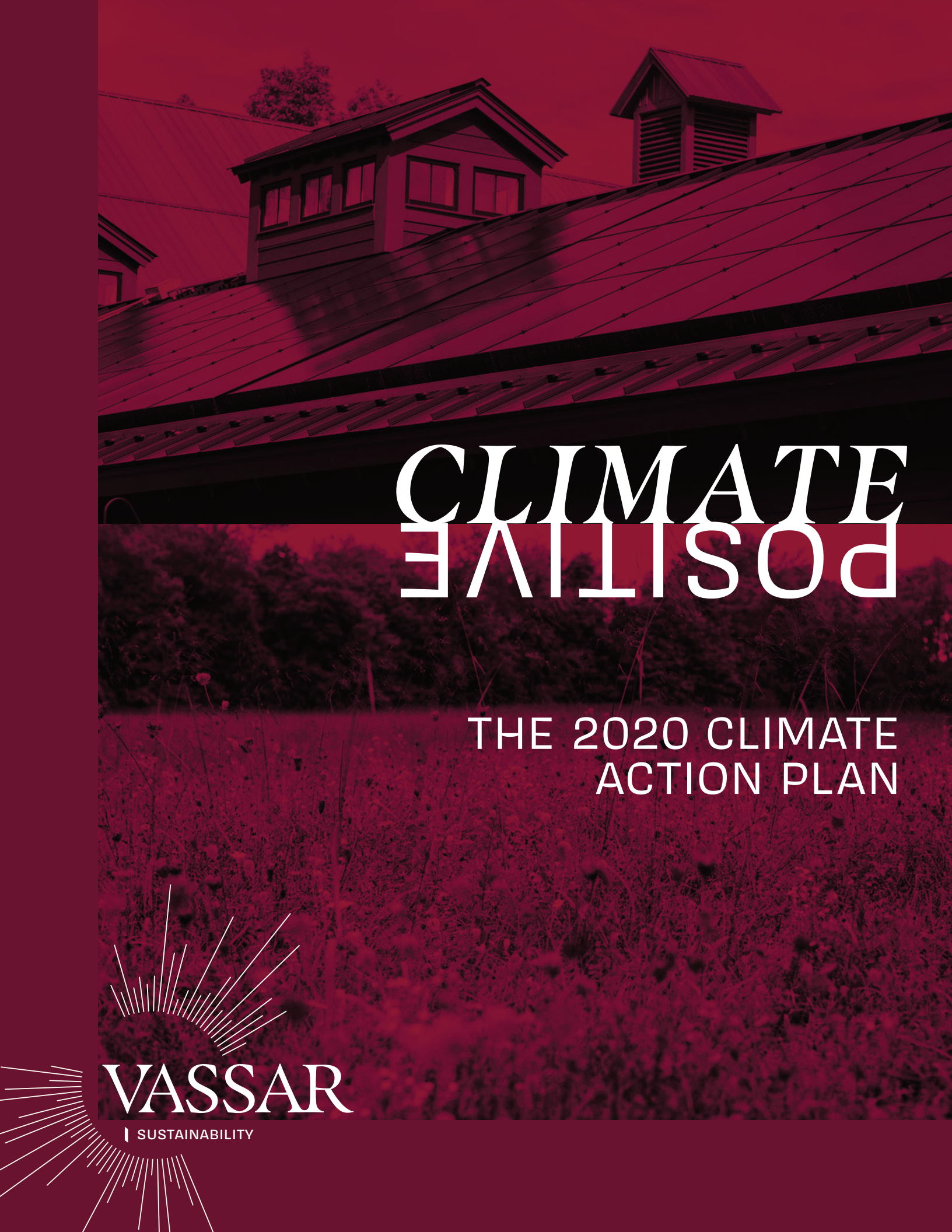




CLIMATE POSITIVE

THE 2020 CLIMATE ACTION PLAN



VASSAR

| SUSTAINABILITY

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VASSAR COLLEGE

ELIZABETH H. BRADLEY

President

Dear Members of the Vassar Community,

I am pleased to introduce Vassar's 2020 Climate Action Plan, outlining the next five years of the College's efforts to address the climate crisis.

At Vassar, we are committed to providing future generations with the capacity to address the world's most pressing problems. We are equipping students with the knowledge to tackle climate change through the Grand Challenges Initiative funded by the Howard Hughes Medical Institute, which has incorporated sustainability education throughout the curriculum. We are sharply decreasing our facilities' carbon footprint through an aggressive \$13 million project approved by the Board of Trustees in 2019. And, through the ambitious but achievable steps detailed in this Climate Action Plan, we are taking even greater strides to minimize our negative impact on the environment.

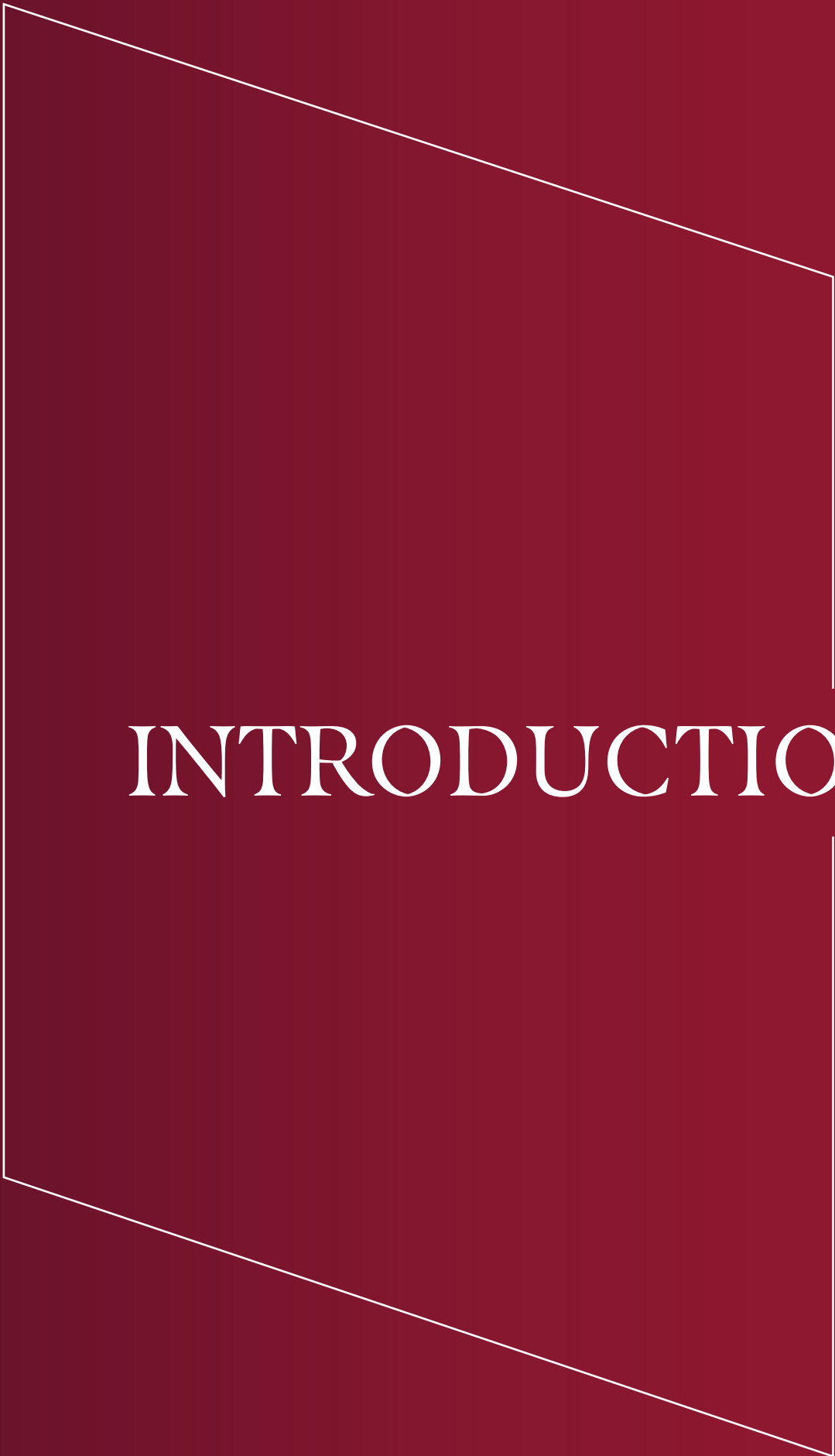
I would like to thank the Climate Action & Sustainability Committee and the Office of Sustainability for the substantial work they put into creating this plan over the last year. I would also like to thank the many students, faculty, staff, and administrators who shared their thoughts by attending a Climate Action Forum, responding to the campus-wide survey, or serving on a Climate Action Team. The Climate Action Plan truly represents our shared vision.

As the past year has shown, the Vassar community can accomplish incredible things when we work collectively. I encourage you to consider how your personal efforts can contribute to our goals, and I look forward to seeing what we accomplish together.

Sincerely,



Elizabeth H. Bradley
President



INTRODUCTION

A Commitment to Climate Action

On April 22, 1970, millions of people joined in observing the inaugural Earth Day. In New York City, Fifth Avenue was closed to vehicles for 45 blocks, and over 100,000 residents passed through observances at Union Square Parkⁱ. Eighty miles north, the Vassar chapter of Protect Your Environment offered a comparatively smaller slate of activities, with a series of lectures, movie screenings, and a teach-inⁱⁱ.

Vassar – and the world beyond – observed the 50th Earth Day under radically different circumstances. In the months since rampant wildfires have devastated the West Coast. Tropical storms and hurricanes have battered the nation, from the Rio Grande Valley to the Hudson Valley. And the COVID-19 pandemic has caused untold harm across the globe.

The urgency – and moral necessity – of immediate climate action has never been more evident.

Vassar’s 2016 Climate Action Plan outlined the “framework and [...] actions that are needed to demonstrate regional and national leadership and set the trajectory of the College toward carbon neutrality.ⁱⁱⁱ” Perhaps its most substantial impact was establishing Vassar’s commitment to carbon neutrality no later than 2030.

The 2020 Climate Action Plan results from over a year of effort from hundreds of members of the Vassar community. It builds on the successes and lessons learned from Vassar’s 2016 Climate Action Plan. Like its predecessor, it contains high-level frameworks and immediate actions to work toward carbon neutrality.

It also contains two additional commitments.

