10,391.78	$361.00	$9,666.77
6038	Kamine	Electrical Systems	Installation of Steam Meter	79.94	0.39	$10,391.78	$130.00	$26,852.15
6039	Keefe Hall	Electrical Systems	Installation of Steam Meter	13.86	2.24	$10,391.78	$750.00	$4,647.49
6040	Kirby Hall of Civil Rights	Electrical Systems	Installation of Steam Meter	28.79	1.08	$10,391.78	$361.00	$9,666.77
6041	Kirby House	Electrical Systems	Installation of Steam Meter	10.92	2.84	$10,391.78	$952.00	$3,661.66
6042	Kunkel Hall	Electrical Systems	Installation of Steam Meter	21.83	1.42	$10,391.78	$476.00	$7,323.31
6043	Lerch House	Electrical Systems	Installation of Steam Meter	65.36	0.47	$10,391.78	$159.00	$21,969.94
6044	Markle Hall	Electrical Systems	Installation of Steam Meter	14.70	2.11	$10,391.78	$707.00	$4,932.03
6045	Marquis Hall	Electrical Systems	Installation of Steam Meter	22.49	1.38	$10,391.78	$462.00	$7,552.17
6046	McKeen Hall	Electrical Systems	Installation of Steam Meter	12.21	2.54	$10,391.78	$851.00	$4,096.09
6047	Oechsle Hall	Electrical Systems	Installation of Steam Meter	10.75	2.88	$10,391.78	$967.00	$3,607.01
6048	Olin-Hugel Science Center	Electrical Systems	Installation of Steam Meter	4.68	6.62	$10,391.78	$2,222.00	$1,569.28
6049	Pardee Hall	Electrical Systems	Installation of Steam Meter	21.16	1.46	$10,391.78	$491.00	$7,107.92
6050	Pfenning Alumni Center	Electrical Systems	Installation of Steam Meter	48.11	0.65	$10,391.78	$216.00	$16,111.29
6051	Plant Operations	Electrical Systems	Installation of Steam Meter	102.89	0.30	$10,391.78	$101.00	$34,524.19
6052	Ramer Hall	Electrical Systems	Installation of Steam Meter	65.36	0.47	$10,391.78	$159.00	$21,969.94
6053	Rubin Hall	Electrical Systems	Installation of Steam Meter	102.89	0.30	$10,391.78	$101.00	$34,524.19
6054	Ruef Hall	Electrical Systems	Installation of Steam Meter	20.58	1.51	$10,391.78	$505.00	$6,904.84
6055	Scott Hall	Electrical Systems	Installation of Steam Meter	358.34	0.09	$10,391.78	$29.00	$120,834.68
6056	Skillman Library	Electrical Systems	Installation of Steam Meter	14.12	2.19	$10,391.78	$736.00	$4,738.61
6057	Soles Hall	Electrical Systems	Installation of Steam Meter	48.11	0.64	$10,391.78	$216.00	$16,111.29
6058	South College - Jesser Hall	Electrical Systems	Installation of Steam Meter	15.65	1.98	$10,391.78	$664.00	$5,253.68
6059	Van Wickle Hall	Electrical Systems	Installation of Steam Meter	55.28	0.56	$10,391.78	$188.00	$18,589.95
6060	Watson Hall	Electrical Systems	Installation of Steam Meter	15.33	2.02	$10,391.78	$678.00	$5,141.90
6061	William E. Simon Center for Economics and Business	Electrical Systems	Installation of Steam Meter	72.17	0.43	$10,391.78	$144.00	$24,166.94
6062	Williams Center for the Arts, Morris R	Electrical Systems	Installation of Steam Meter	48.11	0.65	$10,391.78	$216.00	$16,111.29
6065	Markle Hall	Electrical Systems	Installation of Occupancy Sensors	4.54	15.49	$12,014.49	$2,647.00	$775.62
6066	Williams Visual Arts Building	Electrical Systems	Installation of Occupancy Sensors	4.44	9.33	$9,179.75	$2,068.00	$984.23
6067	Oechsle Hall	Electrical Systems	Installation of Occupancy Sensors	7.24	16.17	$18,244.36	$2,521.00	$1,128.61
6068	Rubin Hall	Electrical Systems	Installation of Occupancy Sensors	10.28	4.64	$7,246.83	$705.00	$1,561.93
6069	4 West Campus	Electrical Systems	Installation of Occupancy Sensors	13.05	0.97	$1,931.58	$148.00	$1,988.60