Millersville University

Climate Action Plan

Message from the President

In our Strategic Plan, I called for members of the Millersville University community to take a Bold Path that inspires and enables our students to contribute positively to local and global communities.

We are reminded each day of the global challenge of climate change. Confronting this challenge requires bold action on the part of individuals, communities and nations. As individuals, as members of a local community and a community of higher education institutions, and as citizens of nations from around the world, Millersville's faculty, staff and students have prepared this Climate Action Plan to articulate our response to climate change.

We are personally, professionally and collectively committed to taking action on this issue. From the student who starts each day with a bicycle ride to campus, to the professor who stays up late incorporating climate change content into coursework, to the staff person who carefully reviews plans for our new net-zero energy Welcome Center, individual actions are creating the future we envision for Millersville University.

We intend to continue forward on this bold path. The path leads to a low-carbon, energy conscious and sustainable future for Millersville. While we reduce fossil-based energy and greenhouse gas emissions, we will harness the energy and imagination of our faculty, staff and students. Their passion, knowledge and commitment are the driving force behind this Climate Action Plan.

I invite all members of the Millersville University community to join us as we develop new and innovative ways to respond to climate change and as we inspire a generation of energized and empowered citizens. Together we can define the future.

- Dr. John M. Anderson
President

Biemesderfer Executive Center, Office of the President

Contents

Millersville University's Climate Action Plan reflects the outcome of numerous campus discussions and the input of countless thoughtful and passionate individuals. In particular, the authors would like to thank the following individuals for their contributions.

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EXECUTIVE SUMMARY

This Climate Action Plan provides a framework for how Millersville University will address the challenge of climate change by reducing greenhouse gas (GHG) emissions and achieving carbon neutrality. It reflects the ideas, interests and passions of faculty, staff and students and represents the culmination of discussions, debates and knowledge sharing. Implementing the Plan will provide opportunities to develop innovative solutions to challenges faced by Millersville and the world while sparking the imagination of a new generation of leaders, thinkers and doers.

The Plan provides a clear vision for a low-carbon, energy conscious and sustainable future at Millersville. Achieving this vision requires a curious and energized faculty, staff and student population; close collaboration with University partners, friends and neighbors; and an endless willingness to adopt and apply new information and insights.

Millersville will use a two-pronged strategy to achieve the goal of carbon neutrality:

1) Reduce absolute GHG emissions to the maximum extent possible with an initial target of 65 percent by 2040, and

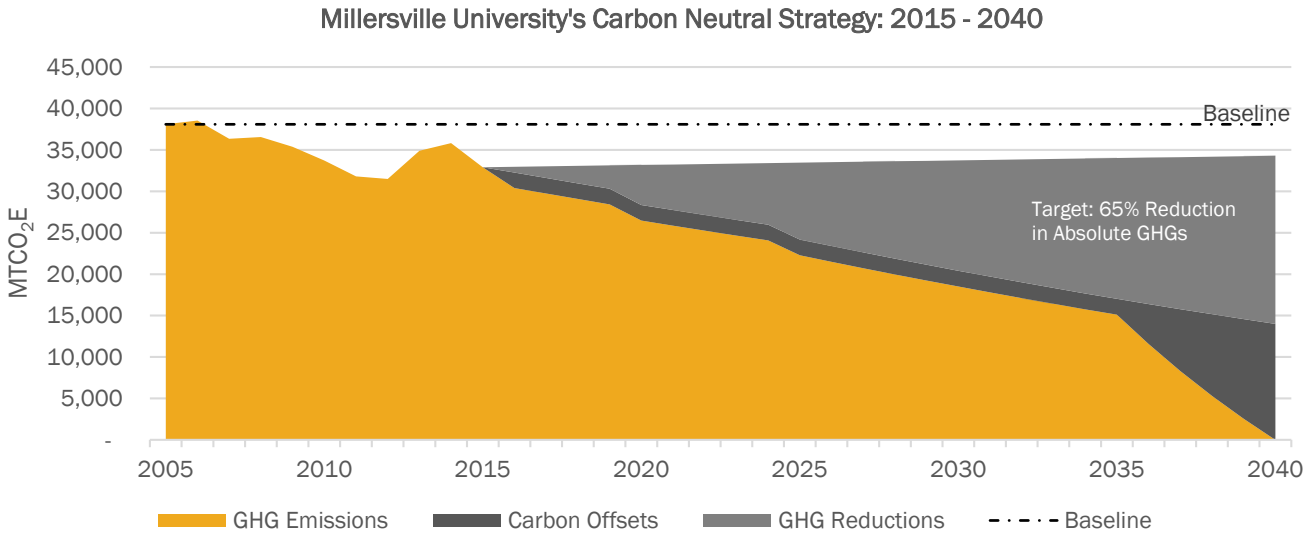
2) Phase in viable and broadly beneficial carbon offsets to balance remaining emissions and achieve carbon neutrality.

This Climate Action Plan establishes 10 supporting goals (see right) that will serve as guideposts as the University pursues this strategy.

10 Goals Supporting Carbon Neutrality

1. Design and build all new buildings, and major renovations to existing buildings, to green building rating system standards.
2. Increase the energy efficiency of Millersville's existing buildings through retrofits and upgrades while creating a culture of energy conservation among Millersville's faculty, staff and students.
3. Increase use of renewable electricity.
4. Increase on-site renewable energy generation.
5. Provide educational opportunities that require less commuting and increase the percentage of the student population that walks or bikes to campus.
6. Reduce the per-mile GHG emissions intensity associated with faculty, staff and student commuter travel.
7. Increase waste diversion while continuing to reduce GHG emissions associated with the supply chain.
8. Increase campus climate literacy.
9. Advance a culture of sustainability.
10. Incorporate climate change and sustainability considerations into University planning activities and administrative practices.

The goals are informed by Millersville's GHG emission inventory. In 2015, Millersville's gross GHG emissions totaled 32,910 metric tons of carbon dioxide equivalent ($MTCO_2E$)—down 14 percent since 2005. The majority (approximately 65 percent) of the University's GHG emissions stem from energy use in campus buildings and approximately 23 percent come from transportation—primarily student commuting. The 10 supporting goals focus Millersville's GHG mitigation activities on the University's largest emission sources (energy and transportation) while recognizing that the greatest opportunity for Millersville to have lasting impact is to empower and excite a new generation of thought leaders.



INTRODUCTION

Since its humble beginnings as the Lancaster County Normal School, Millersville University has been rooted in the ideals of enlightened citizenship—educating individuals to be responsible contributors to society. Today, the University's mission continues to focus on inspiring learners to grow both intellectually and personally to enable them to contribute positively to local and global communities. Inherent in this mission is a willingness and responsibility to be part of the solution to the challenges that society faces locally and globally. Today's challenges are many, but few necessitate as large of a communal response as climate change.

Recognizing and valuing its role as a local leader called to address the global challenge of climate change, Millersville University established a goal to achieve carbon neutrality in its strategic plan—*Our Bold Path*. By pursuing carbon neutrality Millersville will seek to bring the University's greenhouse gas (GHG) emissions to zero and thus eliminate its contributions to global atmospheric GHG concentrations and climate change.

"The adoption of Millersville's Climate Action Plan attests to the University's commitment to meeting significant climate educational and social responsibilities, and could happen at no better time than following the signing of the Paris Climate Agreement."

- Dr. Kathy Schreiber
Geography, Climate Action Plan Subcommittee Chair

Perhaps more importantly, Millersville will use the pursuit of carbon neutrality to accentuate its core mission of educating the next generation of leaders, thinkers and doers. The projects and programs Millersville implements to address climate change will take place on campus grounds and buildings and the innovations and improvements will come from student groups, committees and classrooms.

Within the challenge of climate change lies the opportunity to energize and empower a generation of individuals that will manage businesses that create new and better ways of living, raise families that use resources responsibly and transform communities into places that elevate the quality of life.

This Plan builds on significant progress that the University has made to date. Faculty have incorporated climate change studies into their classes; student groups and University committees have launched sustainability initiatives; thousands of faculty, staff and students walk, bike or ride the campus shuttle to and around campus; waste is disposed of responsibly in the dining areas and around campus; and plans are in the works for a new net-zero energy Welcome Center. Each of these reflect the commitment of the University community to build a more sustainable, low-carbon future and serve as examples of the types of actions set forth in this Plan.

Millersville's Climate Action Plan lays out a specific strategy for achieving carbon neutrality supported by 10 goals that provide a framework for reducing Millersville's GHG emissions. Within the goals are an initial set of short-, mid- and long-term actions to reduce, or mitigate, GHG emissions. These actions, and the goals they support, will grow and evolve within an implementation framework that emphasizes agility, measurement, innovation, collaboration and education. Individually, the actions will lessen Millersville's carbon footprint; collectively, the actions will further transform the University into an institution that optimizes operations, creates tangible learning opportunities and prioritizes a culture of sustainability.

Millersville University

Millersville University is a top-ranked, public university located in south-central Pennsylvania, just 3 miles southwest of the City of Lancaster. Founded in 1855 as the first Normal School in Pennsylvania, Millersville University is one of 14 universities within the Pennsylvania State System of Higher Education (PAASHE). Dedicated to providing nationally recognized programs that embrace the liberal arts, Millersville offers academic opportunities to 8,000 students.

CLIMATE ACTION PLAN GOALS

Millersville has set an overarching goal to achieve carbon neutrality. To do so, the University will execute a two-pronged strategy:

1) Reduce absolute GHG emissions to the maximum extent possible with an initial target of 65 percent by 2040, and
2) Phase in viable and broadly beneficial carbon offsets to balance remaining emissions and achieve carbon neutrality.

The University has identified 10 additional goals that directly and indirectly contribute to reducing Millersville's absolute GHG emissions, as follows:

1) Design and build all new buildings, and major renovations to existing buildings, to green building rating system standards.
2) Increase the energy efficiency of Millersville's existing buildings through retrofits and upgrades while creating a culture of energy conservation among Millersville's faculty, staff and students.
3) Increase use of renewable electricity.
4) Increase on-site renewable energy generation.
5) Provide educational opportunities that require less commuting and increase the percentage of the student population that walks or bikes to campus.
6) Reduce the per-mile GHG emissions intensity associated with faculty, staff and student commuter travel.
7) Increase waste diversion while continuing to reduce GHG emissions associated with the supply chain.
8) Increase campus climate literacy.
9) Advance a culture of sustainability.
10) Incorporate climate change and sustainability considerations into University planning activities and administrative practices.

These 10 goals set the strategic framework for reducing GHG emissions at Millersville. The goals were developed based on an understanding of our GHG emission profile and the emission sources that require focus in order to make meaningful progress. Each is supported by a preliminary set of planned mitigation activities. Moving forward the 10 goals, an annual assessment of Millersville's GHG profile and an evaluation of progress to date will be used to help prioritize existing (and plan new) mitigation activities and implementation procedures.

In addition to the 10 goals, Millersville will apply five guiding principles to support the carbon neutral strategy, as follows:

1) Agility,
2) Measurement,
3) Innovation,
4) Collaboration, and
5) Education.

"Higher education should serve as a positive role model for our students and for our community."

- Dr. Len Litowitz
Applied Engineering, Safety and Technology

The Millersville community understands that this Climate Action Plan represents the beginning of a process and that success depends on the University's ability to transfer the goals o f this Plan into meaningful action and measurable progress. While the 10 goals supporting carbon neutrality are outcome-based, the guiding principles are process-based. They will help to guide how Millersville approaches the challenge of climate change and will serve as a reminder that while our desired destination is clear, the path remains ours to carve and to empower us to remain dynamic.