The first is becoming a signatory of the Second Nature Presidents’ Climate Commitment^{iv}. As a signatory to the Commitment, Vassar pledges to share its annual progress towards carbon neutrality and develop efforts to increase the campus’s and community’s resilience to climate change impacts.

The second is to build the next five years of climate action around the United Nations Sustainable Development Goals (SDGs).

The Sustainable Development Goals were established in 2015 as a framework for global sustainability efforts and were adopted by all UN Member States. The 17 SDGs balance the need for immediate climate action with the moral imperative to create a more equitable future without poverty, hunger, and discrimination^v.

While not every Sustainable Development Goal will directly apply to an action undertaken in the 2020 Climate Action Plan, adopting the SDGs as a framework will ensure a more equitable and holistically sustainable future for the campus and the community.

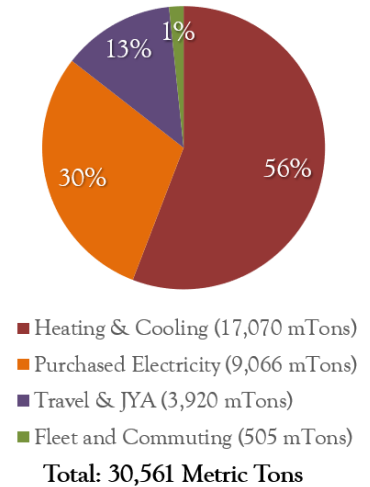
A Path to Climate Positivity

Historic Emissions

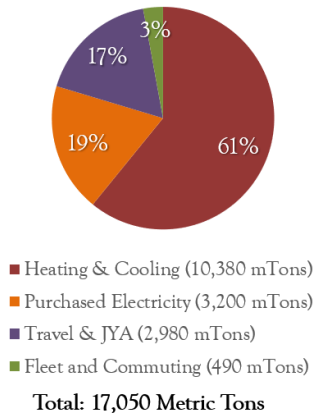
Vassar tracks its annual carbon footprint through the Sustainability Indicator Management & Analysis Platform (SIMAP)^{vi}. Contained within this carbon footprint are all greenhouse gas emissions resulting from heating and cooling campus buildings, total electricity purchased, fuel used by owned and leased vehicles, business and research travel funded by Vassar, Junior Year Abroad, and staff and faculty commuting.

In 2005, these sources of emissions totaled 30,561 metric tons (mTons) of greenhouse gas. Over half of all emissions came from the fuel oil used to heat the campus, with another third from purchased electricity. Travel, JYA, commuting, and fleet emissions combined for the remaining 14% of the total campus footprint.

2005 Carbon Footprint



2018 Carbon Footprint



Progress to Date

Over the next decade, Vassar made significant progress in reducing emissions, especially from heating and purchased electricity. By 2018, Vassar's carbon footprint had fallen to approximately 17,050 mTons – a 45% reduction from the 2005 baseline.

Migrating from fuel oil to natural gas, combined with some energy efficiency improvements, reduced total campus heating and cooling emissions by 6,690 mTons. The greening of the New York electrical grid and some renewable power purchasing agreements led to a similar reduction in purchased electricity emissions of 5,866 mTons. Vassar also saw minor decreases in campus travel and JYA emissions.

While these reductions were significant, much more work would be needed to reach carbon neutrality no later than 2030. To help outline a path forward, Vassar began to develop an Energy Master Plan and, ultimately, a near-term plan for immediate decarbonization.

The Near-Term Decarbonization Plan

Throughout 2019, Vassar partnered with the energy performance contracting firm Ecosystem to develop several scenarios for infrastructure upgrades toward net-zero carbon emissions. During this process, Ecosystem met with key campus stakeholders and committees, conducted site walkthroughs, reviewed existing reports such as the 2016 version of the Climate Action Plan, and analyzed existing energy data.

Ecosystem's final report outlined several long-term scenarios for carbon neutrality at Vassar, with substantial costs and an implementation period of at least 10-15 years^{vii}. They also provided a near-term plan that is immediately actionable, cost-effective, and a solid foundation for future carbon reduction efforts.

Under this near-term plan, Vassar will convert two central boilers from natural gas as a feedstock to biofuel, for a **4,000 ton per year** reduction in greenhouse gas emissions. Though still using steam as the primary district energy solution, this conversion, coupled with additional energy-saving measures, allows Vassar to reduce its carbon footprint by approximately **7,755 tons per year** relative to its 2018 greenhouse gas emission totals. This project would carry a total estimated capital cost between **\$10 and \$13 million**.

As Vassar revisits its utility contracts in 2020, there is an opportunity to purchase exclusively renewable electricity for an immediate and cost-effective reduction in our carbon footprint. Ecosystem did not integrate pricing for this in the scope of its report; however, it will be a top priority as Vassar revisits its utility contracts in the immediate future. Fully decarbonizing the College's electricity reduces its carbon footprint by an additional **2,555 tons per year** compared to 2018 levels.

Combining the measures in the partial decarbonization plan enumerated at the end of this document would reduce Vassar's total carbon footprint to a combined campus total of approximately **6,850 tons per year**, a **77% reduction** from the baseline year of 2005.

Looking Forward

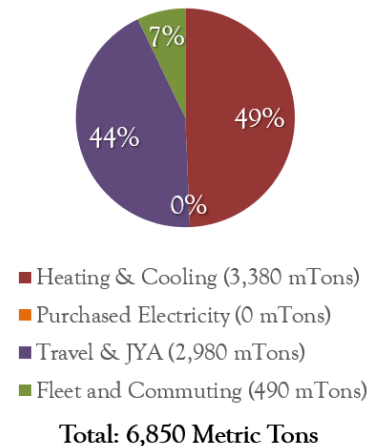
Over the next decade and beyond, Vassar could pursue a more intentional series of building conversions to several different next-generation technologies like those highlighted in the Ecosystem report. By taking a modular approach, Vassar can use a wider variety of technologies - perhaps including technologies that do not yet exist. Many buildings could even be removed from the central heating loop to allow for full electrification.

The 2020 Climate Action Plan outlines many steps that Vassar can take to reduce its carbon footprint even further, ultimately achieving net zero emissions by 2030. Reaching carbon neutrality is a significant milestone for the College, but that need not be the end of its sustainability journey.

The Vassar Farm & Ecological Preserve alone sequesters hundreds of metric tons of greenhouse gas each year. Facility modernization and electrification will continue to decrease the College's carbon emissions, while restorative land management practices will increase its carbon sequestration.

Eventually, Vassar will reach a point where it sequesters more greenhouse gas than it emits, moving from carbon neutral to climate positive.

2022 Carbon Footprint
(Projected)



A Plan for the Next Five Years

Drafting the Plan

Throughout Fall 2019, more than 200 students, faculty, staff, and administrators shared their feedback on how to make the campus more sustainable with the Office of Sustainability through a campus-wide survey and a series of in-person forums. Typical areas of focus included energy efficiency, waste & recycling, campus dining, and conservation. A more detailed summary of feedback is available in Appendix C, and unabridged results are available in a separate document.

In Spring 2020, the Office of Sustainability charged four Climate Action Teams (CATs) with refining this feedback into recommendations in the areas of Energy & Stationary Emissions; Food, Procurement & Waste; Land & Sequestration; and Travel, Fleet & Commuting. These teams ultimately created a set of 10 concrete “Goals” (measurable and trackable targets for sustainability) and 17 “Action Steps” (efforts working toward the Goals).

Throughout the development process, the Office of Sustainability worked with staff and administrators to ensure that the individuals and departments impacted by these recommendations considered them feasible and acceptable.

In May 2020, the Climate Action & Sustainability Committee (CASC) approved these Goals and Action Steps as the foundation for the 2020 Climate Action Plan (CAP).

Reviewing the Plan

During Summer 2020, an Environmental Defense Fund Fellow named Camila Bobroff consulted with the Office of Sustainability to review the draft Climate Action Plan. Camila evaluated the CAP through:

- a global lens, using the U.N. Sustainable Development Goals to determine if/how Vassar’s climate action steps align with the goals, and how to measure progress toward those goals, and
- a local lens, engaging stakeholders to develop a multi-criteria analysis to capture impact relative to input for each action step

Additionally, Camila developed roadmaps for implementing three critical measures to reducing air travel emissions at Vassar:

- Improving tracking and analyzing air travel emissions,
- Setting priorities for air travel, and
- Offsetting necessary air travel.

Her work is reflected throughout this document, and an overview of all her recommendations is available in Appendix B.

Navigating the Plan

The first five chapters of the 2020 Climate Action Plan examine the specific Goals and Action Steps recommended for implementation over the next five years. The sixth chapter outlines the implementation process and resources available for the Climate Action Plan. The remaining appendices and glossary provide reference information of use while navigating this plan.

In this document, footnotes are intended for brief clarifications and explanations, while endnotes are used exclusively for references to external resources and further reading.

Two final notes on the terminology used in this document:

Goals are quantitative indicators that can track progress toward implementing the CAP over the next five years¹. They are presented as follows:

5-Year Goal:	Full text of the Goal as approved by CASC
UN SDGs Supported:	The United Nations Sustainable Development Goals that this CAP Goal supports. A more in-depth explanation of the SDGs and how the 2020 CAP works toward their targets is available in Appendix A.
Background:	Context and summary of what the goal addresses and why it was included
Analysis:	An overview of potential setbacks and areas of concern to reach the targets outlined in the Goal.

Action Steps are immediate actions that work toward reaching Goals. They are presented as follows:

Description:	A basic summary of the Action Step being undertaken
CAP Goal Supported:	The specific Goal or Goals the Action Step directly works toward
Resources Required:	An estimate of the staff time and financial cost needed to implement this action step
Analysis:	An overview of potential setbacks and areas of concern during implementation

¹ The forthcoming Climate Action Plan Dashboard will track all quantitative indicators associated with the Goals in this document; c.f. Chapter 6



ENERGY AND STATIONARY EMISSIONS

Purchased electricity and stationary emissions account have accounted for most of Vassar’s carbon footprint since our baseline year of 2005. While the Near-Term Decarbonization Plan will decrease the carbon impact from Vassar’s purchased electricity and stationary emissions to just 13% of 2005’s baseline, reducing stationary emissions is integral to reaching carbon neutrality by 2030.

A vital facet of the Near-Term Decarbonization Plan is migrating from natural gas to renewable fuel oil (RFO) for central heating. While RFO has only a fifth of the life-cycle emissions than natural gas, it is not a zero-emission fuel. Thus, it is not appropriate as a long-term solution for Vassar’s sustainability ambitions. This chapter focuses on reducing total campus combustion rather than direct carbon emissions. Reducing combustion will reduce Vassar’s carbon footprint as well, but in a manner that more clearly empowers a longer-term vision of an electrified campus.