CLIMATE CHANGE: MILLERSVILLE UNIVERSITY PERSPECTIVE

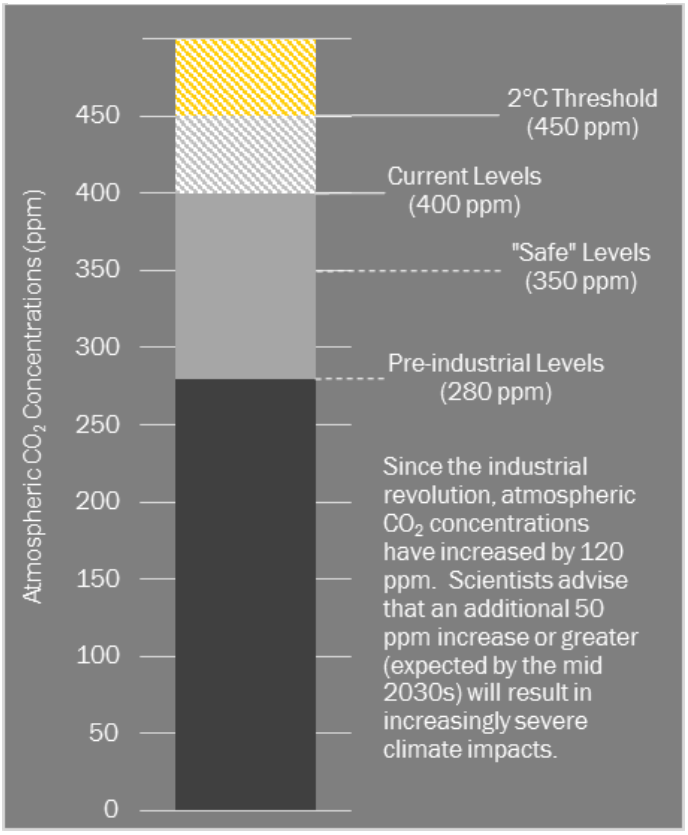
From lighting the night to powering global travel, burning fossil fuels has provided countless societal and technological advancements since the advent of the Industrial Revolution. The energy provided by this resource has improved the quality of life for hundreds of millions of individuals and contributed to an increase in global life expectancy.[1] Global productivity and personal income have increased substantially and conveniences that were revolutionary a century ago have become commonplace. Across any number of indicators the world is a demonstrably better place to live due to the energy that has been provided by burning fossil fuels.[2]

However, burning fossil fuels has also dramatically increased atmospheric concentrations of GHGs—primarily carbon dioxide (CO_2). In the early 1800s (prior to the Industrial Revolution), global atmospheric CO_2 concentrations were about 280 ppm (parts per million). Persistent use of fossil fuels has driven concentration levels above 400 ppm. At current rates, concentration levels are expected to exceed 450 ppm by the mid 2030s—well above the 350 ppm level that many scientists consider safe. Reaching 450 ppm will lead to a global temperature rise that is 2 degrees Celsius (°C) above pre-industrial levels (Figure 1). The Intergovernmental Panel on Climate Change (IPCC) advises that pushing beyond a 2°C threshold commits the globe to changes in climate that will have severe impacts on human health, ecosystem strength and diversity, and resource availability.[3]

The effects of climate change are already being felt, globally and locally in Pennsylvania. Over the past 110 years, Pennsylvania has become warmer and wetter. Specifically, Pennsylvania has experienced a 1°C (1.8°F) increase in temperature as well as a general trend toward increasing levels of precipitation.[4]

While temperature and precipitation vary year-to-year and over decades based on different naturally-occurring climate modes (e.g., El Nino/Southern Oscillation, Pacific Decadal Oscillation, etc.), Pennsylvania is expected to get warmer and wetter faster as climate changes in the coming decades. By 2050, Pennsylvania is expected to be 3°C (5.4°F) warmer than it was in the late 1990s. Additionally, average annual precipitation levels are likely to increase and the intensity of precipitation events is likely to increase.[5] Indeed, to date, the broader Northeast Region of the U.S. has experienced a greater increase in extreme precipitation than any other region in the U.S.[6]

Figure 1: Atmospheric CO_2 Concentration Levels



Source: IPCC Fifth Assessment Report

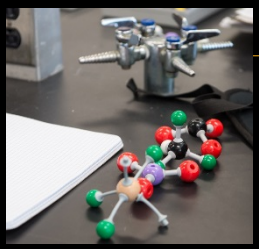
[1] Our World in Data, Life Expectancy http://ourworldindata.org/data/population-growth-vital-statistics/life-expectancy/
[2] Our World in Data, GDP Growth http://ourworldindata.org/data/growth-and-distribution-of-prosperity/gdp-growth-over-the-last-centuries/
[3] IPCC Fifth Assessment Report, https://www.ipcc.ch/report/ar5/
[4] Pennsylvania Climate Impacts Assessment Update, http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-108470/2700-BK-DEP4494.pdf
[5] Pennsylvania Climate Impacts Assessment Update, http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-108470/2700-BK-DEP4494.pdf
[6] National Climate Assessment, http://nca2014.globalchange.gov/report/regions/northeast#intro-section-2

These climatic changes will have both beneficial and detrimental effects on Pennsylvanians and Pennsylvania ecosystems and economy. As examples, increased average temperatures will likely lengthen the growing season, which may lead to higher crop yields and also make it possible to grow crops that are currently limited to warmer locations, while more intense precipitation events may damage crops and increase the risk of severe flooding. Warmer temperatures may lessen winter heating costs while also increasing demand for electricity for cooling in summer months—the net effect may be an increase in demand for energy, particularly electricity. Increased demand for electricity may coincide with decreased reliability of energy delivery systems created by extreme weather events (e.g., heat wave, ice storm). Increasing temperatures may also push tree species that are at the southern extents of their range to higher latitudes—limiting habitat for some species—and result in more heat waves with potential increases in human mortality rates (particularly for those that do not have access to adequate air conditioning).

"People need to view nature as a good friend that we cannot afford to lose. So far we have taken more from nature than we have provided in return. We need to compromise to maintain a natural balance between all living things, and that is why I am beyond excited that we have put forth this Plan to rekindle this friendship."

- Irena Riley
Student, Biology, German

Each of the above are examples of how climate change may affect the way of life at Millersville and the communities that surround the University. While there is uncertainty in the specifics, it is clear that climate change is already happening, that Pennsylvania's future will likely be warmer and wetter and that these changes will have small and large effects on the way Pennsylvanian's produce food, generate energy, conduct commerce and interact with their environment. As a community leader, Millersville has the responsibility and intent to contribute meaningfully to the regional climate change response. This begins with implementing comprehensive measures to lessen our contribution to climate change by reducing, or mitigating, our GHG emissions. The remainder of this document presents an assessment of Millersville's GHG emissions followed by a detailed approach for reducing them.



GHG Emission Reporting Units

Throughout this Plan, GHG emissions are reported in metric tons of carbon dioxide equivalent ($MTCO_2E$). A $MTCO_2E$ is a unit of measure that is used to report GHG emissions. Activities at Millersville produce different types of GHGs, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and hydrofluorocarbons (HFCs). Some of these GHGs are more effective at heating the atmosphere than others. As an example, CH_4 is 25 times more effective at heating the atmosphere than CO_2—so emitting 1 pound of CH_4 is the same as emitting 25 pounds of CO_2. For simplicity, we report all GHGs as in their equivalent amount of CO_2—or CO_2 equivalent. A second reporting convention is to report in metric tons rather than tons. Combined these two conventions create the reporting unit, $MTCO_2E$.

So how much is 1 $MTCO_2E$? At standard atmospheric temperature and pressure, 1 metric ton of CO_2 would fill a balloon the size of a mid-size, two-story house.

In fall 2015, President Anderson joined higher education and business leaders from around the country at the White House to pledge to take action on climate. The Act on Climate pledge reaffirmed Millersville's commitment to achieve carbon neutrality and increased focus on using the challenge of climate change to engage the community and create experiential learning opportunities for students.

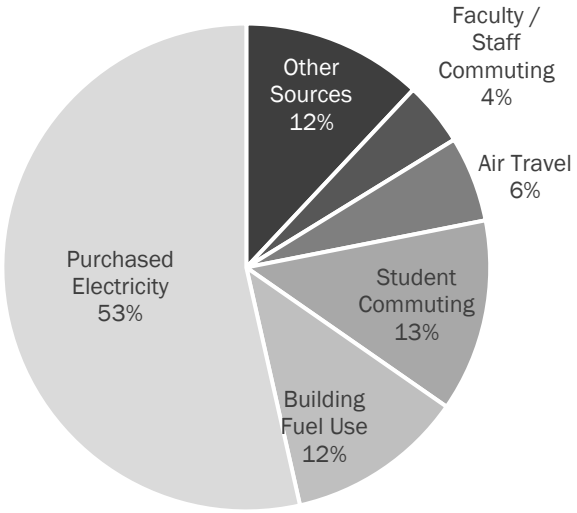
GREENHOUSE GAS EMISSIONS AT MILLERSVILLE UNIVERSITY

The daily activities needed to run academic and administrative programs at Millersville produce GHG emissions. Some GHG emissions occur directly on-site through the combustion of fossil fuels in campus vehicles and in boilers and generators. They also occur upstream—through the combustion of fossil fuels at power plants that provide electricity to Millersville-- and downstream of the University—through the decomposition of waste at landfills, as examples. Faculty, staff and students use electricity to power computers and classrooms and gasoline to power the cars we drive to campus. Each of these activities emit GHGs to the atmosphere. Collectively, the GHG emissions amount to what is commonly referred to as Millersville's carbon footprint. Millersville's GHG emissions along with the GHG emissions of other colleges and universities, corporations, individuals and nations continue to build up in the atmosphere—leading to human-induced changes in climate.

Millersville annually accounts for its GHG emissions by preparing a GHG emission inventory (Figure 2). A GHG emission inventory provides the University with an understanding of where emissions are occurring to help focus GHG reduction, or mitigation, activities. In 2015, Millersville University's gross GHG emissions totaled 32,910 $MTCO_2E$.

- At 53 percent (17,618 $MTCO_2E$), purchased electricity was the largest emission source. Purchased electricity emissions have decreased by 24 percent since the base year due to improved energy efficiency in campus buildings and a transition to natural gas for building heating.
- At 13 percent (4,202 $MTCO_2E$), student commuting is the second largest emission source. Student commuting emissions have remained flat since the 2005 base year—despite a decrease in the total number of students that commute—due to an increase in the average commuting distance.
- At 12 percent (3,882 $MTCO_2E$), building fuel was the third largest emission source. GHG emissions from building fuel use have more than doubled since the base year due to a transition from electricity to natural gas to heat campus buildings.
- At 6 percent (1,868 $MTCO_2E$), air travel (for business purposes and study abroad programs) is the fourth largest emission source.
- At 4 percent (1,391 $MTCO_2E$), faculty/staff commuting was the fifth largest emission source. Faculty/staff commuting has decreased by 25 percent since the base year due to increased interest in biking and other alternative forms of travel.
- Remaining emission sources—including fleet vehicles and equipment, waste disposal, wastewater treatment, refrigerant use, fertilizer use, electricity transmission and distribution, and paper use—collectively accounted for 12 percent (3,948 $MTCO_2E$) of gross GHG emissions with landfilled waste accounting for the greatest share of emissions from the remaining sources. Combined these emission sources decreased by 30 percent since the base year.

Figure 2: Millersville's 2015 GHG Emission Profile



Overall Millersville's gross GHG emissions have decreased by 14 percent since the 2005 base year (Figure 3). The 14 percent decrease is primarily attributable to a decline in emissions from purchased electricity; however, this decrease is offset in part by a concurrent increase in GHG emissions from building fuel use as the University begins to transition toward using natural gas instead of electricity for heating purposes.

Figure 3: 2005-2015 GHG Emissions by Source

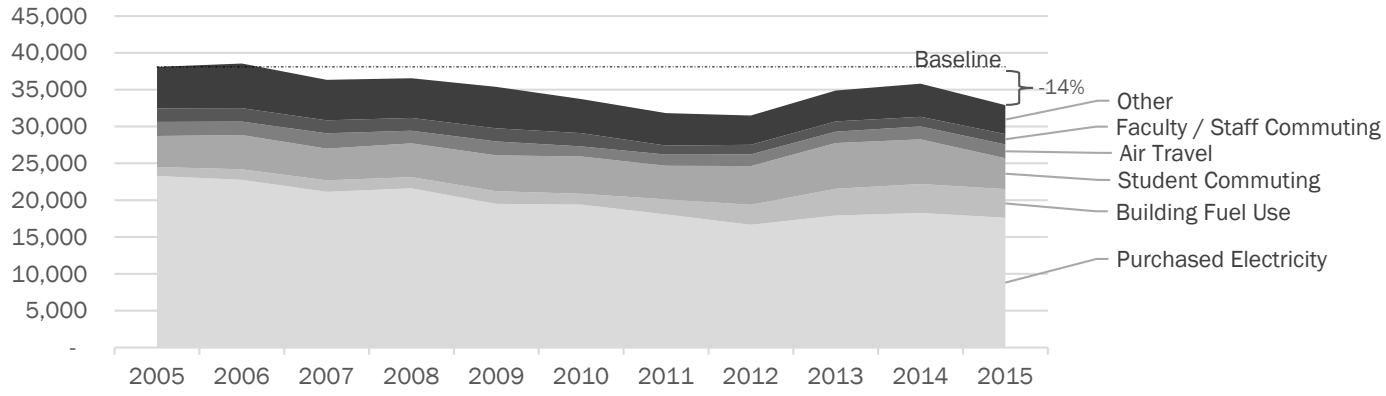
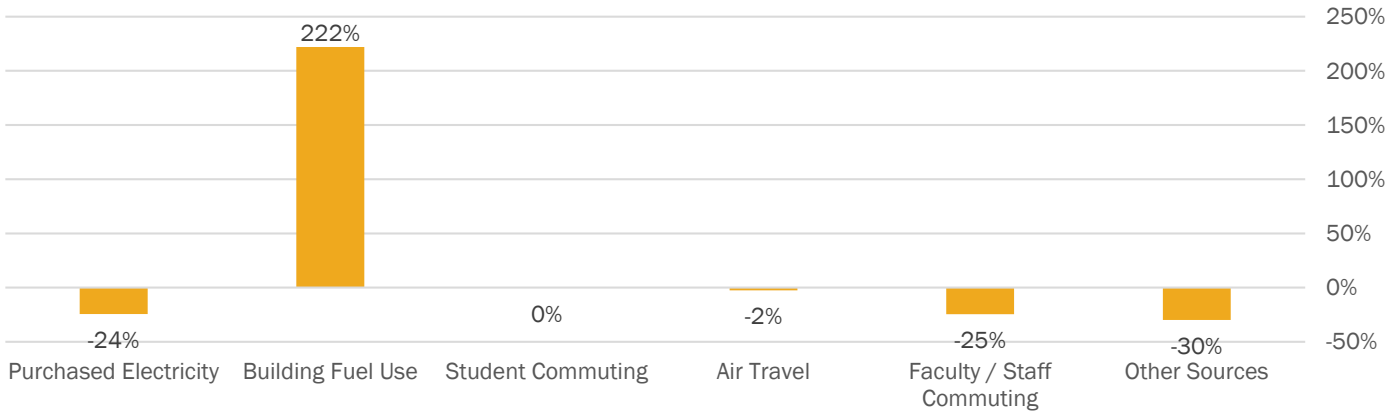


Figure 4: 2015 Percent Change Relative to 2005 Base Year by Source



In 2015, net GHG emissions totaled 32,813 $MTCO_2E$. Net GHG emissions have varied year-to-year depending on the number of Renewable Energy Certificates (RECs) the University purchased. Millersville made a small REC purchase in 2015 that resulted in an overall carbon benefit (or reduction in gross GHG emissions) of 97 $MTCO_2E$.

GHG EMISSION PROJECTION

Millersville's current GHG emissions are driven primarily by campus building energy use and by student commuting and, to a lesser degree, business travel and travel for study abroad programs. Moving forward these emission sources are likely to continue to be the primary drivers of Millersville's GHG emissions. Therefore, changes in the size and nature of the campus building portfolio as well as changes in how students commute to campus (and how many students commute to campus) all affect Millersville's future emission profile.

Building Energy Use

Millersville has undergone significant recent changes to the building portfolio—including construction of several large new buildings. Despite growth in the total amount of building space, overall building-related GHG emissions have declined due to fuel switching in major buildings from electricity to natural gas for heating purposes. Based on the University's current plans, some additional construction is anticipated in the near future—including a new net zero energy building—however, under a no-mitigation or business-as-usual scenario, building-related GHG emissions are expected to remain largely flat either because the new buildings are net-zero energy or because new construction is matched by disposition.

Student Commuters

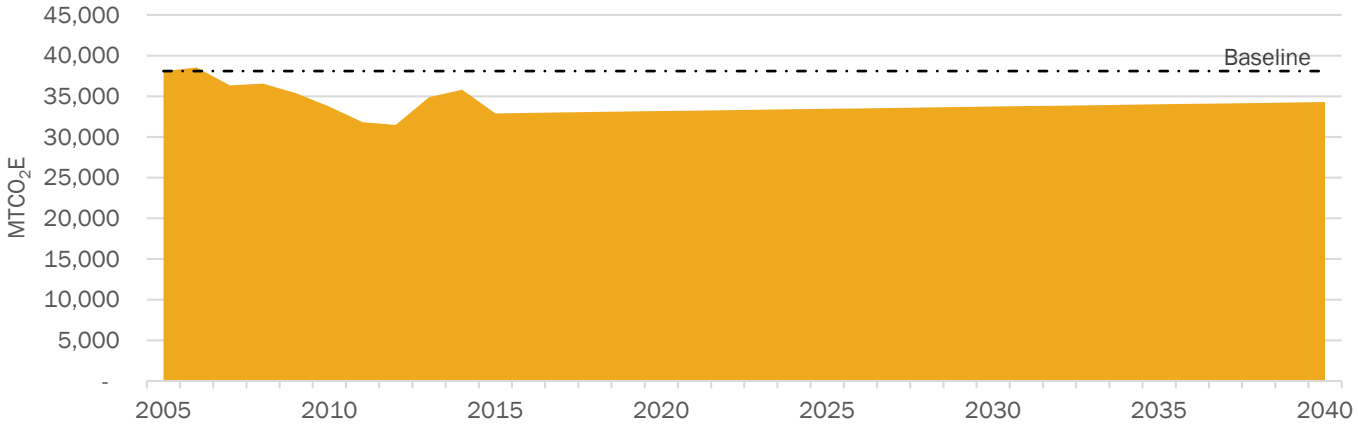
Currently, students who commute to campus account for approximately 48 percent of the student population. Under a business-as-usual scenario the percent of students who commute to campus is not expected to change; however, based on current projections, the overall size of the student population is expected to increase. Assuming that the percent of students that commute to campus remains the same, the number of student commuters will likely increase by approximately 7 percent by 2040 based on current enrollment projections. Assuming that the average commuting distance stays roughly the same, this means that overall student-commuting related GHG emissions will also increase by about 7 percent.

Air Travel

While not as large an emission source as building energy or commuting, emissions from air travel still account for approximately 6 percent of Millersville's overall GHG emissions. The University has set a strategic goal to increase the number of students studying abroad by 50 percent; therefore, these emissions can be expected to increase in the future. Currently, travel for study abroad programs accounts for approximately 40 percent of overall GHG emission from air travel. An increase of 50 percent in travel for study abroad programs would increase the overall air travel emissions by approximately 20 percent.

Based on the above anticipated changes in activities at Millersville University, by 2040 projected GHG emissions are likely to increase slightly despite the mitigation activities implemented to date (Figure 5).

Figure 5: Projected Business-as-Usual GHG Emissions, 2015-2040



Direct and Indirect GHG Emissions

Millersville's GHG emission inventory is prepared in accordance with GHG accounting protocols used by colleges and universities. While not discussed at length in this Climate Action Plan, GHG emission accounting protocols call for separating GHG emissions into those that result directly from emission sources that Millersville controls and those that occur indirectly as a result of Millersville's activities, but by sources owned by another entity. As an example, Millersville's fleet vehicles are a direct emission source (the University owns the vehicle) while student commuter vehicles are an indirect emission source (the student, not the University, owns the vehicle). Direct emission sources are commonly referred to as "scope 1" emission sources, while indirect emission sources are broken out into "scope 2" (purchased electricity) and "scope 3" (all other indirect emission sources).

By definition, Millersville has more control over direct emission sources. For this reason, actions that address scope 1 emissions are likely to focus on infrastructure or operational changes while those that address indirect emissions may focus more on education and outreach or incentive-based programs. Because the degree of influence over emission sources differs, organizations often set separate goals for scope 1 and 2 emissions and scope 3 emissions. For consistency with other colleges and universities, Millersville has set one goal (carbon neutrality) that addresses all scope 1, 2 and 3 emission sources; however, the University recognizes that the ability to influence some scope 3 sources may be limited.

Millersville's trolley provides students with a safe, low-impact mode of travel for getting around campus. The trolley provides over 70,000 rides annually—lessening vehicle travel on campus.

GREENHOUSE GAS MITIGATION APPROACH

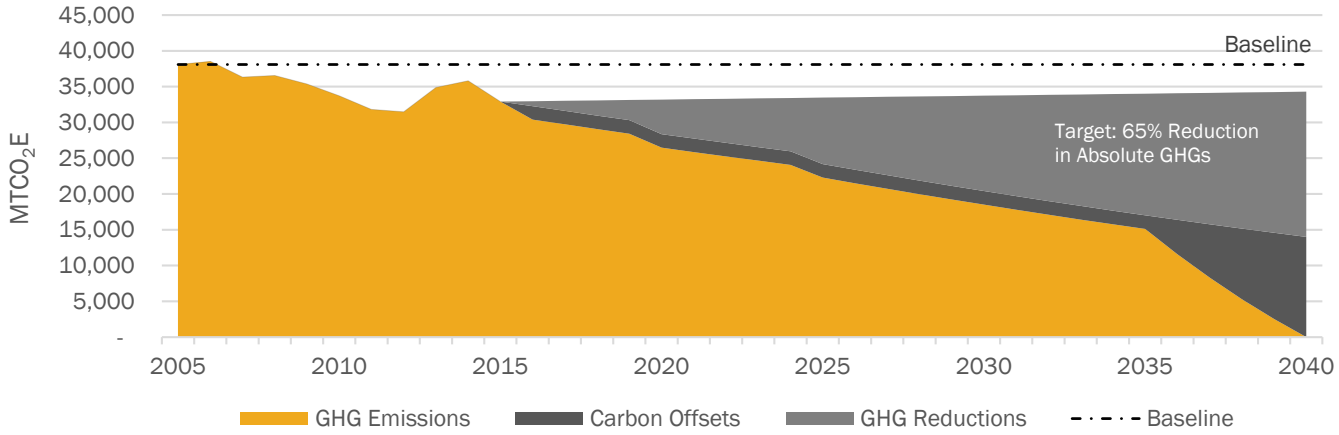
Millersville's approach for achieving carbon neutrality consists of a two-pronged strategy (Figure 6):

1) Reduce absolute GHG emissions to the maximum extent possible with an initial target of 65 percent by 2040, and
2) Phase in viable and broadly beneficial carbon offsets to balance remaining emissions and achieve carbon neutrality.

To reduce absolute GHG emissions, Millersville will:

1) Set broad goals for improving performance within the main emission categories,
2) Identify metrics to track progress toward achieving the performance goals,
3) Plan and implement GHG mitigation actions that support the goals, and
4) Monitor progress and revise the approach as needed to continue moving toward carbon neutrality.

Figure 6: Millersville's Carbon Neutral Strategy, 2015-2040



Achieving a 65 percent reduction in absolute GHG emissions will require coordination across the University's various departments, and the personal and professional commitment of faculty, staff and students. It will require conservation activities and efficiency improvements, changes in behavior and integration of climate change considerations into University activities—from campus events to classroom discussions. All members of the University community can and should be involved.

Millersville plans to implement numerous mitigation activities. Some activities result directly in GHG emission reductions while the benefits of others are indirect. The planned cumulative effect of these activities is carbon neutrality. Millersville selected the organizational framework used by the Association for the Advancement of Sustainability in Higher Education's (AASHE) STARS® rating system as a broad structure for categorizing the activities. While the STARS rating system is intended to assist universities with a full assessment of their overall sustainability, applying the framework now will ensure consistency if the STARS rating system is applied. The broad categories used by STARS include Operations, Academics, Engagement, and Planning and Administration. Millersville organized mitigation activities within these categories, as follows:

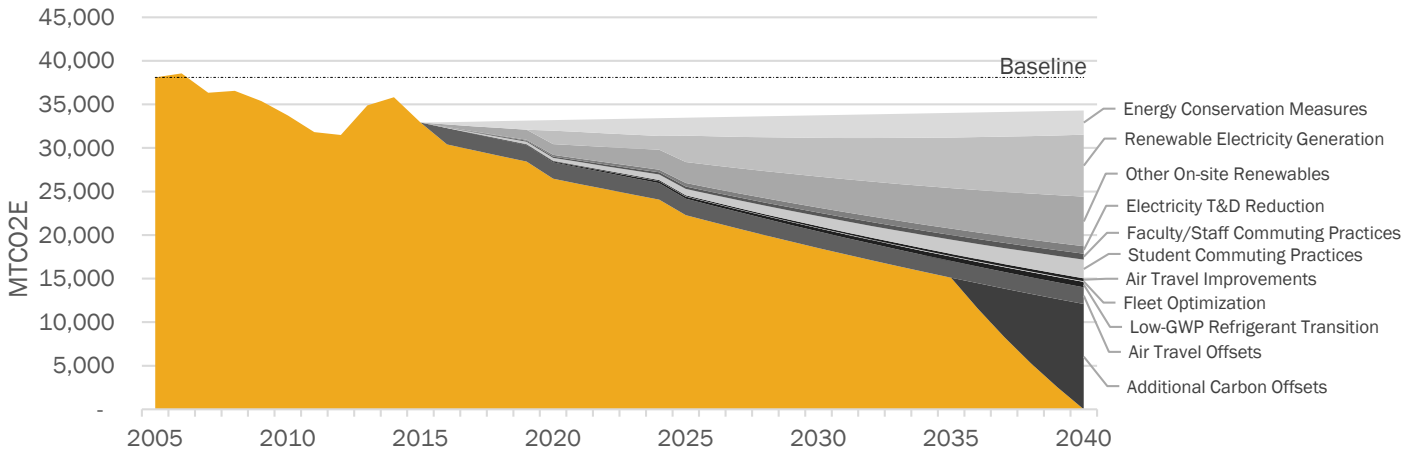
- Through **operations** Millersville will optimize building energy use, reduce waste and flex the University's purchasing power to support sustainable products.
- Through **academics** Millersville will increase awareness of climate change issues, find solutions to real challenges the University faces in reducing GHGs and demonstrate that the greatest impact lies beyond the campus gates.
- Through **engagement** Millersville will channel the creative energy of the University's faculty, staff and students to elevate the climate change conversation and be agents of change within the community.
- Through **planning and administration** Millersville will ensure that effective implementation instruments are in place and that climate change considerations are incorporated into departmental and administrative responsibilities.

Millersville has set the following goals for achieving carbon neutrality within the institutional areas noted above. The goals set a broad framework for pursuing carbon neutrality.