Goals

EN-A: Campus Combustion Reduction

5-Year Goal:	Reduce total campus combustion to no more than 125,000 MMBtu per year by the end of FY25
UN SDGs Supported:	3 – Good Health and Well-Being 4 – Quality Education 7 – Affordable and Clean Energy 8 – Decent Work and Economic Growth 9 – Industry, Innovation, and Infrastructure 13 – Climate Action
Background:	Vassar currently uses approximately 200,000 MMBtu of combustion-based fuel for heating annually. Upon completion, the Near-Term Decarbonization Plan will reduce total annual combustion to about 145,000 MMBtu. Potential next-step projects from the Energy Master Plan can provide an additional 15,000 – 30,000 MMBtu of reduction, making this Goal aggressive but achievable.
Analysis:	As part of the Near-Term Decarbonization Plan, Vassar migrates from natural gas to renewable fuel oil (RFO) for most heating needs. While the life-cycle emissions of RFO are substantially lower than natural gas, it is not a carbon-neutral fuel. To reach carbon neutrality, Vassar will need to substantially decrease its total on-campus combustion through a combination of electrification (changing how heat is supplied to buildings) and energy efficiency measures (reducing the total demand for heat in buildings).

Action Steps

EN-01: Energy Dashboard

- Description:** The Office of Sustainability and Facilities Operations will develop an in-house energy dashboard website that provides the College's current energy usage and generation data in a single location.
- CAP Goal Supported:** EN-A (Campus Combustion Reduction)
- Resources Required:** Minimal additional resources will be needed. Staff time from sustainability interns for data entry will be required for some aspects of the dashboard, but the remainder should be automated as part of other ongoing campus efforts.
- Analysis:** While many students have used campus energy data to great effect in their coursework and research, accessing this data can be challenging. Building-level and campus-wide data is split between multiple sources and formats, frequently in esoteric and hard-to-manage formats.
- Centralizing higher-level data in a single dashboard will significantly enhance usability for academic pursuits while also increasing transparency for Vassar's work toward its climate goals. Campus-level data can currently be integrated into the GRITS platform presently used for the Green Reinvestment Fund. Facility-level data can be made available as Vassar updates its building management systems and energy metering over the next few years.

EN-02: Energy Management Support Team

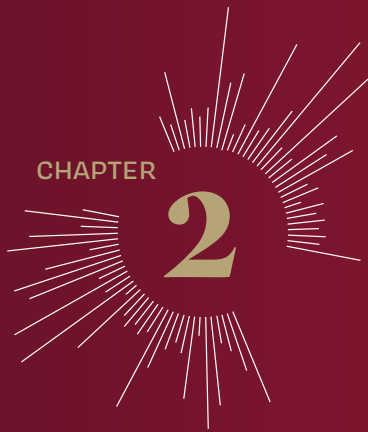
- Description:** Vassar will establish an Energy Management Support Team (EMST) consisting of representatives from Facilities Operations, Residential Life, the Office of Sustainability, CASC, Finance and Administration, and other relevant groups. This team would support and implement energy conservation policies, residential energy education programs, and coordination of future studies toward long-term decarbonization.
- CAP Goal Supported:** EN-A (Campus Combustion Reduction)
- Resources Required:** A small time commitment from staff, interns, and volunteers to attend meetings of the Energy Management Support Team and, as able, follow-up on items raised at team meetings.
- Analysis:** Reaching net-zero stationary emissions will require coordinated efforts to retrofit existing facilities, construct all new facilities to the standards outlined in the Green Building Guidelines, and implement behavior-change programs across campus. The Energy Management Support Team would assist in the implementation of these efforts.
- The work of the EMST would vary from semester to semester. Still, early work could include developing proposals for Green Reinvestment Fund projects, reviewing the Green Building Guidelines and their application in new projects, and leading conducting energy audits within residential houses.

EN-03: Energy Master Plan Implementation

Description:	Facilities Operations will strategically implement projects aligned with the Energy Master Plan to provide a total combined reduction in on-campus combustion of at least 20,000 MMBtu.
CAP Goal Supported:	EN-A (Campus Combustion Reduction)
Resources Required:	This step will require substantial financial resources to implement. Given the anticipated positive return on investment for projects under consideration, projects should be eligible for financing under the Green Reinvestment Fund guidelines. Where possible, projects should also align with existing asset renewal efforts to maximize the environmental and financial benefits to Vassar. The Energy Management Support Team established by EN-02 can provide valuable assistance in identifying and implementing projects.
Analysis:	The Energy Master Plan, the Net-Zero Report from Ecosystem, and the work of past Environmental Defense Fund Fellows offer a wealth of possible projects for implementation in the coming years. These include: • Cozy™ Radiator Covers^{viii}, which would reduce overheating in residential spaces and improve campus energy efficiency • Expanded building-level steam and electricity metering^{ix}, which allows for granular tracking of building-level consumption and cost savings through real-time energy management • Retrocommissioning^x, which effectively provides ‘tune-ups’ for existing HVAC systems

EN-04: Cooling & Supplemental Heating Audit

Description:	The Office of Sustainability will oversee an audit of cooling and supplemental heating equipment for the campus. During the cooling season this will include desk fans, ceiling fans, and window-unit air conditioners. During the heating season, this will primarily focus on space heaters.
CAP Goal Supported:	EN-A (Campus Combustion Reduction)
Resources Required:	Oversight from a sustainability intern and student volunteers. Members of the Energy Management Support Team may be asked to assist as well.
Analysis:	The Vassar campus contains over fifty buildings with various cooling systems in use, from central air conditioning to window units to desk fans. Data from a full audit of the campus cooling infrastructure will help identify opportunities to enhance energy efficiency and improve occupant comfort.



FOOD, PROCUREMENT, AND WASTE

This chapter focuses on arguably the most visible indicators of sustainability on the Vassar campus. Almost every student visits the Gordon Commons daily, and the local and vegetarian meal options available provide an immediate and tangible experience of sustainability in action. Waste, recycling, and composting have historically been significant points of concern, drawn into even greater visibility with increased single-use products due to public health protocols. And Vassar's purchasing practices, while often remarkable examples of environmental and social consciousness, can be siloed and hard to measure.

A challenge uniquely endemic to this chapter is the individual behavior change needed for these Goals and Action Steps to be successful. Expanding the local and vegetarian meal options offered through campus dining only makes a positive environmental impact if people choose to eat them. Increased availability of recycling and compost bins, coupled with a campus-wide education campaign, will still only be successful if people consciously choose to sort their waste. And even the strictest purchasing policies are still ultimately reliant on individuals and departments not finding administrative workarounds.

The Goals and Action Steps in this chapter represent Vassar's institutional commitment to work toward a long-term goal of a zero-waste campus and a more environmentally conscious supply chain. Ultimately, though, it can only be successful through support from the entire campus community.

Goals

FPW-A: Green Purchasing Guidelines

5-Year Goal:	Develop a set of Green Purchasing Guidelines and ensure at least 80% of campus purchase spending complies with them
UN SDGs Supported:	10 – Reduced Inequalities 12 – Responsible Consumption and Production
Background:	While Vassar makes many of its procurement decisions with sustainability as a core value, there is currently no centralized set of guidelines bringing these many disparate policies and practices into a single document. The Green Purchasing Guidelines would pull together Vassar's existing methods and build on them to create a single set of easily accessible guidelines for widespread use.
Analysis:	Developing a reasonable and achievable scope for the Green Purchasing Guidelines will be paramount for successful implementation. Certain areas, such as laboratory equipment and supplies, will require stakeholder input and review. A target of 80% compliance was selected to allow individuals/departments with unique needs and use cases to make other purchasing decisions. As non-mandatory guidelines, their ultimate success will rely on successful education and relationship-building with departments and individuals across campus.

FPW-B: Local Food Procurement

5-Year Goal:	Ensure that a minimum of 20% of food purchase spending in campus dining meet Bon Appetit standards for local food procurement, with a focus on small farms and environmentally responsible food production practices.
UN SDGs Supported:	2 – Zero Hunger 12 – Responsible Consumption and Production
Background:	Bon Appetit already has a stated target of 20% of its food at each operation to be sourced from local vendors, defined as vendors located within 150 miles of campus. By adding this existing target as a Climate Action Plan Goal, the Office of Sustainability can better partner with Dining Services to track progress transparently and build a joint plan to increase total local food procurement.
Analysis:	Vassar’s location and operational model pose some challenges for reaching this Goal consistently. The peak growing season for most local produce is during the summer when Vassar is not in session. Conversely, many of the products most easily sourced locally year-round are meats, cheeses, eggs, and other non-plant-based options. And given the administrative processes in place to ensure adequate procurement of food to meet campus needs, some vendors may not be compatible partners. Reaching and maintaining this 20% threshold in a way that fits the programmatic needs for campus dining will require additional research into local options and partnerships with campus dining to create an achievable framework.

FPW-C: Community-Based Dining

5-Year Goal:	Ensure that a minimum of 5% of food purchase spending in campus dining sources from the Hudson Valley region.
UN SDGs Supported:	2 – Zero Hunger 12 – Responsible Consumption and Production
Background:	2-4% of Vassar’s total dining spending comes from vendors near campus. This new requirement that 5% of all dining purchases come from Hudson Valley vendors creates a stated commitment to building wealth within the community and supporting small businesses in our region. Purchases made toward this Goal also count toward the broader local food purchasing target in FPW-B.
Analysis:	As in FPW-B, finding vendors within the Hudson Valley who can provide food compatible with the campus dining program's demands is a significant challenge. One incredibly valuable aspect of this Goal is that it places an even greater emphasis on direct investment within the community. Small farmers and food producers, especially ones from underrepresented and less privileged backgrounds, should be prioritized to maximize this goal's impact.

FPW-D: Waste Tonnage Reduction

5-Year Goal: Reduce annual campus waste tonnage by 15% relative to 2005 baseline

UN SDGs Supported: 6 – Clean Water and Sanitation
11 – Sustainable Cities and Communities
12 – Responsible Consumption and Production
14 – Life Below Water
15 – Life on Land

Background: In 2005, Vassar generated approximately 1,800 tons of campus waste, with 1,450 tons directly landfilled and another 350 tons recycled or composted (a 19.5% diversion rate). Vassar made substantial progress toward reducing this total over the next decade. By 2014, total waste tonnage was down to 1,600 tons (an 11% reduction in total waste tonnage) and 450 tons recycled or composted (a 28% diversion rate).