1) Design and build all new buildings, and major renovations to existing buildings, to green building rating system standards.
2) Increase the energy efficiency of Millersville's existing buildings through retrofits and upgrades while creating a culture of energy conservation among Millersville's faculty, staff and students.
3) Increase use of renewable electricity.
4) Increase on-site renewable energy generation.
5) Provide educational opportunities that require less commuting while increasing the percentage of the student population that walks or bikes to campus.
6) Reduce the per-mile GHG emissions intensity associated with faculty, staff and student commuter travel.
7) Increase waste diversion while continuing to reduce GHG emissions associated with the supply chain.
8) Increase campus climate literacy.
9) Advance a culture of sustainability.
10) Incorporate climate change and sustainability considerations into University planning activities and administrative practices.

Many of these goals, and the actions that support them, will result in a direct reduction in Millersville's GHG emissions. To assist with tracking performance, Millersville has established goal-specific performance metrics where possible. Collectively, these actions are projected to result in a 65 percent reduction in GHG emissions. When coupled with targeted carbon offset purchases, implementing these actions should set Millersville on a path to achieve carbon neutrality by 2040.

Figure 7: GHG Mitigation Approach, 2015-2040



The remainder of this section organizes Millersville's mitigation goals and actions according to the four categories of Operations, Academics, Engagement, and Planning and Administration.

OPERATIONS

Campus operations offer the greatest potential to reduce GHG emissions included within the GHG emission inventory. Significant investment in energy-efficiency upgrades combined with a commitment to responsible growth and a transition to on-site renewable energy generation and low-carbon fuel sources provide a foundation for sustained reductions in GHG emissions over the next two decades.

The mitigation goals and activities planned for Millersville's *operations* are organized as follows:

- Buildings;
- Energy;
- Transportation;
- Purchasing, Waste and Dining Services; and
- Grounds.

Buildings

Millersville University's building portfolio includes more than 80 buildings and 2.1 million gross square feet (GSF) of building space. The buildings vary considerably in size, age and use—ranging from single-family homes that were built in the late 1800s and early 1900s and have been repurposed as academic and administrative buildings to a multipurpose student union building (the Student Memorial Center) that alone accounts for more than 10 percent of the University's building space.

Overall, small buildings (those that are less than 10,000 GSF) account for the greatest number of buildings on campus (60 percent) (Figure 8), while large buildings (those that are greater than 50,000 GSF) account for the greatest share of building space (64 percent) (Figure 9). The top 10 largest buildings, which, in addition to the Student Memorial Center (SMC), includes the Francine G. McNairy Library, Caputo Hall, Winter Visual and Performing Arts Center, and several others—collectively account for more than half of the university's building space. Of these, all but two buildings are more than 25 years old—though most (72 percent) have undergone significant renovation within the past 15 years (Figure 10).

While much of the campus building space is established, the University has initiated planning activities for some new construction—including constructing a new net zero energy Welcome Center. The net zero energy Welcome Center serves as a model for new construction and major renovation activities on campus and sets a precedent for sustainable construction. Based on this model for sustainable construction, Millersville has set a building-related goal to:

Goal 1: Design and build all new buildings, and major renovations to existing buildings, to green building rating system standards.

Millersville will seek to incorporate sustainable design principles and green building rating system standards into new construction and major renovation activities to ensure that the University grows in a responsible manner. Additionally, the University will consider instituting planning procedures and mechanisms that allow for evaluating the current use of space to identify opportunities for space consolidation and perhaps the disposition of assets as appropriate.

Figure 8: Percent of Campus Building Number by Building Size

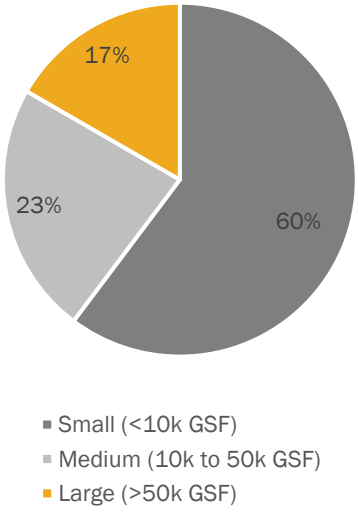
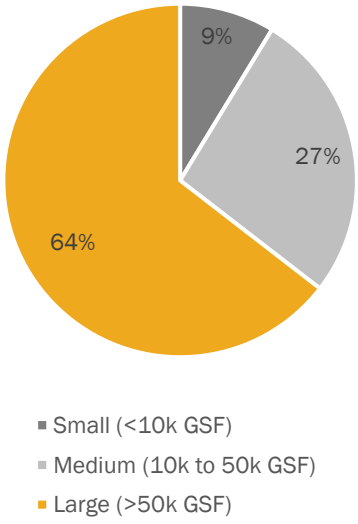


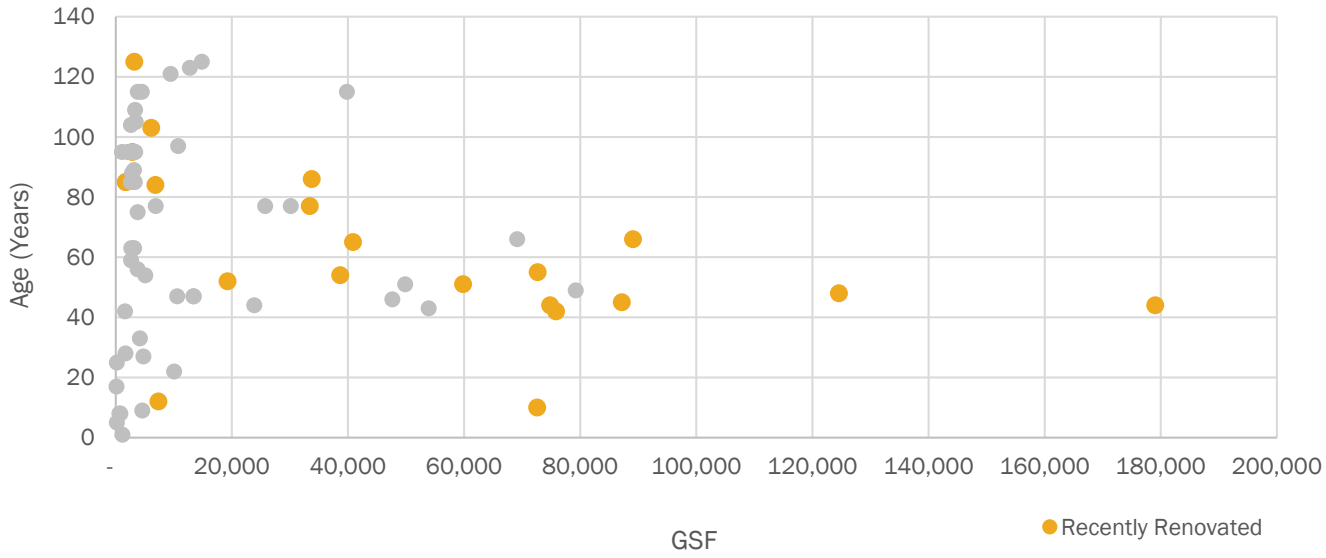
Figure 9: Percent of Total Building Space by Building Size



Specifically, Millersville will:

- Design and construct a net zero energy Welcome Center as a highly-visible demonstration of the University's climate commitment.
- Consider conducting an analysis of building use to identify opportunities for space consolidation, building disposition and a reduction in conditioned space.
- Consider adopting mechanisms and metrics to allow departments to evaluate their use of building space.
- Develop a policy for constructing new buildings according to green building standards.
- Conduct an assessment of university laboratories to identify opportunities to improve performance—particularly with respect to ventilation.
- Identify, prioritize and implement various measures to improve the overall performance and sustainability of the building portfolio (using GHG mitigation potential as one project prioritization criterion).

Figure 10: Building Portfolio by Age and Size



Energy

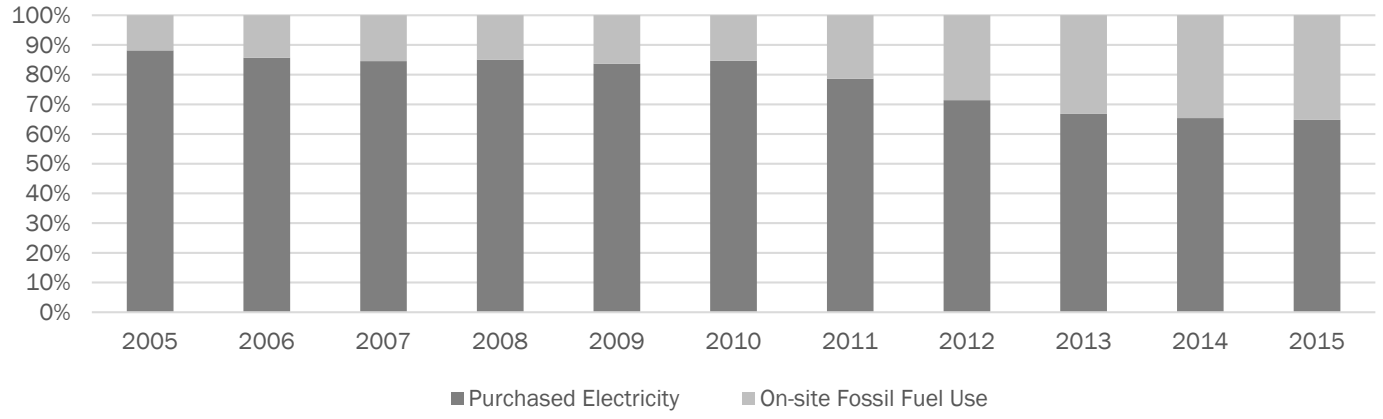
Millersville has a unique history associated with meeting the University's energy demand. Like many other universities in the Mid-Atlantic and Northeast regions of the United States, the University originally operated a centralized steam plant that provided heat to campus buildings. The steam plant was in use from the late 1930s to 1970 at which time Millersville transitioned away from meeting heating demand using centralized steam generation toward providing decentralized heating—primarily through electric heat. The steam plant was converted into what is now the University data center (Boyer Building).

Rising electricity costs and lower natural gas costs combined with and interest in converting to less-carbon intensive forms of energy have spurred a recent transition toward natural gas heating (Figure 11). Approximately 15 campus buildings are now supplied by natural gas to meet either space heating or water heating needs or both. While fuel switching has led to an overall decline in energy-related GHG emissions, at 65 percent of total GHG emissions, GHGs from building energy use still account for the largest share of the University's GHG emissions.

Millersville has initiated plans to construct a net zero energy Welcome Center on campus. The net zero energy building will serve as a model for new construction and major renovation activities on campus and set a precedent for sustainable construction.

Net Zero Energy Welcome Center, Artist Rendering

Figure 11: 2005-2015 Campus Energy Use by Fuel Type



Significant planning and resources will be dedicated to reducing GHG emissions from buildings by creating a culture of energy conservation, investing in building energy-efficiency upgrades and, in time, transitioning to on-site renewable energy generation. Millersville has set energy-related goals to:

Goal 2: Increase the energy efficiency of Millersville's existing buildings through retrofits and upgrades while creating a culture of energy conservation among Millersville's faculty, staff and students.

Goal 2 Performance Metrics:
2005 Building Energy Use Intensity: 94 kBtu/GSF
2040 Target Building Energy Use Intensity: 71 kBtu/GSF

Goal 3: Increase use of renewable electricity.

Goal 3 Performance Metrics:
2005 Renewable Electricity Use: 0% of campus demand
2040 Target Renewable Electricity Use: 25% of campus demand

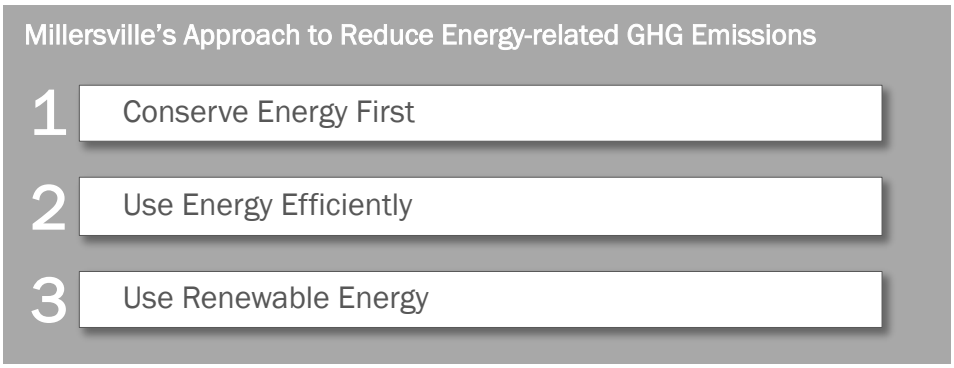
Goal 4: Increase on-site renewable energy generation.

Goal 4 Performance Metrics:
2005 Other On-site Renewable Energy Generation: 0% of campus demand
2040 Other On-site Renewable Energy Generation: 20% of campus demand

Millersville's approach to reducing energy-related GHG emissions can be characterized by three activities (Figure 12):

1. Reduce overall energy demand through conservation,
2. Increase efficient use of energy by implementing energy efficiency measures, and
3. Transition toward alternative, less carbon-intensive, forms of renewable energy to meet remaining demand.

Figure 12: Millersville's Approach to Reduce Energy-related GHG Emissions



Conservation

Conservation can be as easy as turning off a light switch. It therefore offers the most cost-effective means of reducing energy consumption. While cost-effective, conservation also relies almost entirely on the energy consumers—the faculty, staff and students that use the classrooms, offices and residence halls. Through campaigns, competition and recognition, Millersville will further develop and enhance a culture that values energy conservation. Specifically, Millersville will take actions such as:

- Mobilize student groups to incorporate energy awareness and conservation practices into their campus life activities.
- Develop and release education and outreach materials focused on energy conservation.
- Create web-based dashboards that present building energy consumption as a visible reminder of building energy use and to support energy management.
- Establish temperature set points for buildings during occupied and unoccupied hours that optimize building comfort while lessening overall energy demand.
- Encourage use of daylighting in campus classrooms, offices and common spaces.
- Establish an energy-conservation policy and campaign that provides specific guidance and best practices for responsible use of energy resources.
- Institute and implement an energy shutdown or reduction policy at appropriate buildings during minimal utilization periods such as winter break.
- Install pool covers at the Pucillo Pool and the Brooks Pool.

Efficiency

Coincident with energy conservation campaigns and other activities that lessen the overall demand for energy, Millersville will implement a suite of energy efficiency upgrades to campus buildings with intent to reduce building energy use intensity by 25 percent relative to the 2005 base year. While many campus buildings have energy-efficient appliances and lighting and up-to-date heating and cooling systems, many others do not. Energy efficiency upgrades will therefore be made in a deliberate and prioritized manner that begins by targeting those buildings that offer the greatest potential for improvement. Millersville has recently finished installing metering systems that will allow for building-level tracking of energy consumption. The University will use this information to track performance and to develop building energy use intensities that will allow for comparing the buildings against each other and against other like building types. Using this information, Millersville will monitor building performance to identify buildings that offer opportunities for improvement and prioritize them for further evaluation to identify energy conservation measures (ECMs). Millersville will compile ECMs for all target buildings and prioritize them for implementation based on available funding using a project prioritization process (see Planning and Administration). Additional planned efficiency improvements may include:

- Continue to retrofit existing buildings with high-efficiency boilers and HVAC systems.
- Identify and implement building envelope improvements throughout the building portfolio.
- Transition to using solar-powered LED lighting for outdoor lighting where appropriate.
- Implement high-efficiency lighting upgrades throughout campus buildings.
- Conduct an analysis of the data center energy usage and convert appropriate equipment to high-efficiency models.

Renewables

A strong energy conservation program coupled with ongoing energy efficiency upgrades will position Millersville to achieve significant reductions in energy use intensity. As energy demand decreases and aligns more closely with target levels, Millersville will transition from investing primarily in energy efficiency upgrades to investing in alternative forms of energy supply. Specifically, by 2040 Millersville will target supplying 25 percent of electricity demand through on-site renewable electricity generation and 20 percent of on-site thermal energy demand through renewable generation—such as geothermal.

To do so, the University will pilot on-site renewable electricity generation using photovoltaics (PV) to meet the energy requirements of the planned net zero energy Welcome Center (see the Buildings section). Millersville will monitor the performance of the Welcome Center's PV system and use the understandings gained to inform an On-site Renewable Electricity Generation Plan for the University. The On-site Renewable Electricity Generation Plan will provide a roadmap for phasing in on-site renewable electricity generation through a series of projects over the next two decades—including the potential for solar canopies over parking lots and rooftop solar arrays on large campus buildings.

"Nearly every individual I have met at Millersville has an intrinsic sense of where the opportunities lie to strengthen our response to climate change. This Plan begins to bring those ideas together to create a concerted, purposeful movement. Our individual actions, a continued willingness to collaborate, and a few exciting projects are all that stand between today and a climate-friendly future."

- Chris Steuer
Sustainability Manager

Millersville has also piloted use of geothermal heating on campus for the recently-constructed East Village, West Village and South Village student housing units. Moving forward, Millersville will monitor the performance of these geothermal devices and use the knowledge gained to inform a transition toward greater use of geothermal on campus. Millersville has recently made several upgrades in heating systems to transition from electric heat to natural gas. A transition to geothermal for buildings that have recently converted to natural gas may occur after the useful lifetime of the recently-installed systems while other buildings slated for conversion to natural gas may instead by converted to geothermal. Additionally, Millersville will investigate opportunities to install solar hot-water heating devices on appropriate buildings and continue to transition to natural gas over electric-supplied heat where appropriate.

Collectively Millersville's efforts to conserve energy, use it efficiently, and transition to alternatives are projected to reduce overall energy-related GHG emissions by 58 percent by 2040 relative to the 2005 base year.

Transportation

Millersville's transportation-related emissions stem primarily from commuter travel (both student commuting, and faculty and staff commuting) and to a lesser degree travel for business and study-abroad programs. Additionally, on-campus travel contributes to the University's overall GHG emissions as do emissions from the campus fleet and equipment use. This section describes planned goals and actions for reducing GHG emissions associated with transportation-related emission sources.

Commuting

GHG emissions from student commuting accounted for approximately 13 percent of total GHG emissions in 2015 while GHG emissions from faculty and staff commuting accounted for approximately 4 percent of total GHG emissions in 2015. The amount of GHG emissions that result from commuting depend on the number of commuters, the distance traveled by each commuter, and the emissions intensity (expressed as GHGs per mile) of each commuter.

Currently, approximately 3,306 students (48 percent of the student population) commute to campus each day. The average distance traveled by a student commuter to reach campus is approximately 14 miles and roughly 77 percent of student commuters, commute alone in a personal vehicle. On average each student is responsible for generating approximately 0.81 pounds of CO_2E for every mile traveled—slightly lower than in 2005 (0.84 lbsCO_2E/mile).

All faculty and staff commute to campus (nearly 900 individuals) and most (approximately 90 percent) commute alone using a personal vehicle. The average trip distance is approximately 11 miles and, on average, each faculty and staff person is

responsible for generating approximately 0.82 pounds of CO_2E for every mile traveled—slightly lower than in 2005 (0.86 $lbsCO_2E$/mile).

Millersville currently offers bus options for commuters through a contract with a local municipal bus service. Students may use the bus service, which provides service to the City of Lancaster, free of charge using their student I.D. The bus service also provides access to downtown campus locations (e.g., the Ware Center) and local business attractions as well as connections to regional transit. Ridership has increased slightly since 2005 contributing to a slight decline in the number of students that commute to campus alone in a personal vehicle. Despite a slight increase in bus ridership, overall GHG emissions from student commuting have increased since 2005 largely due to an increase in the average distance traveled by students that commute alone.

"Promoting bicycling as a preferred means of transportation on campus will create a healthier and more sustainable university."

- Dr. Dan Keefer
Professor and Chairperson,
Department of Wellness and Sport Sciences

Millersville has set the following goals to reduce GHGs associated with commuting:

Goal 5: Provide educational opportunities that require less commuting while increasing the percentage of the student population that walks or bikes to campus.

Goal 5 Performance Metrics:
2005 Student Commuter Percentage: 63 percent of student population
2040 Target Student Commuter Percentage: 40 percent of student population

Goal 6: Reduce the per-mile GHG emissions intensity associated with faculty, staff and student commuter travel.

Goal 6 Performance Metrics:
2005 Student Commuter GHG Emission Intensity: 0.84 $lbsCO_2E$/mile
2040 Target Student Commuter GHG Emission Intensity: 0.47 $lbsCO_2E$/mile

2005 Faculty and Staff Commuter GHG Emission Intensity: 0.86 $lbsCO_2E$/mile
2040 Target Faculty and Staff Commuter GHG Emission Intensity: 0.42 $lbsCO_2E$/mile

Achieving these goals, will take considerable planning and coordination within the University gates and with the surrounding community. Millersville has identified actions to reduce commuting GHG emission such as:

- Conduct a commuter survey and analysis to understand commuter behavior such as modes of travel, points of origin and travel routes.
- Work with partners (e.g., Commuter Services of Pennsylvania) to evaluate and promote existing and planned alternative commuting options available in the City of Lancaster and surrounding region.[7]
- Develop a commuting plan that characterizes commuter travel, presents opportunities for reducing emissions associated with commuting based on existing and planned regional alternative travel options, and identifies specific actions that Millersville can take to lessen commuting emissions. Example actions include:
  - Designing and implementing a web-based rideshare or carpooling program for commuters.

[7] Commuter Services of Pennsylvania, http://pacommuterservices.org/rtcs/

- Designating parking spaces or parking permit discounts for individuals that carpool or use low-GHG emitting vehicles such as electric vehicles or hybrids while increasing the number of electric-vehicle charging stations.
- Expanding subsidized public transportation options.
- Improving bicycling infrastructure (e.g., trails, bike repair services, shared-lane bicycle markings) to provide a bicycle-friendly campus and more bike-friendly access to campus.
- Concentrating class schedules to more hours on fewer days to limit the number of trips made to campus.

Business Travel and Study Abroad Programs

In 2015, Millersville's GHG emissions from business travel and study abroad programs totaled 1,868 $MTCO_2E$. The majority (60 percent) of air travel emissions are attributable to faculty and staff travel for business purposes, while the remaining air travel emissions (40 percent) are associated with faculty and student travel for study abroad programs. Air travel emissions have decreased slightly (2 percent) since 2005 due, in part, to business travel restrictions.

Historically, air travel has not seen as significant an increase in efficiency as other industries—meaning that, on a per mile basis, it still takes about as much carbon to travel in an airplane as it did years ago. As such, the primary option available to Millersville and other universities to reduce emissions is to limit air travel. Millersville has taken, and will continue to take, steps to reduce travel; however, for some programs doing so conflicts with other priorities. As an example, the University's 2014-2017 Strategic Plan calls for increasing the number of students that study abroad by 50 percent by 2020.[8]

There are some indications that the carbon intensity of air travel may start to improve, however. Notably, in June 2015, the EPA announced an Advanced Notice of Proposed Rulemaking to set international CO_2 emissions standards for aircraft. Additionally, the Federal Aviation Administration (FAA) has proposed various options for improving air travel efficiency—including adopting satellite-based air traffic procedures that will optimize flight routes and airport access—particularly during fuel-intensive takeoff and landing.[9] Other national mitigation strategies include aircraft engine efficiency improvements, improved operation and maintenance practices, and use of sustainable aviation fuels. While Millersville cannot directly influence these activities, part of the University's mitigation strategy can include preferential use of airlines that are early adopters of these strategies.

Despite these promising advancements, air travel is likely to be a carbon-intensive form of travel for the foreseeable future. Air travel is also necessary for providing faculty, staff, and students with valuable professional and academic experiences to help them grow and flourish. Still, the University does have a broad range of options available for offsetting the carbon associated with travel—including easy carbon offset options provided on most travel websites.

Millersville has identified actions to reduce GHG emissions from business travel and study abroad programs, such as:

- Seek opportunities to limit business travel by using video conferencing, exploring professional development opportunities made available through online education and training programs, and participating in virtual conferences.
- Increasingly participate in off-campus meetings using remote applications—such as video conferencing.
- Increase use of remote interview procedures to conduct interviews for university positions—particularly for initial screenings.
- Encourage use of less carbon-intensive forms of travel (e.g., trains) for regional business travel.
- Set university policy that encourages use of rental vehicles with high fuel economy or are low GHG-emitting (e.g., electric vehicles).
- Encourage faculty and staff to use public transportation instead of rental vehicles for conferences, meetings and other business travel.
- Establish university policy that identifies and encourages use of airlines that are early adopters of less carbon-intensive engine technologies and flight procedures.
- Encourage departments to adopt use of carbon offsets for air travel.

[8] http://www.millersville.edu/iea/planning/
[9] https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=19375

Campus Travel

Once on campus, faculty, staff and students have several options for getting around. Most campus buildings are located within easy walking distance of one another and there are numerous pathways and walkways that connect campus buildings. Bike racks and bike repair stations are provided and a campus trolley shuttle travels a continuous loop that connects various key campus locations. Overall, the on-campus travel footprint is relatively small; however, there are some opportunities for reducing GHG emissions. As an example, while the majority of faculty, staff and students use the walkways and pathways to move between various campus locations, there is also a tendency among some to travel between buildings using personal vehicles by simply driving from one parking lot to another. While this represents a relatively small segment of the campus-travel population, it does increase the amount of vehicle traffic on campus and impact the bike-and-pedestrian friendly nature of some key campus locations. Opportunities to reduce GHG emissions from campus travel include:

- Encourage increased ridership and use of the campus shuttle system.
- Continue to ensure that the shuttle connects to key travel nodes on campus.
- Increase signage and other markings to encourage a bike-friendly campus.
- Adopt bus tracking applications to allow students to track bus arrival on their smartphones.
- Work with the bus vendor to install bike racks on buses.
- Adopt a campus no idling policy.
- Launch campaigns to encourage largely pedestrian and bicycle travel on campus.
- Consider installing bike-sharing system for travel between key campus locations.