Over the last five years, Vassar has regressed substantially in both metrics. By the end of FY19, total annual waste tonnage had increased back to 1,750 tons, and combined recycling and compost had decreased to 360 tons (a 20% diversion rate). Further research is required to determine the specific causes of this regression. The results of this research will shape ongoing waste reduction efforts.

As shown from our past ability to decrease campus waste substantially, a 15% reduction in waste tonnage relative to the baseline is aggressive but achievable.

Analysis: The uptick in single-use plastic consumption due to campus safety protocols will likely increase Vassar's total waste tonnage for the next year. Helping members of the Vassar community un-learn less sustainable waste disposal behaviors acquired under current practices will be crucial to our ability to meet this Goal.

FPW-E: Waste Diversion Improvement

5-Year Goal: Increase combined recycling and composting rate to a minimum of 30%

UN SDGs Supported: 6 – Clean Water and Sanitation
11 – Sustainable Cities and Communities
12 – Responsible Consumption and Production
14 – Life Below Water
15 – Life on Land

Background: As noted in FPW-D, Vassar's waste diversion rate regressed from 28% in FY14 down to 20% by the end of FY19. Though reaching a 30% diversion rate is an aggressive goal, it is a vital backstop to prevent regression below our 2005 baseline.

Analysis: In addition to the difficulties mentioned under FPW-D, the global recycling market has shifted substantially since 2014. The export of single-use plastics abroad for recycling overseas has been drastically curtailed, and domestic recyclers are much more selective about the recyclables they accept. Even relatively minor contamination of non-recyclable products in a recycling bin can now lead to the entire bag being landfilled. Making progress on this Goal will require substantial education and signage measures.

Action Steps

FPW-01: Sustainable Dining Campaign

- Description:** Bon Appetit and the Office of Sustainability will collaborate on an informational campaign encouraging students to seek out menu options with plant forward, vegetarian, vegan, and locally sourced menu options. This will be supplemented by increased food procurement from within the Hudson Valley.
- CAP Goal Supported:** FPW-B (Local Food Procurement); FPW-C (Community-Based Dining)
- Resources Required:** The majority of the resources needed for this Action Step come from staff and volunteer time to promote behavior change efforts. Some administrative staff time will also be required to identify and onboard new vendors when able potentially.
- Analysis:** One of the most significant factors in an individual's carbon footprint is their diet. A plant-forward diet can have less than half the environmental impact as one with heavy meat consumption^{xi}. As campus dining works to make appetizing plant-forward dishes as a part of their total offerings, the Office of Sustainability and partnered groups can work to educate individuals on the benefits of moving toward a more sustainable diet. Growing consumer demand for more environmentally conscious diets can help individuals reduce their carbon footprint and decrease potential food waste.

FPW-02: Food Waste Reduction Campaign

- Description:** The Office of Sustainability, in coordination with Bon Appetit and student organizations, will launch a campaign to focus on behavioral causes of food waste. This campaign will require both peer-to-peer education from sustainability interns and engaged students and operational support to reduce food waste at Gordon Commons. Much of this work will dovetail with efforts to meet new legislative mandates for food waste reduction under the Food Waste and Food Donation Recycling Act, which takes effect in January 2022.
- CAP Goal Supported:** FPW-D (Waste Tonnage Reduction); FPW-E (Waste Diversion Improvement)
- Resources Required:** The majority of the resources needed for this Action Step come from staff and volunteer time to promote behavior change efforts. Minor financial support for equipment and signage may also be needed.
- Analysis:** A series of waste audits in Fall 2019 and Spring 2020 showed that almost 60% of the waste Vassar landfilled last year alone could have been composted instead – as much as 800 tons based on 2019's waste hauler data^{xii}. Vassar must substantially reduce its total food waste to reach its goals.
- This campaign will focus on three concepts: minimization, diversion, and contamination. Minimizing food waste through portion control and right-sized consumption will decrease the aggregate landfill, recycling, and composting tonnage. Proper diversion of compostable food waste from trash cans to front-of-house composting bins will decrease landfill tonnage. And reducing contamination from non-compostable waste in composting bins will prevent the unfortunate landfilling of otherwise compostable waste.

FPW-03: Recycling Outreach & Education

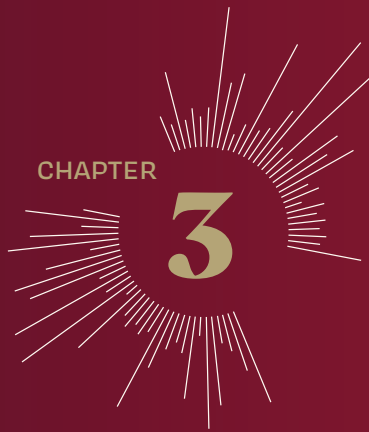
- Description:** The Office of Sustainability and Facilities Operations will standardize campus recycling signage. The Office of Sustainability will partner with current student organizations to lead a campus-wide educational campaign on proper recycling practices.
- CAP Goal Supported:** FPW-D (Waste Tonnage Reduction); FPW-E (Waste Diversion Improvement)
- Resources Required:** The majority of the resources needed for this Action Step come from staff and volunteer time to promote behavior change efforts. Minor financial support for equipment and signage may also be required.
- Analysis:** Just as FPW-02 focuses on decreasing plate waste and contamination within Gordon Commons, this Action Step is focused on better promoting recycling and proper waste sorting across campus. In addition to signage, education and outreach efforts should include programming like a session during orientation, support for Sustainability Peer Educators, and a Green Event Certification program.

FPW-04: Green Purchasing Guideline Development

- Description:** The Office of Sustainability, Purchasing, Facilities Operations, and other stakeholders will collaborate to consolidate and expand current procurement practices to develop Green Purchasing Guidelines for future procurement decisions.
- CAP Goal Supported:** FPW-A (Green Purchasing Guidelines)
- Resources Required:** Limited staff time and labor from a Sustainability Intern for follow-up and research.
- Analysis:** Vassar already uses socially conscious and environmentally friendly procurement in many areas of its operations. Developing Green Purchasing Guidelines will centralize existing information and practices for sustainable procurement while also providing the opportunity to research new products and solutions to enhance Vassar's sustainability efforts.

FPW-05: Plastic-Free Vending Pilot

- Description:** Purchasing will work with Vassar's current beverage vendor to pilot offering no plastic bottled beverages in vending machines in 2-3 high traffic areas to evaluate the feasibility of future plastic-free initiatives on the Vassar campus.
- CAP Goal Supported:** FPW-D (Waste Tonnage Reduction); FPW-E (Waste Diversion Improvement)
- Resources Required:** Minimal staff time to implement the pilot and interpret results.
- Analysis:** Even before the short-term return of single-use plastic water, plastic beverage bottles were a substantial part of the total campus waste stream. As pandemic-induced health guidelines are relaxed in the coming years, decreasing the total consumption of plastic bottled beverages is one promising way to reduce the total campus waste stream. This action Step would begin with a pilot program in 1-2 high-traffic locations to determine suitability for possible future expansion.



LAND AND SEQUESTRATION

The previous two chapters focused on ways that Vassar can reduce the amount of greenhouse gas the College emits through its operations. This chapter has a different focus, shifting from minimizing ongoing harm to the environment to maximizing environmental benefits instead.

The hundreds of acres of natural space on Vassar's campus are a carbon sink, naturally and continually sequestering atmospheric greenhouse gas. The practices proposed in this chapter will help grow the sequestration potential for the College's outdoor space while also increasing the ecological benefits it provides to the surrounding ecosystem.

Goals

LS-A: Restorative Land Management Guidelines

5-Year Goal: Develop Restorative Land Management Guidelines and ensure that at least 80% of outdoor spaces are compliant with these practices

UN SDGs Supported: 3 – Good Health and Well-Being
6 – Clean Water and Sanitation
12 – Responsible Consumption and Production
13 – Climate Action
14 – Life Below Water
15 – Life on Land

Background: The Restorative Land Management Guidelines will provide an overarching framework for how campus grounds and the Vassar Farm & Ecological Preserve are managed, with the following objectives:

- Classifying campus spaces by use type and aesthetic, allowing for high levels of active, curated management in locations like the flowerbed in Main Circle but more naturalized approaches in lower-traffic areas
- Restoring as much of the campus footprint as possible to its historic ecological purposes, including serving as an urban wildlife corridor and supporting local pollinators
- Selecting native plants and plants with resilience to climate change impacts as often as possible, where suitable for a location's aesthetic needs
- Utilizing the carbon sequestration from trees and shrubs maintained on campus as a documented and verified carbon sink, reducing Vassar's total carbon footprint
- Prioritizing preservation and management of the Vassar Farm and Ecological Preserve as an integral part of our decarbonization strategy

Analysis: Development of these guidelines will require input and assistance from a wide range of stakeholders, including Facilities Operations, the Vassar Farm & Ecological Preserve, the Arboretum Committee, the Campus Master Planning Committee, among others. Balancing the feedback and expectations of stakeholders to create actionable guidelines will require care.

Action Steps

LS-01: Carbon Reduction & Reinvestment

Description:	The Office of Sustainability will lead efforts alongside staff from the Vassar Farm & Ecological Reserve (VFEP) and relevant faculty to pursue 3 rd -party verification of on-campus carbon sequestration. Third-party certification will allow Vassar to accurately demonstrate the role of its conservation practices in decarbonizing campus.
CAP Goal Supported:	LS-A (Development of Restorative Land Management Guidelines); TFC-A (Campus Travel Emissions Reduction)
Resources Required:	Staff time from a small team of faculty and administrators for annual reporting and minimal fees for third-party certification.
Analysis:	The natural environment maintained by the College, including the 415-acre Vassar Farm & Ecological Preserve, serves as a ‘carbon sink.’ Per the 2018 i-Tree Ecosystem Analysis^{xiii}, the VFEP stores over 7,700 metric tons of carbon dioxide and sequesters an additional 240 mTons annually. Vassar’s carbon accounting already reflects how investments in energy efficiency and electrification of campus facilities decrease the amount of greenhouse gas emitted into the atmosphere. In contrast, the considerable resources invested in ongoing maintenance and conservation of the VFEP are not similarly reflected. Under the status quo, purchasing carbon offsets to plant trees on the other side of the country – or the world – would have more of a direct impact on Vassar’s reported carbon footprint than growing the same number of trees on campus. Receiving 3rd-party verification of on-campus carbon sequestration helps ensure a holistic approach to carbon neutrality that balances natural sequestration with technological solutions.