Campus Fleet

"For me, sustainability is a movement to respect nature and our place in it. It is expanding our consideration for each other and the resources that sustain our everyday lives. It is seeing the intrinsic value of all living organisms and extending love."

- Hannah Beville
Student, Biology

The University fleet consists of approximately 90 vehicles and an additional 20 pieces of medium and heavy-duty equipment, such as backhoes, tractors and mowers. GHG emissions from University vehicles and equipment are a small emission source that, on average, accounts for less than one percent of total GHG emissions. While this emission source is small compared to others, campus vehicles are a visible representation of the University's commitment to reducing GHG emissions. An appropriately-sized fleet that consists of fuel-efficient vehicles demonstrates that Millersville considers its GHG impact in all campus activities. Additionally, using vehicles that are powered with alternative-fuels demonstrates the technologies viability and encourages broader use within and beyond the campus gates. The opportunities Millersville has identified to reduce GHG emissions from the campus fleet include:

- Conduct a fleet optimization analysis that evaluates the purpose and use of each vehicle with intent to ensure that vehicles are matched to the right job.
- Adopt a vehicle replacement and purchasing methodology that considers the vehicle's fuel economy and fuel type along with other priorities related to purpose and use.
- Consider opportunities to test new alternative-fuel technologies—particularly by working with University partners, state and federal programs.
- Continue to implement vehicle maintenance practices that ensures that vehicles are routinely serviced and operating optimally.

Installing bike racks and campus bicycle repair stations among other bike-friendly actions earned Millersville an honorable mention with the League of American Bicyclist's Bicycle Friendly University program. Future plans include developing signage to help bicyclists and motorists share campus roadways, creating dedicated bike shelters and expanding bike work stations.

Purchasing, Waste and Dining Services

Purchasing, waste, and dining services at Millersville are closely related. Purchasing decisions are largely decentralized to the various departments though policy and guidance are set (and support provided) by the Purchasing Department. Dining and Conference Services oversees their purchasing activities and is one of the main waste generators on campus. Dining and Conference Services has also made some of the greatest strides within the University to reduce waste and make purchasing more sustainable. This section presents mitigation activities related to purchasing, waste and dining services and sets a goal to:

Goal 7: Increase waste diversion while continuing to reduce GHG emissions associated with the supply chain.

Purchasing

At first glance, GHG emissions associated with purchasing account for a relatively small share of Millersville's GHG footprint; however, closer review and consideration reveals that wise purchasing decisions have some of the greatest potential to lessen the University's contribution to climate change. From a life-cycle perspective, the products and services that Millersville purchases come with embedded GHGs—GHGs that occur during the extraction of raw materials used in products we purchase, GHGs from energy used to manufacture the products, and GHGs that occur through the transport of materials from the manufacturer to the University doorstep. These embedded GHGs are, for the large part, not yet accounted for as a GHG source in Millersville's GHG emission inventory; however, those companies and organizations that have accounted for lifecycle GHGs often find that they can significantly outweigh emissions from other sources such as buildings and fleet operations.[10]

Millersville's Purchasing Department has already taken great strides to purchase sustainable products. As examples, the University has adopted an Energy Star Priority Purchasing Program to ensure that equipment for both single and mass purchasing actions are Energy Star compliant. Additionally, the University works with vendors, contractors and maintenance staff to purchase environmentally-friendly cleaning materials. Additionally, the University has implemented a paper reduction policy that reduced paper use by nearly 50 percent in one year. Moving forward Millersville plans to:

- Continue to look for opportunities to implement sustainable purchasing policies (e.g., biopreferred) with an emphasis on reducing embedded GHGs within the supply chain.
- Develop a guidebook for sustainable purchasing for use by campus departments.
- Review purchased materials to identify products with high embedded GHGs and identify low-carbon alternatives.
- Consider incorporating language in contracts to encourage product and service providers to report GHGs.
- Modify business travel tracking capabilities to track department-level purchase of carbon offsets for business travel (see the Business Travel and Study Abroad Programs section).

Waste

The University's landfilled solid waste has decreased significantly since 2005—from approximately 700 tons produced annually to approximately 400 tons produced annually (42 percent reduction) through efforts to reduce waste at its source and increase waste diversion (through composting and recycling). Still, waste accounts for approximately 4 percent of total GHG emissions. Additionally, waste production and waste disposal practices are a highly visible indicator of the University's commitment to GHG reduction and to sustainability overall. Notably, one of the University's highest profile sustainability initiatives focuses on waste diversion—specifically diverting items that are not commonly recycled (e.g., water filters, toothpaste tubes, energy bar wrappers) through a partnership with TerraCycle® to generate funds that are then donated to the Smile Train, a charity to support surgeries for children with cleft lips or palates.[11]

Moving forward the University will focus on increasing waste diversion rates with intent to achieve a 50 percent waste diversion rate in the near-term and long-term goal of incorporating broader net-zero waste principles into purchasing and waste disposal

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[10] WRI Scope 3 GHG Protocol FAQ, http://www.ghgprotocol.org/files/ghgp/public/FAQ.pdf
[11] TerraCycle at the 'Ville-age, http://www.millersville.edu/ccerp/CSE/terracycle-at-the-ville-age.php

procedures. Incorporating zero waste principles into University operations will challenge us to change our perception of waste as a natural byproduct of our activities to a resource that should be looped back into the supply chain. Pursuing net zero waste principles will require broad evaluation of the supply chain and coordination among various University departments—including Purchasing, Facilities, and Dining and Conference Services. Additional mitigation opportunities include:

- Establish a campus waste reduction taskforce.
- Develop a paper reduction training and goals for departments and offices.
- Formally participate in the annual Recyclemania competition.
- Conduct an analysis of waste disposal practices to better understand the waste profile and identify specific opportunities for source reduction and waste diversion.
- Increase the number and improve the siting of recycling bins on campus.
- Expand the composting program to include additional Dining and Conference Services facilities as well as appropriate housing locations and other campus locations.
- Improve programs and infrastructure dedicated to donating, reusing and recycling electronic materials.
- Increase waste diversion rates for campus events with intent to move toward net-zero waste events.
- Require construction/demolition waste management plans and increase solid waste diversion from construction and demolition activities.

"In the future we will look back with a mixture of outrage and puzzlement at our era of uncontrolled carbon emissions—just as we look back at a time when people could smoke indoors, dump industrial chemicals into our air and water, and use leaded gasoline. As a society, we overcome these forms of environmental contamination, and we will do so again by implementing climate action plans and other measures to make the world more sustainable"

- Patrick Weidinger
Director, Safety and Environmental Health

Dining Services

Millersville's dining services are managed in-house. This provides Millersville with an opportunity to directly oversee dining service operations—including managing the sustainability of the supply chain as well as managing the purchase, maintenance and use of food service equipment. A variety of on-campus dining halls and retail operations are provided—ranging from small convenience store operations and a food truck to a full-service restaurant and food courts.

Sustainability is at the heart of day-to-day operations within Dining and Conference Services. The Office has implemented various activities to reduce GHG emissions by increasing energy efficiency. As examples, dining facilities use high-efficiency lighting and shutoff of unnecessary lighting during daytime hours, automatic light-sensitive shades are used to lessen the cooling demand, and high-efficiency cooking-duct systems and dishwashing machines have been installed to cut down on energy use for cooking and cleaning. The Office has also dramatically reduced GHG emissions associated with waste disposal through source reductions (e.g., eliminated individual condiment packaging) and waste diversion (e.g., composting, recycling). Moving forward Dining and Conference Services plans to continue to reduce GHGs, including actions such as:

- Continue to provide options to locally-source food; including producing and processing food on-site.
- Develop and implement a sustainable food purchasing policy.
- Encourage appropriate portion sizing to cut down on food waste.
- Continue to evaluate and upgrade kitchen equipment to use high-efficiency models.
- Purchase and use a food pulper and dehydrator to improve composting capabilities and cut down on landfilled waste.
- Expand use of bulk condiments to eliminate single-packet servings.

Millersville's Dining and Conference Services incorporates sustainable principles into daily operations, including providing locally-sourced food, diverting waste through recycling and composting programs and using energy-efficient equipment.

Grounds

While not included in the GHG emission inventory, land management practices can contribute to the loss of carbon or carbon storage (sequestration). Millersville's campus consists of approximately 250 acres ranging from parking lots to a biological preserve. The center of campus features well-maintained grassy lawns crosscut by walkways that carry pedestrians around the Millersville pond. Numerous mature trees line the walkways and grassy areas. Notably, Millersville faculty have installed interpretive markers that identify "Trees of Distinction" throughout campus.

The outskirts of campus include some forested areas—including the campus's biological preserve. Historically, some forested areas have been removed for campus growth; however, new plans call for reforesting areas—including planting 300 to 400 trees in an area of campus known as the Keever Plot. After about 10 years, these trees should lead to an uptake of approximately 15 $MTCO_2E$ and will continue to sequester more carbon as the forest further establishes itself.

Millersville's grounds staff strive to manage the grounds responsibly. The University maintains a fleet of grounds equipment that includes mowers, a backhoe, plows and pickups, among other vehicles and equipment. Green infrastructure is increasingly being used throughout campus to manage stormwater in select areas and leaves are gathered and composted for later use as soil enrichment. A native plant conference that brings together hundreds of enthusiasts from around the world to learn about native plants occurs annually at Millersville and a garden adjacent to the Francine G. McNairy Library features native plants.

Moving forward Millersville will implement various land management activities that reduce GHG emissions such as:

- Continue to look for opportunities to convert grasslands to native vegetation to cut down on mowing.
- Continue to implement green infrastructure projects across campus.
- Review mowing schedules to ensure that mowing practices optimize lawn health while reducing fuel use.
- Reforest the Keever Plot to ensure the area acts as a carbon sink.

"It is critical that the goals and expected outcomes of this Climate Action Plan are fully integrated into academics, specifically into high impact learning practices such as service learning, community engagement, faculty-student research, learning communities and study abroad opportunities. Such integration will establish sustainability as a core value of Millersville University."

- Dr. Vilas Prabhu
Provost and Vice President for Academic Affairs

ACADEMICS

Reducing GHG emissions associated with campus operations is fundamental to achieving carbon neutrality; however, the greatest potential for reducing GHGs comes in creating the next generation of thought leaders. Millersville will use the time spent with each student to increase their understanding of how human society influences the climate system and how climate change will affect global populations and individuals while creating opportunities for students to address the challenge of climate change.

On average, each Millersville student is responsible for generating approximately 17 $MTCO_2E$ annually through their personal activities such as driving to school, powering computers and disposing of waste that can't be composted or recycled.[12] Some of these emissions are directly attributable to Millersville (such as the electricity used to charge a computer while at the University library), while others are indirectly attributable (such as commuting emissions) and others are not attributable to Millersville (such as emissions that occur when returning home for visits or for student commuters). With a population of approximately 8,000 students, this adds up to about 140,000 $MTCO_2E$ annually—four times greater than the emissions from University operations. It is therefore imperative that the University incorporate awareness of climate change into the academic program to

[12] U.S. per capita GHG emissions, http://data.worldbank.org/country/united-states. This value is the U.S. per capita emission value derived by dividing total U.S. emissions by the U.S. population. Millersville's per student emissions are approximately 5 $MTCO_2E$, but this excludes emissions associated with off-campus student activities, which can be significant given the large number of student commuters.

help students understand their impact and to help them learn how to make informed decisions about managing their personal carbon footprint. Specifically, Millersville has set an academics goal to:

Goal 8: Increase campus climate literacy.

Curricular and Co-curricular Activities

Millersville will increase campus climate literacy by identifying opportunities to incorporate a basic understanding of the climate system, climate change and sustainability into curricular and co-curricular activities. The University will develop and implement educational programs for students as well as consider opportunities to develop more sustainability-focused areas of study. Additionally, Millersville will further integrate climate change considerations and sustainability into freshman orientation and general education classes with intent to expose all of Millersville's students to basic information about climate change and sustainability. Actions that Millersville can take with respect to curricular and co-curricular activities include:

- Track existing and incorporate new sustainability and climate change considerations into General Education.
- Track existing and incorporate new learning outcomes into the curriculum that focus on understanding and applying sustainability principles—in part to improve each student's ability to lessen their climate impact.
- Develop opportunities for sustainability experiential learning that focus on projects that lessen the University's carbon footprint.
- Establish Freshman Year Experience courses focused on sustainability and climate change while incorporating sustainability principles into Freshman Orientation.
- Increase student internships in sustainability.

"While being more sustainable certainly means to work toward carbon neutrality and addressing environmental concerns, we need to remind ourselves that it also means to work toward social and economic justice."

- Dr. Joseph Revelt
Director, Institutional Research

Research

Millersville will also encourage and incentivize faculty and students to conduct research on climate change and sustainability topics. Millersville currently supports individuals who are conducting research in the areas of climate change and sustainability and values programs that apply sustainable principles to address challenges on campus and beyond. Research activities benefit from the rich academic culture at Millersville and include such varied areas as understanding how art can be used to expose various audiences to climate change topics, techniques that can be used to encourage adoption of sustainable behaviors, the impact hands-on activities such as gardening have on influencing perceptions of climate change and sustainability, evaluating the response of ecosystems and environmental change, and exploring the viability of various nascent sustainable technologies through application and use. Millersville plans to continue to expand research activities in the areas of climate change and sustainability through actions such as:

- Provide incentives for sustainability-related research and creative works.
- Pursue grants and other funding opportunities to support research related to climate change engagement.
- Further define specific on-campus climate change and sustainability challenges and align them with research activities.
- Coordinate with partners within the region to identify climate-change related challenges that the University can help provide solutions to.
- Increase research opportunities for students interested in sustainability.