LS-02: Partnerships with Leased Space

- Description:** The Office of Sustainability will lead a collaborative process to develop goals and partnerships for current leased space like the Golf Course and Poughkeepsie Farm Project to support Vassar's climate goals in the near term. As opportunities arise, the Climate Action & Sustainability Committee will coordinate conversations on how best to utilize the space in an environmentally responsible manner.
- CAP Goal Supported:** LS-A (Development of Restorative Land Management Guidelines); TFC-A (Campus Travel)
- Resources Required:** Limited staff time to advise leased space partners on aligning their land management with Vassar's climate goals.
- Analysis:** Since near-term implementation involves a non-binding and voluntary request for partnership, those involved in implementing this Action Step will need to share a congenial spirit of collaboration.
- Longer-term plans for the space should reflect the considerable work already undertaken by the Climate Action & Sustainability Committee and Students for Equitable Environmental Decisions (SEED). Additional consultation with the Campus Master Planning Committee will also be required prior to any leased space repurposing.

LS-03: Campus Outdoor Space Inventory

- Description:** A team of student interns and volunteers, working with Facilities Operations, will conduct a comprehensive audit of outdoor spaces and current grounds management practices to form the foundation for future Restorative Land Management Guidelines.
- CAP Goal Supported:** LS-A (Development of Restorative Land Management Guidelines)
- Resources Required:** 2-4 staff hours per month; 10-20 student and volunteer hours per month during the drafting process.
- Analysis:** In addition to being necessary for the Restorative Land Management Guidelines, the Outdoor Space Inventory is an excellent opportunity for student engagement in campus sustainability. Much of the work needed for this inventory can be conducted virtually using existing reports and GIS data. Any in-person work can be performed alone or in a socially distanced manner.

CHAPTER

4

TRAVEL, FLEET, AND COMMUTING

As a world-renowned academic institution committed to providing students with a global perspective, travel is integral to fulfilling Vassar’s mission. The greenhouse gas emissions from travel, by extension, will remain a significant and hard-to-reduce component of the College’s carbon footprint – as much as 50% of the annual carbon footprint by 2023.

Sharp reductions in total travel may not be compatible with the programmatic needs of the College. Still, there are other ways for Vassar to address this source of emissions and emissions resulting from its fleet and staff/faculty commuting. Opportunities for remote work and scholarship can reduce emissions from no longer necessary travel. More sustainable alternatives to flying can be identified for shorter trip. And support for electric vehicle charging can accelerate the electrification of the campus fleet – while also providing a valuable resource for commuters.

The Environmental Defense Fund Fellow assigned to Vassar over the summer of 2020 focused much of her time on identifying ways that Vassar can decrease its travel, fleet, and commuting emissions. Her work and her recommendations are reflected throughout this chapter.

Goals

TFC-A: Campus Travel Emissions Reduction

5-Year Goal:	Reduce campus travel emissions through behavioral and offsetting efforts by at least 50% relative to 2018 baseline
UN SDGs Supported:	7 – Affordable and Clean Energy 8 – Decent Work and Economic Growth 10 – Reduced Inequalities 15 – Life on Land
Background:	By 2022, approximately half of Vassar’s total carbon footprint will come from sponsored campus travel and Junior Year Abroad. Given Vassar’s programmatic needs and institutional profile, air travel will almost certainly remain an ongoing source of emissions for the foreseeable future. Participating in online professional development events and increasing the use of Zoom or similar platforms can reduce some of Vassar’s need for travel. Migrating the travel mode from flying to other more sustainable options, especially for short-distance trips, can also work toward this Goal. However, Vassar will need to offset any remaining emissions.
Analysis:	Vassar is a college with a global reach, and travel has been essential to fulfill Vassar’s mission. While behavior change efforts can make some impact, total emissions from travel will remain hard to reduce to zero in the near term without external carbon offsets. In addition to seeking certification for on-campus carbon sequestration at the Vassar Farm & Ecological Preserve as proposed in Action Step LS-01, the Climate Action & Sustainability Committee should remain engaged in decisions related to a long-term carbon offsetting strategy.

TFC-B: Campus Fleet Emissions Reduction

5-Year Goal: Reduce net campus fleet emissions by at least 20% relative to a 2018 baseline

UN SDGs Supported: 7 – Affordable and Clean Energy
8 – Decent Work and Economic Growth
9 – Industry, Innovation, and Infrastructure
11 – Sustainable Cities and Communities

Background: The extensive use of combustion-based vehicles and equipment accounts for approximately 5% of Vassar’s carbon footprint. The most straightforward way to decrease fleet emissions is to migrate to electric vehicles; however, other solutions such as increasing biodiesel use in campus vehicles and equipment may help Vassar reach this target.

Analysis: This Goal is somewhat contingent on technology continuing to advance in a way that matches Vassar’s operational needs. The Office of Sustainability will help impacted departments identify possible alternatives that prove compatible with unit needs and are not cost-prohibitive.

TFC-C: Sustainable Commuting Expansion

5-Year Goal: Increase share of Vassar faculty, staff, and administrators choosing sustainable commuting methods (i.e., not single-occupancy combustion-based vehicle) to at least 50%

UN SDGs Supported: 7 – Affordable and Clean Energy
8 – Decent Work and Economic Growth
9 – Industry, Innovation, and Infrastructure
11 – Sustainable Cities and Communities

Background: As of February 2020, roughly 60% of Vassar’s faculty, staff, and administrators commuted to campus via single-occupancy vehicles at least three days per week. With emerging opportunities for individuals to work from home and increased support for sustainable commuting methods for individuals who come into the campus, Vassar can drastically reduce its commuting footprint without substantial cost.

Analysis: For many employees, transitioning to more sustainable transit methods comes with a level of decreased flexibility and convenience. Offering options and support to ameliorate these tradeoffs are necessary to reach this Goal.

Action Steps

TFC-01: Sponsored Travel Assessment

- Description:** The Office of Sustainability will assess current sponsored travel at Vassar, focusing on flights within the Northeast and along major rail corridors to identify opportunities to migrate to more sustainable modes of commuting.
- CAP Goal Supported:** TFC-A (Campus Travel Emissions Reduction)
- Resources Required:** Staff and intern labor will be required to complete the assessment. No direct financial cost is anticipated.
- Analysis:** Conducting a comprehensive audit of all sponsored travel is labor-intensive but will provide valuable baseline data for future carbon reduction efforts. Once the assessment is complete, a separate informational campaign should be developed to educate travelers on more environmentally conscious alternatives to flight.

TFC-02: Sustainable Commuting Infrastructure

- Description:** The Office of Sustainability will partner with Facilities Operations and Safety & Security to support greener commuting opportunities. These may include carpooling incentive programs, a vanpool service to and from the Poughkeepsie Train Station during the highest demand times, and expanded Electric Vehicle infrastructure.
- CAP Goal Supported:** TFC-B (Sustainable Commuting Growth)
- Resources Required:** The vast majority of the resources required to expand existing infrastructure for sustainable commuting can be funded in part or in full by external grants and existing Vassar resources.
- Analysis:** The specific programs undertaken to support sustainable commuting will vary depending on interest and participation from campus community members. Ultimately, expanding sustainable commuting infrastructure not only reduces Vassar's carbon footprint. It also enhances the quality of life for current students and employees.

TFC-03: Fleet Electrification Pilot

- Description:** Facilities Operations and Safety & Security will begin a pilot program of migrating existing campus fleet vehicles and grounds equipment from combustion-based to electric through asset renewal and attrition. This pilot will seek to evaluate the suitability of electric vehicles for various use cases.
- CAP Goal Supported:** TFC-B (Campus Fleet Emissions Reduction)
- Resources Required:** This Action Step can be financially supported through a combination of external grants and the existing asset renewal process.
- Analysis:** Existing gas-powered vehicles in Vassar's fleet range from 15-passenger vans to lawnmowers. Before committing to large-scale electrification of the fleet, Vassar will need to work with individual departments to pilot different solutions.

TFC-04: Shared-Use Path Expansion

- Description:** Vassar will expand existing campus path infrastructure to work toward providing a single shared-use path that ultimately provides a direct connection between the Vassar Farm & Ecological Preserve and the Rail Trail.
- CAP Goal Supported:** TFC-C (Sustainable Commuting Growth)
- Resources Required:** Substantial financial investment, to be funded through a combination of existing resources, outside grants, and donor contributions.
- Analysis:** In addition to enhancing support for sustainable commuting, a shared-use path across campus provides a substantial benefit to runners, cyclists, and members of the local community.
- Implementing this step will require substantial resources and stakeholder involvement. A separate task force or working group should be established to address the issue once Vassar can safely welcome off-campus visitors back to campus.

TFC-05: Remote Professional Development & Scholarship Feasibility Study

- Description:** A team including representatives from the Office of the Dean of the Faculty and the Office of Sustainability will examine the costs, benefits, and feasibility of developing incentives and opportunities for faculty to supplement their professional development and research through remote opportunities that do not require travel.
- CAP Goal Supported:** TFC-A (Campus Travel Emissions Reduction)
- Resources Required:** To be determined. Some staff time from faculty and administrators will be required to develop the study and draft recommendations for action.
- Analysis:** The current global pandemic has forced opportunities for professional development and scholarly collaboration to primarily occur virtually. In the coming years, as the world transitions away from travel restrictions and in-person gatherings can occur safely once more, the College should evaluate what opportunities that used to be solely in-person could transition to virtual platforms instead.
- This specific Action Step focuses on offering incentives and additional opportunities for remote professional development and collaboration, **not** reducing opportunities for faculty, staff, and administrators to travel.



ADDITIONAL ACTIONS

Two additional recommendations were developed directly by the Office of Sustainability, receiving the endorsement of CASC at their final meeting of the 2019-2020 academic year. Both recommendations propose developing additional plans to support Vassar's response to the Climate Crisis separately from the operational focus on decarbonization in the Climate Action Plan.

The UN Sustainable Development Goals remain incredibly relevant to both climate resilience and sustainability in the curriculum. The SDGs should be retained as part of the framework for both plans.

Campus & Community Climate Resilience Response

Description: A comprehensive response to the climate crisis requires more than just efforts to minimize Vassar's environmental footprint. It must also focus on preparing the institution, in partnership with the surrounding community, to address climate change's adverse impacts. The Office of Sustainability will lead the following steps to promote and expand community resilience:

- Convening a campus-community task force to bring together appropriate representatives from Vassar College, local municipalities, Dutchess County, and other regional entities to support climate resilience efforts
- Completing a comprehensive assessment of campus and community resilience through a joint effort with the Task Force
- Drafting a Campus & Community Resilience Action Plan that addresses targeted, quantifiable goals for campus and community resilience

Labor Required: Moderate staff time; no financial impact.

Analysis: The adverse impacts of climate change continue to grow more severe each year, and the College and the surrounding community will be faced with ever-greater challenges in the years to come. Developing a complementary action plan for campus and community resilience is crucial to ensure Vassar is prepared for these challenges. It can also take advantage of and institutionalize existing *ad hoc* partnerships developed through near-term pandemic response.

Assessment of Sustainability in the Curriculum

- Description:** A team comprised of individuals from the Office of the Dean of the Faculty and select departments/programs should review the current presence of sustainability across the curriculum. Based on the assessment results, this team should evaluate the possibility of expanding sustainability in the curriculum and provide recommendations as a separate report that complements the Climate Action Plan.
- Resources Required:** The full resources required to complete this assessment are to be determined, pending the development of the assessment's full scope. The Office of Sustainability and Sustainability Interns can provide *ex officio* support and assistance, but the plan's development needs to be a faculty-driven process.
- Analysis:** The 2020 Climate Action Plan is an administratively driven set of recommendations to work toward carbon neutrality and other key sustainability indicators. Given both the drafting and implementation process, the CAP is not the appropriate venue to recommend modifying the curriculum. However, this is a subject that should be considered more deeply by key faculty stakeholders, and as noted above, can be supported by the Office of Sustainability where needed.



IMPLEMENTATION AND NEXT STEPS

The Vassar of 2025, as outlined in this Climate Action Plan, will be a leader in the field of sustainability in higher education. The College will be emitting less than 5,000 metric tons of greenhouse gas annually – less than a sixth of its 2005 baseline. Almost a decade of regression in its waste reduction and diversion rates will be reversed, with some campus operations even approaching zero waste. The Vassar Farm & Ecological Preserve will remain a key point of pride for the College – while also now receiving credit for its contribution to reaching carbon neutrality by 2030. And ties to the community are strengthened through joint climate action.

This chapter focuses on the Climate Action Plan's implementation process, ensuring the College can bring to life the vision described above.

Implementing the Plan

Full implementation of the 2020 Climate Action Plan is a multi-year process and will require prioritization and careful resource allocation to be successful.

The Climate Action & Sustainability Committee provides top-level oversight of the Climate Action Plan. CASC will help decide which Action Steps are to be prioritized in a given semester or year, informed at least in part by the Multi-Criterion Analysis tool developed by the 2020 EDF Fellow to aid in decision-making^{xiv}.

The Office of Sustainability will provide the CAP's day-to-day administration and can begin the implementation process for many Action Steps during the Spring 2021 semester. The same Climate Action Teams that helped draft the 2020 Climate Action Plan may now be asked to assist, where able, in the implementation process.

The Action Steps, as proposed, may not be sufficient to fully reach the 5-year targets in the Goals associated with the 2020 CAP. CASC and the Climate Action Teams may propose additional Action Steps as existing ones are completed to ensure continued relevance and momentum for campus sustainability.

Funding the Plan

Throughout the drafting process for the 2020 Climate Action Plan, a guiding principle was ensuring that all the Goals and Action Steps included could be implemented. During the review period of the Climate Action Plan over Summer 2020, the Office of Sustainability and the EDF Fellow identified costs and funding sources for the entire CAP.

Existing Operating Budgets

Many of the Action Steps as proposed carry little direct cost or carry costs that can be absorbed without undue burden on impacted departments. The 2020 Climate Action Plan, as much as possible, avoids the inclusion of any unfunded mandates.

External Grants

Many of the 2020 Climate Action Plan efforts are eligible for full or partial grant funding from state agencies, federal agencies, and NGOs. The New York State Energy Research & Development Authority, for example, has provided sizeable grants to Vassar for electric vehicle charging stations, large-scale facility retrofits, and the drafting and implementation of the Energy Master Plan.

As Vassar continues to embrace innovative and cutting-edge approaches to making the College more sustainable, many other grant opportunities may become available.

The Office of Sustainability has already applied for more than \$1.2 million in grant funding during FY20 alone. Given the importance of external financial resources to sweeping climate action at Vassar, the Office of Sustainability should prioritize securing external funding as part of its core mission.

Donor Support

Vassar is fortunate to receive consistent support from an engaged and generous community of alumnae/i, parents, and friends of the College. Support from donors has been invaluable in establishing new sustainability initiatives at Vassar, including the Green Reinvestment Fund. Continuing to show gratitude for contributions made to date while offering new opportunities to support Vassar's sustainability should also be considered part of the Office of Sustainability's core mission.

The Green Reinvestment Fund

Seeded entirely by contributions from generous donors, the Green Reinvestment Fund (GRF) is an internal revolving loan fund for Vassar's energy efficiency projects^{xv}. Cost savings from projects funded through the GRF are repaid to the GRF until the total project cost and a 10% surcharge are recouped. All further savings support campus operations at large.

The GRF is the primary anticipated funding source for capital-intensive projects like implementing the Energy Master Plan.

The Green Innovation Fund

While the Green Reinvestment Fund can provide substantial support for campus sustainability, many of the projects under consideration in this Climate Action Plan do not have the short payback periods needed to qualify for funding through the GRF. The Green Innovation Fund, seeded initially by external grant funding, will offer a dedicated funding source for smaller CAP projects that might otherwise struggle to find financing.

Tracking the Plan

A final piece of the implementation process is providing clear public dashboards for the Climate Action Plan to track progress toward Goals while ensuring public accountability.

By early 2021, the Office of Sustainability will oversee developing a dashboard for the 2020 Climate Action Plan that includes all relevant baseline data for the Goals and the near-term and long-term targets. At launch, the following indicators specifically will be tracked:

- Total Greenhouse Gas Emissions, By Scope
- Total On-Campus Combustion, by MMBtu
- Total Landfill Tonnage
- Composting and Recycling Tonnage
- Total Project Impacts from Green Reinvestment Fund

Additional indicators will be added as data becomes available.

The CAP Dashboard will be updated no less than annually, with a target of quarterly updates where possible.



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APPENDIX



OVERVIEW OF THE UN SUSTAINABLE DEVELOPMENT GOALS

The United Nations Sustainable Development Goals (SDGs) are “a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030^{xvi}.” The 2020 Climate Action Plan is adopting this framework to help guide institutional sustainability in a more intersectional manner.

The United Nations track progress toward each Goal through a series of targets and quantitative indicators. As a global framework focused on action at the national level, not all targets and indicators are directly applicable to Vassar's efforts.

The following information accompanies each SDG listed below:

Summary:	The summary of the SDG as provided by the United Nations
Relevant Targets:	A specific target or targets associated with the Goal that is directly applicable to actions in the 2020 CAP.
Application to CAP:	A non-comprehensive example of where this SDG is addressed in the Climate Action Plan. If no specific target associated with the SDG is addressed in the Climate Action Plan, engagement opportunities in a different context are mentioned.

1. No Poverty^{xvii}

Summary:	End extreme poverty in all forms by 2030
Relevant Targets:	Build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social, and environmental shocks and disasters (1.5)
Application to CAP:	As Vassar expands its public-facing efforts in sustainability and works to build campus and community resilience to climate change, finding ways to invest in the community, especially those in greatest need, is vital. For example, investing in energy efficiency retrofits in the community could become part of Vassar’s carbon reduction plan in place of only purchasing external carbon offsets.

2. Zero Hunger^{xviii}

Summary:	End hunger, achieve food security, and promote sustainable agriculture
Relevant Targets:	Double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists, and fishers (2.3); ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding, and other disasters and that progressively improve land and soil quality (2.4)
Application to CAP:	When refining and updating its procurement strategy for campus dining, Vassar should focus on how it can best support local and sustainable food producers in alignment with this SDG and best practices for sustainable dining ^{xix} .

3. Good Health & Well-Being^{xx}

- Summary:** Ensure healthy lives and promote well-being for all at all ages
- Relevant Targets:** Substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination (3.9)
- Application to CAP:** Reducing total combustion on campus, both through electrification of heating systems and migration to electric vehicles, will improve local air quality. The Green Procurement Guidelines will also examine ways that the products Vassar consumes can have lower pollution as part of their life cycle emissions.

4. Quality Education^{xxi}

- Summary:** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Relevant Targets:** Ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development (4.7)
- Application to CAP:** Assessing sustainability in the curriculum as proposed in Chapter 5 will provide a valuable foundation for all future efforts to support this SDG.

5. Gender Equality^{xxii}

- Summary:** Achieve gender equality and empower all women and girls
- Relevant Targets:** No specific SDG targets align with actions proposed in the 2020 Climate Action Plan.
- Application to CAP:** While the 2020 Climate Action Plan does not directly impact any of the targets associated with SDG 5, existing coursework and research likely do. During the assessment of sustainability in the curriculum, Vassar should evaluate if this SDG is sufficiently examined. If not, this may be an area for growth.

6. Clean Water and Sanitation^{xxiii}

- Summary:** Ensure availability and sustainable management of water and sanitation for all
- Relevant Target:** Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes (6.6)
- Application to CAP:** Sustainable land management strategies may improve water quality. One possible indicator would be to measure water quality at creeks, ponds, or lakes on Vassar land over time. Measurements should be taken near landscaped areas and the golf course, for example, along the creek between Skating Pond and Sunset Lake.

7. Affordable and Clean Energy^{xxiv}

Summary:	Ensure access to affordable, reliable, sustainable and modern energy for all
Relevant Targets:	Increase substantially the share of renewable energy in the global energy mix (7.2); Double the global rate of improvement in energy efficiency (7.3)
Application to CAP:	The Near-Term Decarbonization Plan will substantially increase Vassar's energy efficiency and renewable electricity consumption. The proposed Energy Dashboard will track and report on-campus energy consumption and sources, including data on renewable energy, energy efficiency, and investment in clean energy technologies.

8. Decent Work and Economic Growth^{xxv}

Summary:	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Relevant Target:	Improve progressively global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead (8.4)
Application to CAP:	The Green Purchasing Guidelines will consider both the upstream and downstream environmental impacts of the goods and services purchased by Vassar.