Millersville's TerraCycle® at the Ville'age program works with TerraCycle® to upcycle items such as energy bar wrappers and toothpaste tubes. Earned funds are donated to Smile Train to provide needed funds to repair cleft lip and palate in children around the world.

ENGAGEMENT

At Millersville, climate change mitigation, adaptation and communication activities are nested within the broader Office of Sustainability, centers and programs. Therefore, the University will incorporate climate change messages into planned and existing sustainability engagement programs and initiatives. Doing so will help the University reduce redundancy, ensure that climate change and sustainability messages and materials are aligned, and provide consistent sources of information for faculty, staff, and students to increase their own understandings of climate change and sustainability issues and activities.

Millersville's various engagement activities will imbue a commitment to sustainability across colleges, departments and offices and lead to direct and indirect reductions in GHG emissions. The various activities will include incorporating climate change and sustainability considerations into education and outreach materials, campus events and campus life, and public engagement. Collectively, these activities will further advance a burgeoning culture of sustainability at Millersville. Specifically, Millersville has set an engagement goal to:

Goal 9: Advance a culture of sustainability.

Education and Outreach

Millersville has numerous vibrant mechanisms dedicated to University outreach, including:

- The Snapper – a student newspaper dedicated to topics of interest for the University community.
- WIXQ (91.7 FM, "The Ville") – Millersville's non-commercial college FM radio station.
- MUTV 99 – The on-campus cable station used to provide students with hands-on experience in television production.
- University website – provides information, news and other resources for the University community.
- Student groups and clubs – focused on various topics including advancing sustainability on and off campus.
- The Exchange – an electronic newsletter for faculty and staff.
- Numerous education and outreach publications.

Millersville will seek to incorporate climate change and sustainability messaging into the existing outreach mechanisms. To do so, the Sustainability Committee will establish a subcommittee dedicated to increasing awareness of sustainability issues among faculty, staff and students and the broader Millersville community. The subcommittee will implement actions such as:

- Develop core messages that convey the University's climate change and sustainability activities and priorities.
- Define University audiences that should receive information concerning Millersville's climate change and sustainability activities and tailoring the messages to audiences as appropriate.
- Identify available education and outreach mechanisms and use them to transmit climate change and sustainability messages to appropriate audiences.
- Coordinate climate change and sustainability engagement efforts with the University Communications, Marketing and Development offices; the College of Humanities and Social Sciences and other groups as appropriate.
- Develop informational panels and other materials that promote green roofs, renewable energy, wildscaping and other GHG emission reduction efforts on campus.

The subcommittee will also identify and promote the work of individuals within the Millersville community that help to advance a culture of sustainability. The University will create a Personal Sustainability Project (PSP) Program that recognizes individual faculty, staff and students, whose actions contribute to a more sustainable campus.

Sustainable Events

Millersville will also work to incorporate climate change and sustainability considerations into University events including student admission and orientation activities, employee orientation activities and campus events such as guest speakers, workshop and conference activities. Climate change and sustainability event activities will focus both on conducting events with topics focused specifically on climate change and sustainability as well as making the events more sustainable by lessening environmental impacts.

Specifically, Millersville will implement actions such as:

- Host speakers, workshops and conferences that focus on sustainability and climate change.
- Develop and implement a sustainable practices plan for student orientation that familiarizes students with sustainability at Millersville and ensures that the first days on campus have a low carbon impact.
- Continue to host an annual Campus Sustainability Day that calls attention to the University's sustainability activities and seeks to get faculty, staff and students involved.
- Provide an introduction to campus sustainability initiatives at admissions open house events to raise awareness about Millersville's commitment to sustainability.
- Incorporate sustainable practices such as increased waste diversion, material reuse and energy conservation measures into special events.

Campus Life

Millersville's student body has the ability to affect change on campus and beyond through their individual actions and as members of broader communities. The University will create programs and initiatives that engage students on the topics of climate change and sustainability, that encourage them to consider their impact and that empower them to be agents of change today and into the future. Millersville will incorporate climate change and sustainability considerations into campus life by identifying touchpoints where current student activities can provide enhanced messaging and by developing entirely new programs dedicated to climate change and sustainability. Opportunities for engagement include:

- Incorporate climate change and sustainability messaging into campus life activities as appropriate.
- Design and implement a peer educators program focused on sustainability topics and created to allow students to learn best practices from each other.
- Develop a mechanism for providing feedback on campus climate change and sustainability initiatives and for submitting ideas for campus sustainability projects.
- Support existing and develop new student groups and clubs focused on climate change and sustainability topics and implementing projects that improve campus and regional sustainability and reduce GHG emissions.
- Consider developing living-learning communities dedicated to sustainability and climate change mitigation within student housing. Use these communities to conceptualize and pilot new ideas, to implement competitions for reducing GHGs, and to serve as models for sustainable behavior on campus.
- Ensure that proper mechanisms are established to receive feedback concerning projects and their potential impact on faculty, staff and student well-being and other considerations.
- Empower students to further refine what it means to have a culture of sustainability on campus.
- Provide dashboards and other resources that allow students to compare sustainability performance (e.g., energy conservation) in student housing, develop best practice materials to help them improve and implement an awards program that recognizes the highest-performing units.

"Climate change is a global issue that inspires many artists to create conversation through their work. As an institution dedicated to incorporating the arts into learning, it is our mission to support artistic work that prompts students to ask questions and connect to their community."

- Laura Kendall
Director, Office of Visual and Performing Arts

Public Engagement

Millersville's commitment to climate change mitigation and to broader sustainability issues doesn't end at the campus gates. It extends into surrounding communities, including:

- University communities such as alumni, partners and other stakeholders;
- Local communities such as the City of Lancaster and surrounding regions;
- National communities such as organizations committed to advancing sustainability within higher education; and
- Global communities such as through Millersville's involvement in international enrollment and study abroad programs.

Millersville students annually participate in an "MU Day of Caring" wherein they clean up waste and implement other sustainability-focused projects in the local community.

Millersville will be an active participant committed to addressing the challenge of climate change within each of these communities. Specifically, Millersville has planned actions to engage the public such as:

- Incorporate climate change and sustainability information—including updates on University progress and initiatives—in alumni outreach materials (e.g., Millersville Review magazine).
- Work with local municipalities to reduce GHG emissions and further sustainability within the region.
- Increase collaboration with local, regional and national partners—including other colleges and universities, nonprofit, commercial and governmental organizations—that are dedicated to reducing GHG emissions and advancing sustainability at various levels.
- Increase student service-learning and volunteer opportunities focused on climate change and sustainability.
- Participate in, contribute to, and host meetings, workshops and conferences focused on climate change and sustainability.
- Serve as technical resource on climate change and sustainability for the City of Lancaster and surrounding regions.
- Develop sustainability goals and best practices for faculty and students involved in study abroad programs to help them serve as sustainability ambassadors.
- Include information on Millersville's climate change commitments in international student enrollment resources.

Notably, Millersville has a unique opportunity to engage the broader community on the topics of climate change and sustainability through arts and culture. Millersville's Office of Visual and Performing Arts oversees two state-of-the-art performing arts facilities, The Ware Center (located downtown in the City of Lancaster) and The Winter Center (located on Millersville University's campus). The two locations provide forums for the University to engage the broader community and world through a variety of events and exhibitions. Historically, these facilities have provided a location to explore topics that deal with climate change and sustainability. Moving forward Millersville will continue to explore these topics through future events.

PLANNING AND ADMINISTRATION

By creating this Plan, Millersville has taken the first steps toward meaningfully reducing GHG emissions and improving sustainability across the University. Continuing on this path will require a concerted effort across University departments, colleges, and offices to further integrate climate change considerations into University planning, administration and daily activities. This Plan provides a vision and the implementation steps needed for Millersville to achieve carbon neutrality. Achieving the vision will take additional planning, individual and group commitment, and a continual willingness among faculty, staff and students to celebrate accomplishments while focusing on the next challenge. Millersville has set a Planning and Administration goal to:

"What most excites me about the work being done at Millersville is that we demonstrate that sustainability and fiscal responsibility are not mutually exclusive. They are in fact two cuts from the same cloth."

- Roger Bruszewski
Vice President for Finance and Administration

Goal 10: Incorporate climate change and sustainability considerations into University planning activities and administrative practices.

Coordination and Planning

Millersville will use this Plan as a foundation for establishing a broader sustainability vision for the University. To help pursue the sustainability vision, the Office of Sustainability will work with University departments (and individual offices and colleges as appropriate) to prepare individual sustainability plans that align the goals of this Plan and other sustainability activities with their mission. Through the planning process, University departments can take action such as:

- Increase awareness of campus sustainability and broader sustainability activities within higher education and beyond,
- Work with the Office of Sustainability to conduct an assessment of current activities and areas of influence,
- Identify priorities for improving sustainability within their department, and
- Develop a tailored strategy for advancing campus sustainability that aligns with their department's mission and values.

Additionally, Millersville will work to prepare department-level accounting of GHG emissions on an absolute basis and using meaningful intensity indicators (e.g., GHGs/employee) to help departments better understand their contribution to the University's overall carbon footprint and prepare department-level paths for reduction.

Investment

Millersville will apply a multi-faceted and deliberate process for funding the climate change mitigation activities presented in this Plan. The financial mechanisms used will vary based on the funding requirements of the project—including project cost, timeline, return on investment (ROI), etc.—and may include involving an energy service company (ESCO), grants, donations, general funds and perhaps establishing a green revolving fund. In applying this Plan, Millersville will:

- Create a funding pathways plan that characterizes project funding options.
- Develop a project evaluation and prioritization process that assesses a project's value based on various criteria including GHG benefit, ROI and University impact, among others.
- Conduct lifecycle cost analyses for renewable energy, energy efficiency and other projects that require large capital investments.
- Evaluate funding options available through federal and state grant programs as well as utility programs.
- Prepare a green-revolving fund implementation plan that presents the green revolving fund framework, specific opportunities for seed capital and a roadmap for applying the green revolving fund to campus operations.

Carbon Offsets

Millersville's approach for achieving carbon neutrality consists of a two-pronged strategy that begins with reducing absolute GHG emissions to the maximum extent possible. The second part of the strategy is to phase in viable and broadly beneficial carbon offsets to balance remaining emissions. Carbon offsets refer to GHGs that are avoided or carbon that is sequestered by a separate entity to compensate for emissions generated by Millersville. Millersville recognizes that achieving carbon neutrality will not be possible without purchasing carbon offsets; however, the University also values investing first in reducing the emissions included within the campus inventory as much as possible.

The phased approach for pursuing carbon offsets begins with encouraging departments to apply carbon offsets to balance GHG emissions associated with air travel. Departments may choose to purchase carbon offsets through approved airline-sponsored programs. Appropriate tracking mechanisms will be put in place to ensure that the offsets are valid and that the GHG benefit associated with the offset is discounted from the University's annual GHG inventory.

The second phase of the carbon offset approach will consist of identifying local carbon offset opportunities that the University can pursue in line with the intent to achieve carbon neutrality by 2040. Millersville will conduct the due diligence necessary to identify offsets that are:

- *Real* – The offset represents GHGs that are reduced as a result of activity undertaken for the purpose of reducing GHGs,
- *Permanent* – The GHG reduction is not reversible,
- *Additional* – The offset occurs as a direct response to the investment,
- *Verifiable* – The offset can be monitored and verified by an independent and qualified third party, and
- *Enforceable* – The credit can be tracked and attributed to the purchaser to avoid double counting.[13]

Additionally, Millersville values pursuing carbon offsets that contribute to the economic well-being of the local economy while providing a local demonstration of GHG reduction techniques. Example carbon offset projects include dairy farm methane digesters and implementing energy efficiency projects for in low-income housing areas.

[13] The Bottom Line on Offsets, http://www.wri.org/publication/bottom-line-offsets

Millersville annually hosts artists, lecturers and thought leaders from various disciplines to talk about climate change and sustainability with the University community at Millersville's art venues—the Ware and Winter Centers. This includes art installations, such as a recent exhibition from ecological-art pioneer, Patricia Johanson.