9. Industry, Innovation, and Infrastructure^{xxvi}

Summary:	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Relevant Target:	Upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes (9.4)
Application to CAP:	Migration to more sustainable on-campus heating and cooling systems and fleet electrification positively impacts this SDG.

10. Reduced Inequalities^{xxvii}

Summary:	Reduce inequality within and among countries
Relevant Target:	Empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status (10.2)
Application to CAP:	In addition to prioritizing environmentally responsible products and services, the Green Purchasing Guidelines should consider support for historically underutilized businesses to direct Vassar's purchasing power toward those most in need in the nearby community.

11. Sustainable Cities and Communities^{xxviii}

Summary:	Make cities and human settlements inclusive, safe, resilient and sustainable
Relevant Targets:	Provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities (11.7); Substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters (11.b)
Application to CAP:	The most substantial impacts on this SDG will be seen through Vassar's work to promote campus and community resilience to the effects of climate change. Maintaining the Vassar Farm & Ecological Preserve as a resource for the community once it is safe to reopen is another way to support this SDG.

12. Responsible Consumption and Production^{xxix}

Summary:	Ensure sustainable consumption and production patterns
Relevant Targets:	Halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses (12.3); substantially reduce waste generation through prevention, reduction, recycling, and reuse (12.5)
Application to CAP:	Almost all of the goals and action steps proposed in Chapter 2 (Food, Procurement, & Waste) positively impact the targets for this SDG.

13. Climate Action^{xxx}

Summary:	Take urgent action to combat climate change and its impacts
Relevant Target:	Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning (13.3)
Application to CAP:	Every Goal and Action Step in the 2020 Climate Action Plan in some way supports this SDG.

14. Life Below Water^{xxxi}

Summary:	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Relevant Target:	Prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution (14.1)
Application to CAP:	The most powerful way Vassar can address this SDG is through its waste reduction efforts – specifically, efforts to reduce total campus use of plastic. Depending on the outcomes seen from the implementation of the waste reduction Action Steps proposed in Chapter 2, the 2025 Climate Action Plan may need to have even more aggressive targets for plastic waste reduction.

15. Life on Land^{xxxii}

- Summary:** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Relevant Target:** Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species (15.5)
- Application to CAP:** Development and implementation of the Restorative Land Management Guidelines proposed in Chapter 3 directly align with this SDG.

16. Peace, Justice, and Strong Institutions^{xxxiii}

- Summary:** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Relevant Targets:** No specific SDG targets align with actions proposed in the 2020 Climate Action Plan.
- Application to CAP:** While the 2020 Climate Action Plan does not directly impact any of the targets associated with SDG 16, existing coursework and research likely does. During the assessment of sustainability in the curriculum, Vassar should evaluate if this SDG is sufficiently examined. If not, this may be an area for growth.
- Additionally, much of the civic engagement work already conducted by Vassar addresses targets under this Goal. Additional work done to bolster campus and community resilience to climate change impacts will also engage with targets under this SDG.

17. Partnerships for the Goals^{xxxiv}

- Summary:** Strengthen the means of implementation and revitalize the global partnership for sustainable development
- Relevant Targets:** No specific SDG targets align with actions proposed in the 2020 Climate Action Plan.
- Application to CAP:** While the 2020 Climate Action Plan does not directly impact any of the targets associated with SDG 17, existing coursework and research likely does. During the assessment of sustainability in the curriculum, Vassar should evaluate if this SDG is sufficiently examined. If not, this may be an area for growth.

APPENDIX

B

EDF FEEDBACK ON AIR TRAVEL EMISSIONS

For the last several years, Vassar has partnered with the Environmental Defense Fund to host a Summer Fellow to support the work of campus sustainability. For 2020, Vassar and the Environmental Defense Fund recruited Camila Bobroff. Her first task was assessing the 2020 Climate Action Plan as an external reviewer to identify feasibility, value, and impact of the Goals and Action Steps as proposed. Her contributions from the review process are reflected throughout this document^{xxxv}.

Her second task was developing an implementation plan to reduce Vassar's air travel emissions. This appendix reproduces the high-level summary of her three-part plan to reduce Vassar's total emissions, informed by benchmarking current practices at other institutions.

Part 1: Tracking and Analyzing Emissions

- Current Conditions
 - There is no formal procedure at Vassar to audit air travel
- Near-Term
 - Calculate Vassar-sponsored air travel emissions through reimbursement forms and receipts. For increased reproducibility, consider writing a script to calculate emissions.
- Mid-Term
 - Administer travel survey to students to estimate their air travel emissions.
 - Expand reporting of travel in Workday
- Long-Term
 - Expand travel booking in Workday.
 - Investigate the potential to book all air travel through Workday to allow for better air travel monitoring and management.

Part 2: Setting Air Travel Priorities

- Current Conditions
 - Vassar's 2020-2025 Climate Action Plan includes 2 actions to explore alternatives to air travel:
 - 1) conduct an assessment of sponsored travel with a focus on flights to destinations located along northeastern rail corridors, and
 - 2) develop a program to support alternatives to travel for professional development opportunities, presentations from outside speakers, etc.
- Near-Term
 - Develop an education campaign to inform departments and individuals of their air travel emissions and resulting environmental impact.
- Mid-Term
 - Promote travel alternatives (e.g., train travel or bus/van rentals) for reasonable destinations.
 - Partner with 511NY Rideshare.
- Long-Term
 - Develop a preferred airline carrier list based on sustainability metrics (e.g., options to purchase carbon offsets, use of biofuels in aircrafts, etc.)

Part 3: Offsetting Necessary Travel

- Current Conditions
 - Vassar does not currently offset air travel at an institutional level.
- Near-Term
 - Assemble a carbon offset team of students, faculty, and staff, to provide input regarding carbon offset purchases and projects
- Mid-Term
 - Develop offset purchasing guidelines to ensure quality carbon reduction investments.
 - Become a Second Nature signatory for resources and guidance.
- Long-Term
 - Develop an internal carbon offset program.
 - Prioritize locally focused projects in purchasing decisions to benefit the local community.

APPENDIX



FEEDBACK FROM THE 2019 CLIMATE ACTION FORUMS

In order to gather representative feedback from the entire Vassar campus for the Climate Action Plan, the Office of Sustainability held a series of nine in-person forums and sent two surveys over email (one to all students and one to all faculty, staff, and administrators). 110 individuals participated in the in-person forum, and 130 individuals completed surveys.

Both the in-person forums and the survey asked participants to address sustainability at Vassar through three distinct lenses:

1. What is Vassar currently doing well, and could consider expanding?
2. What can Vassar do better?
3. What new efforts should Vassar undertake?

Energy efficiency, campus dining, and waste management (including recycling and composting) were the three most frequent topics mentioned by participants in the feedback process. Sustainable commuting, conservation, transparency, and reducing use of combustible fuels were also mentioned by several participants.

The following is a representative sample of comments received during the feedback process, categorized by question and respondent groups.

What is Vassar currently doing well, and could consider expanding?

Students

- “Carbon Neutrality by 2030 is good, but I think we should set ambitious goals for zero emissions”
- “recycling bins as well as trash at most large hub locations”
- “Creating a carbon neutrality plan, the ecological preserve, zipcars”
- “Composting, Recycling, no plastic straws, vegetarian dietary options”
- “The effort to have compostable single-use products in food service is good, but sorting needs to be improved so things are actually composted. Also, in general, move away from single-use products.”

Faculty, Staff, and Administrators

- “Beginning to address food waste. Need a more well-communicated plan”
- “Retrofitting buildings for efficiency and augmenting renewable energy sources”
- “we have a few electric car chargers”
- “planting more trees on campus & ecological preserve”
- “Recycling program. But we still need to supply labeled containers throughout campus to minimize garbage being thrown in wrong places”
- “Having a sustainability committee”

What can Vassar do better?

Students

- “The deece uses way too much meat on a daily basis.”
- “Improving the heating and electricity in dorms to be more sustainable”
- “trash management!! especially in the deece, there needs to be a shift in culture when it comes to food waste and trash sorting in the whole campus. also less disposables at the retreat and express”
- “More explicit directions on what is trash vs recycling vs compostable”
- “it feels wasteful when the Deece uses the plastic utensils or paper cups, especially at late night”
- “More transparency generally or make it easy to find information (what happens to all the old furniture when buildings are renovated?)”

Faculty, Staff, and Administrators

- “More LEED certified buildings, and consideration of LEED for future construction projects”
- “Figure out a way to make our old buildings more energy efficient, while keeping their historic “charm”
- “Realizing the benefits of having a 400-acre nature preserve as part of our campus and the carbon sequestration that this provides”
- “Electrify everything! Especially HVAC on campus, and vehicle fleet”
- “Turn out the lights in buildings overnight (Library and others). Repair ancient heating systems that blast hot air into the winter night from the dorms, where windows have to be opened to cool down the room. Be more active about handling recycling v. trash v. compost.”