IMPLEMENTATION APPROACH

Implementing this Climate Action Plan will require broad commitment from a curious and energized faculty, staff and student population; close collaboration with University partners, friends and neighbors; and an endless willingness to adopt and apply new information and insights. Additionally, implementation will require appropriate levels of management and oversight provided by accountable authorities within Millersville's administrative system and University leadership as well as an awareness and willingness to update this Plan and develop related documents when needed. Perhaps more importantly, a set of guiding principles are needed to assist with transitioning the goals of this Plan into meaningful action and to remind the Plan implementers of the values that underscore Millersville's climate change response. There is also a need to identify known challenges so that the University community can be mindful of impediments to progress and work to address the challenges from a position of knowledge. Lastly, Millersville has and will continue to institute systems that will allow for performance management and tracking and provide for continual evaluation of progress. Collectively, these priorities, needs and implementation methods define Millersville's implementation approach, which is articulated in this section under the following headings:

- Management, Oversight and Implementation
- Guiding Principles
- Perceived Challenges and Solutions
- Tracking Progress

MANAGEMENT, OVERSIGHT AND IMPLEMENTATION

The management, oversight and implementation of this Plan will require coordination and collaboration among several individuals and groups. The roles and responsibilities of these individuals and groups are described below followed by a discussion of planned updates to the Plan and additional documents that will support the Plan's implementation.

Roles and Responsibilities

Clear roles with assigned responsibilities and levels of authority are necessary for ensuring that the goals of this Climate Action Plan are met. The following entities within the University administrative structure will individually and collectively guide the Plan's implementation.

University President and Cabinet

The University President in coordination with the University Cabinet will have final authority regarding the implementation of the Climate Action Plan. The University President and Cabinet will review information provided by the Climate Action Plan Subcommittee and Sustainability Manager and will oversee the strategic direction of all mitigation activities and progress toward meeting the Climate Action Plan goals.

Office of Sustainability

Responsibility for achieving the goals of this Climate Action Plan rests on the University Sustainability Manager within the University's Office of Sustainability. The Sustainability Manager will be responsible for coordinating mitigation activities on and around campus, for reporting progress to various stakeholders and organizations, and for providing the Climate Action Plan Subcommittee and University leadership with the understandings needed to make informed decisions regarding Climate Action Plan implementation. The Sustainability Manager will also be responsible for ensuring that the Climate Action Plan activities support the University's broader sustainability goals.

Sustainability Committee

Millersville University's Sustainability Committee provides a forum for faculty, staff and students to plan various on- and off-campus sustainability initiatives, including the annual Campus Sustainability Day. Sustainability Committee members meet

frequently to discuss campus sustainability initiatives and to chart a coordinated path for furthering university sustainability. The Sustainability Committee will help ensure that the Plan implementation supports broader sustainability goals.

Climate Action Plan Subcommittee

The Sustainability Committee established a Climate Action Plan Subcommittee that prepared the Climate Action Plan. The Climate Action Plan Subcommittee oversaw all activities involved in developing this Plan, including preparing the actions, goals and strategies, and designing the performance metrics that will be used to evaluate progress. Moving forward, the Climate Action Plan Subcommittee, led by the Subcommittee Chair, will be responsible for guiding Climate Action Plan implementation. The Subcommittee will guide decision making and prioritization of Climate Action Plan implementation activities and will work with the Sustainability Manager to provide recommendations for achieving Climate Action Plan goals to University leadership.

Center for Sustainability

Millersville University established a Center for Sustainability that educates the University community about sustainability while organizing various campus sustainability initiatives—including waste-minimization projects with Terracycle and running organic vegetable gardens. The Center for Sustainability will provide a forum for amplifying the activities of the Climate Action Plan Subcommittee and for coordinating several of the projects that support the University's GHG mitigation goals.

University Departments

University departments will help to guide the strategic implementation of this Plan by recommending specific actions and tactics for achieving the broad goals of this Plan and by helping to set priorities and implement the programs, policies and procedures needed to achieve carbon neutrality. Management and staff within the University departments as represented by the President's Cabinet members, through representation on the Sustainability Committee and through individual interest will help generate additional ideas, actions and projects for achieving the Plan's goals.

University Clubs and Organizations

Millersville has numerous student clubs and organizations dedicated to increasing sustainability within the University and beyond. These groups will support the implementation of the Climate Action Plan by transferring the ideas into action. Existing clubs and organizations as well as planned clubs and organizations that will be an outgrowth of this Plan will voluntarily adopt projects that will help to achieve Climate Action Plan goals.

Supporting Documents and Plan Updates

This Climate Action Plan represents the beginning of a process. Success requires transferring the goals of this Plan into meaningful action, measurable progress and actionable skills that Millersville's students can take with them. The architects of this Plan see it as a breathing document that must be revisited periodically to ensure that the goals continue to align with University priorities and that the best available information is applied toward achieving the overarching goal of carbon neutrality. While this Plan was being finalized Millersville also signed the Climate Commitment, which calls for preparing a comprehensive Climate Action Plan that, in addition to addressing carbon neutrality, also addresses the University's efforts to increase climate resilience.[14] Millersville is in the beginning stages of resiliency planning and intends to update this Plan to address resilience in the coming years. That update will provide an opportunity to present publicly any modifications to our carbon neutral strategy. Millersville also joined more than 200 colleges and universities in signing the *American Campuses Act on Climate Pledge*—to reaffirm the commitment to achieve carbon neutrality and increase focus on using the challenge of climate change to engage the community and create experiential learning opportunities for students.[15]

Additionally, supporting and related documents such as a funding pathways plan, energy management plan, resiliency plan, and sustainability plan have all been identified and will further support the University's climate change response.

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[14] Second Nature Climate Commitment, http://secondnature.org/climate-guidance/the-commitments/
[15] American Campuses Act on Climate, https://www.whitehouse.gov/the-press-office/2015/11/19/fact-sheet-ahead-conference-climate-change-more-200-colleges-and

GUIDING PRINCIPLES

Achieving the goals of this Climate Action Plan will take a passion for progress, data-driven decision-making, inspired planning, coordination and collaboration across the University community, and efforts to use the Climate Action Plan to create learning opportunities. These concepts are captured in five guiding principles, Agility, Measurement, Innovation, Collaboration and Education. The guiding principles complement the Climate Action Plan goals. While the goals are focused on outcomes, the guiding principles support the process of implementing the Climate Action Plan.

Millersville's Guiding Principles for Implementing the Climate Action Plan

1) Agility

Achieving carbon neutrality requires setting clearly-defined goals while staying informed of advancements in the field and remaining willing and able to adopt new techniques and technologies as they become available. We have set agility as a guiding principle to remind us to:

- Avail ourselves to the best available information regarding GHG mitigation strategies on a project by project basis.
- Remain flexible and willing to embrace new ideas and approaches as they become available.
- Focus on our goals while incorporating GHG reduction priorities into campus projects and programs whenever possible.

2) Measurement

The faculty, staff and students of Millersville believe that you must measure what you manage. Direct monitoring and measurement coupled with accurate and consistent modeling where appropriate will allow us to evaluate performance over time while increasing confidence in our investments. We have set measurement as a guiding principle to ensure that we:

- Track and evaluate our performance over time.
- Use measured data to prioritize our mitigation activities.
- Invest from an informed position.

3) Innovation

Confronting the challenge of climate change requires a problem-solving approach that goes well beyond business as usual. We must be energized by creativity, inspired by invention and emboldened by out-of-the-box thinking. We have set innovation as a guiding principle to spur us to:

- Value new ideas and new ways of doing things.
- Focus on continual improvement by challenging the notion that we have done as much as we can.
- Design, implement and share creative solutions to mitigate GHG emissions.

4) Collaboration

Climate change is a global challenge that requires broadly-coordinated solutions. The University community, our partners, friends and neighbors are our greatest asset as we seek to create change that will have lasting impact within and beyond the campus gates. We have set collaboration as a guiding principle to encourage us to:

- Develop lasting partnerships that will drive change on campus and in our community.
- Recognize and promote our achievements as well as the achievements of those around us.
- Participate in local, regional and national climate change conversations.

5) Education

As an institution of higher education, our foremost responsibility is to educate the leaders, thinkers and doers of tomorrow. We have set education as a guiding principle to remind us to:

- Create change agents that will use the challenge of climate change as an opportunity to create a stronger, more resilient and more responsible world.
- Confront challenges and new projects with a curious and open mind.
- Empower and energize each student to take action on climate change.

PERCEIVED CHALLENGES AND SOLUTIONS

Millersville has identified challenges that will influence the University's approach to achieving the goals of this Plan. A clear understanding of the challenges will ensure that the University is equipped to develop solutions from an informed and thoughtful position. Some challenges include:

Decentralized heating and cooling: Unlike many colleges and universities (particularly in the northeast), Millersville does not have a centralized heating plant. Buildings have individual heating, ventilation and air conditioning (HVAC) systems. As a result the University's efforts to reduce GHG emissions associated with building heating and cooling must be addressed on a building-by-building basis as opposed to retrofitting a large steam plant to run on an alternative fuel, for example. While this offers Millersville the benefit of piloting new systems at single buildings before applying them portfolio-wide, it comes with the challenge (and costs) of managing numerous individual retrofits or upgrades as opposed to a single large project.

Former houses: Millersville's portfolio include numerous buildings that were once single-family homes. Today these residential buildings contain offices, meeting rooms and other rooms used for various campus activities. Most of the former houses are older—constructed in the early 1900s—and have poor insulation and inefficient windows. While improvements can and will be made to improve the building envelopes, the number and diversity of the buildings presents project management challenges. Managing improvements to many small buildings can be more time-consuming than overseeing a project implementation at a single large building.

Decentralized purchasing: While Millersville's Purchasing Department assists in overseeing contract activities for the University, the departments are responsible for making their own purchases. This provides autonomy and flexibility to the University Departments; however, it also means that increased coordination is required to ensure that departmental purchases are in line with the University's policies regarding sustainable purchasing practices.

TRACKING PROGRESS

In creating this Climate Action Plan, Millersville's faculty, staff and students were very aware that success necessitates setting a clear vision that is supported by meaningful and measurable goals. Moving forward the University must continually track progress and evaluate performance and use the information to make course corrections as needed an appropriate. The University community sees gathering and responding to data and information as fundamental to the process of implementing a Climate Action Plan and has therefore set Measurement and Agility as two of our guiding principles.

Millersville's approach for tracking progress begins with setting a clear goal of achieving carbon neutrality that is supported by a two-pronged strategy to reduce absolute GHG emissions by 65 percent by 2040 while phasing in viable carbon offsets to balance remaining emissions. This broad strategy is supported by 10 goals that provide focus and direction while setting the stage for tracking progress and evaluating performance. Where possible, goals are tied to specific and quantifiable performance metrics (e.g., energy use intensity) that have been used to set a performance target relative to a base year. Using performance metrics to track progress provides many benefits to Millersville including the ability to:

- Evaluate performance relative to previous years,
- Compare performance against other colleges and universities, and
- Adapt the implementation strategy while maintaining a consistent evaluation mechanism.

Not all goals lend themselves to quantifiable performance metrics. This is particularly true for goals that are focused mostly on engagement. While Millersville can track the number and nature of materials and other resources that are prepared to support engagement, drawing a direct connection between these activities and a performance improvement can be challenging. Millersville will therefore continue to track our overall GHG performance by preparing an annual GHG emission inventory. The annual GHG emission inventory will allow Millersville to evaluate performance improvements by emission source. While a direct connection between a specific action and the GHG benefit may not be clear, the cumulative benefit of Millersville's GHG mitigation activities will manifest as GHG reductions by emission source.

In addition to tracking progress using the annual GHG emission inventory and specific performance metrics, Millersville will also implement robust tracking mechanisms for key emission sources. As an example, Millersville recently finished installing metering systems that will allow for building-level tracking of energy consumption. The University will load this data into energy

management software to evaluate building-level energy-performance information to compare the building's performance against itself and peer buildings over time, as well as to identify opportunities to improve performance within the building portfolio. Additionally, several University buildings have, or will receive, building automation systems (BAS) that allow for automated control of building systems and aid identifying issues before they significantly disrupt building performance.

In addition to the above, as part of Millersville's climate commitments, the University will annually and publicly report progress—primarily by preparing and disclosing an annual GHG emission inventory, but also by periodically updating the Climate Action Plan when modifications or enhancements necessitate.

"Climate change is a new challenge, but challenges are not new. We have the rewards of today because others have faced risk and uncertainty with bold optimism. The ideas in this Plan are those of individuals who will tell future generations that they saw in the challenge of climate change the opportunity to better themselves and their world."

- Dr. John M. Anderson
President

MOVING FORWARD

The many hours of planning that have gone into creating this Climate Action Plan mark the trailhead on a journey that leads to Millersville's low-carbon, energy conscious and sustainable future. The Plan's goals and guiding principles serve as guideposts, but realizing the future that Millersville has envisioned will require a longstanding commitment by members of the University community, continual pursuit of new thoughts and ideas, and an endless willingness to adopt and apply new information and insights.

This Plan identifies specific actions that the University will take to achieve carbon neutrality. These actions build upon progress that Millersville has already made to improve the sustainability of its operations, to inspire students to act on climate change, and to engage the broader University community and surrounding region. Further progress requires not only implementing the actions identified in this Plan, but also developing new ideas and planning new measures to address the challenge of climate change with agility, passion and dynamism.

Perhaps most importantly, Millersville intends to use the journey toward carbon neutrality to provide learning experiences for the next generation of leaders, thinkers and doers. Success will be measured not only in tons of carbon reduced, but also in the work performed by our graduates to better society.

Francine G. McNairy Library and Learning Forum

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