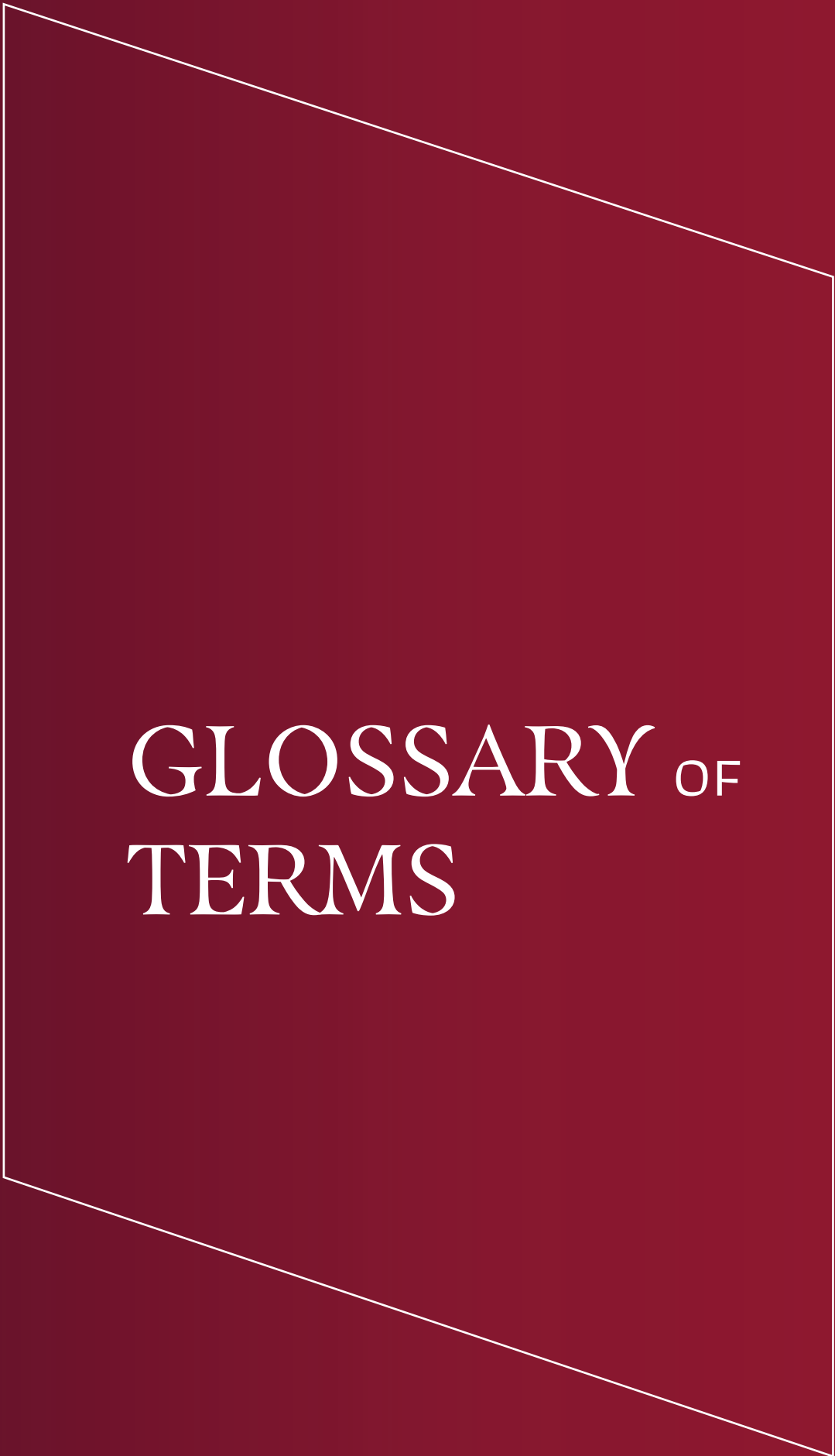
What new efforts should Vassar undertake?

Students

- “Solar powered, maybe geothermal, more renewable energy, education initiatives on how we as students can effectively limit our waste.”
- “Provide more food from the Farm (e.g. honey, lettuce, vegetables).”
- “I would like to see an “eat less meat” initiative within the deece and other dining options. “
- “using less plastic, particularly in retreat/express “
- “Getting food from local farms, installing LED lights in all buildings on campus, declaring a climate emergency, increasing education on climate change and sustainability”
- “Advertise the Vassar Free Market”

Faculty, Staff, and Administrators

- “Add and Environmental Impact Statement to plans and purchasing requests (right now we are rewarded for being demanding and have no incentive for considering larger needs when making classroom requests, etc)”
- “retrofitting buildings so they are zero emission”
- “I’d love to see a plan for water consumption on campus and a reduction in waste water”
- “Rain water collection”
- “in my dream world the college would be vegan, but if there were a significant campaign to reduce meat consumption across the college that would be wonderful”
- “renewable energy usage - upgrading inefficient lighting on campus and drafty/uninsulated spaces”
- “more hybrid shuttles for students and staff instead of everyone parking their car close to Main”



GLOSSARY OF TERMS

British Thermal Unit (BTU and MMBTU)

A measurement of the amount of energy needed to raise one pound of water by one degree Fahrenheit. MMBTU is short for Million British Thermal Units and is the baseline unit of measurement for Vassar's combustion-based fuel usage.

Carbon Neutral

Net-zero release of greenhouse gas emissions, either through undertaking no activities that emit greenhouse gas or offsetting your release by sequestering an equivalent amount of greenhouse gas

Carbon Sink

Something that directly sequesters greenhouse gas out of the atmosphere, like trees or carbon capture and sequestration technology.

Climate Action & Sustainability Committee (CASC)

The Governance Committee that acts as a forum for the discussion of administrative and educational policies related to sustainability. It presents for approval to the faculty policies that are related to educational policy and is advisory to the president on administrative policies. Any policy changes approved by the faculty is submitted to the trustees for final approval.

Climate Action Team (CAT)

A topical working group focused on reviewing and implementing a subject area from the Climate Action Plan

Climate Positive

Going beyond carbon neutrality to give back more to the environment than you take from it (for example, pulling more greenhouse gas out of the atmosphere through trees and shrubs on campus than is produced through campus operations).

Embodied Carbon

The carbon emissions associated with the life cycle of a product, from its production through its site of use. For a steel beam, for example, this includes the emissions to mine the ore, smelt the metal, and transport the product to the construction site.

Greenhouse Gases

Carbon dioxide, methane, and other gases that trap heat within the atmosphere by absorbing infrared radiation. This is also sometimes abbreviated CO₂e, short for "Carbon Dioxide Equivalent."

Mobile Emissions

Emissions resulting from mobile sources owned or controlled by Vassar, such as the campus fleet. Leased vehicles are included in this category; rented vehicles for business travel are not.

Renewable Electricity

Electricity generated through a carbon-neutral fuel source like wind turbines, photovoltaic solar panels, or small-scale hydropower dams. Starting in 2021, all electricity purchased by Vassar will be renewable.

Renewable Fuel Oil (RFO)

Fuel oil produced from waste timber and sawdust that would have otherwise released its carbon through decomposition. The life-cycle emissions of the RFO identified for use at Vassar are ~80% lower than natural gas.

Scope 1 Emissions

Direct greenhouse gas emissions and reductions from Vassar's owned and controlled resources. This includes all of Vassar's **Stationary Emissions**, **Mobile Emissions**, and **Carbon Sinks**.

Scope 2 Emissions

Emissions resulting from purchased electricity. Starting in 2021, Vassar will have net zero Scope 2 Emissions due to our conversion to 100% **Renewable Electricity**.

Scope 3 Emissions

Indirect greenhouse gas emissions and reductions resulting from Vassar operations. Commuting, Junior Year Abroad, university-financed travel, and purchased carbon offsets all contribute to this total.

Stationary Emissions

Emissions generated through stationary equipment and facilities, such as Vassar's central heating plant and smaller building-level heating systems.

Sequestration

Pulling greenhouse gas out of the atmosphere and into a solid or liquid form. The most common form of carbon sequestration is planting trees, which pull carbon dioxide out of the atmosphere and use it to grow.

Solar-Thermal Water Heating

A water heating system that uses the direct energy of sunlight to heat water for use within a facility.

ENDNOTES

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- ⁱ Joseph Lelyveld, “Mood is Joyful as City Gives Its Support,” *New York Times*, April 23, 1970.
- ⁱⁱ Charleen Kress, “MAN MUST RELEARN TO LIVE OR BE CONDEMNED TO DIE,” *Miscellany News*, April 17, 1970
- ⁱⁱⁱ Alistair Hall, Mary Ann Cunningham, Thomas Porcello, et al., “The 2016 Climate Action Plan,” Vassar College, Poughkeepsie, New York, 2016.
- ^{iv} <https://secondnature.org/signatory-handbook/the-commitments/>
- ^v <https://www.undp.org/content/undp/en/home/sustainable-development-goals.html>
- ^{vi} <https://unhsimap.org/>
- ^{vii} Ecosystem Energy Services, “Net Zero Study Final Report,” August 1, 2019.
- ^{viii} Benjamin Shaffer, “A Future Heating Plan for Vassar College,” August 17, 2018.
- ^{ix} New York State Energy Research and Development Authority, “What Is RTEM?,” New York, June 2018.
- ^x Tom Strumolo, “Vassar College Energy Master Plan,” Poughkeepsie, New York, 2020.
- ^{xi} M.C. Heller et al. “Greenhouse gas emissions and energy use associated with production of individual self-selected US diets,” *Environmental Research Letters* 13(4), 044004 (2018): Accessed September 28, 2020.
<https://iopscience.iop.org/article/10.1088/1748-9326/aab0ac/pdf>
- ^{xii} Anna Lockhart, “Waste Audit Report,” Vassar College, Poughkeepsie New York, August 2020
- ^{xiii} “New VFEP Carbon i-Tree v6 Urban Forest Effects and Values,” Vassar College, Poughkeepsie, New York, 2018.
- ^{xiv} Camila Bobroff, “Multi-criteria Analysis for Vassar’s 2020-2025 Climate Action Plan,” August 2020
- ^{xv} “The Green Reinvestment Fund,” Vassar College Office of Sustainability, accessed September 29, 2020,
<https://www.vassar.edu/sustainability/green-reinvestment-fund/>
- ^{xvi} “Sustainable Development Goals,” United Nations Development Programs, accessed September 26, 2020,
<https://www.undp.org/content/undp/en/home/sustainable-development-goals.html>
- ^{xvii} “Goal 1,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal1>
- ^{xviii} “Goal 2,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal2>
- ^{xix} US Department of Agriculture, “Sustainable Agriculture: Definitions and Terms,” by Mary V. Gold, (Beltsville, MD 2007), accessed September 26, 2020, <https://www.nal.usda.gov/afsic/sustainable-agriculture-definitions-and-terms#toc2>
- ^{xx} “Goal 3,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal3>
- ^{xxi} “Goal 4,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal4>
- ^{xxii} “Goal 5,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal5>
- ^{xxiii} “Goal 6,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal6>

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- ^{xxiv} “Goal 7,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal7>
- ^{xxv} “Goal 8,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal8>
- ^{xxvi} “Goal 9,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal9>
- ^{xxvii} “Goal 10,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal10>
- ^{xxviii} “Goal 11,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal11>
- ^{xxix} “Goal 12,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal12>
- ^{xxx} “Goal 13,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal13>
- ^{xxxi} “Goal 14,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal14>
- ^{xxxi} “Goal 15,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal15>
- ^{xxxi} “Goal 16,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal16>
- ^{xxxi} “Goal 17,” United Nations Department of Economic and Social Development Sustainable Development Goals, accessed September 28, 2020, <https://sdgs.un.org/goals/goal17>
- ^{xxxi} Camila Bobroff, “Multi-criteria Analysis for Vassar’s 2020-2025 Climate Action Plan,” August 2020