

Climate Action Plan: Report and Recommendations to the President

President's Council on Sustainability
University of Mary Washington

On behalf of the
Climate Action Task Force

April 2026

Table of Contents

1. Letter from the President's Council on Sustainability	3
2. Charge and Goals	4
2.1. Charge Letter from Dr. Paino.....	4
2.2. Letter from the Task Force	5
2.3. Members of Climate Action Task Force.....	6
3. Overview	7
4. Actionable Goals	8
4.1. Facilities & Energy Management.....	8
4.2. Transportation	11
4.3. Operations	14
5. History and Context of Climate Action at UMW	17
5.1. History of Sustainability at UMW	17
5.2. History of Climate Action at UMW	19
6. Greenhouse Gas Inventory	20
6.1. Definitions.....	20
6.2. UMW's GHG Inventory	21
7. Core Projects	24
7.1. EV Charging Infrastructure Development.....	24
7.2. Energy Savings through Energy Efficiency.....	24
7.3. Renewable Energy Development	25
7.4. Energy Dashboards	25
8. Financing Future Energy Savings and Transportation Projects.....	26
9. Conclusion	27
10. References.....	28

1. Letter from the President's Council on Sustainability

The President's Council on Sustainability (PCS) presents the University's Climate Action Plan – a roadmap for achieving meaningful progress toward climate neutrality and resilience. The plan was initially developed through the collaborative efforts of the Climate Action Task Force between March 2022 and August 2023. However, since the Climate Action Task Force was meant to be a temporary committee with the goal of creating a Climate Action Plan, the PCS was charged with the responsibility of finalizing, publishing, and stewarding this plan. This ensures the plan's long-term success since implementation requires dedicated leadership and accountability, which the PCS will provide.

The Climate Action Plan reflects the hard work and expertise of the Climate Action Task Force, whose collaborative efforts have produced a comprehensive set of strategies to reduce greenhouse gas emissions, enhance sustainability across campus operations, and prepare our community for the challenges of a changing climate. Our role is not only to share the vision outlined by the Task Force, but to ensure that its recommendations are implemented effectively and transparently. As the University's central coordinating body for sustainability, the PCS will oversee progress toward the plan's goals, facilitate cross-campus collaboration, and report regularly on achievements and areas for improvement. We will work closely with academic departments, facilities management, student organizations, and community partners to integrate climate action and resilience into every aspect of university life.

The Climate Action Plan is more than a document – it is a commitment. It calls on all of us to take ownership of our environmental impact and to act boldly in the face of climate change. The PCS will serve as the driving force behind this commitment, ensuring accountability and fostering innovation as we move forward. We can transfer these recommendations into measurable outcomes that reflect our shared values and responsibilities.

We invite every member of our university community to engage with this plan, to contribute ideas, and to join us in creating a campus that models climate leadership. The work ahead will require persistence and collaboration, but with campus-wide support, we can achieve the ambitious goals outlined in this plan and make a lasting difference for future generations.

President's Council on Sustainability

2. Charge and Goals

2.1. Charge Letter from Dr. Paino



UMW Climate Action Task Force

Originator of the charge: Troy Paino, President

Nature of the group: Planning and Initial Implementation of Actions to Reduce UMW Carbon Footprint

Charge Statement: Climate change is one of the most important challenges facing the modern world. This assertion arises from both its global scope and ultimate dire consequences if left unchecked. Guided by our Strategic Vision, the University of Mary Washington (UMW) commits to addressing this challenge on behalf of its students, the institution, surrounding community, and global stakeholders. We must act now as a leader within the community and in recognition of the signs of climate change we experience daily. The primary tools at the University's disposal are the interested, committed and resourceful students, faculty and staff of UMW. Both faculty ([UFC Resolution on Climate Change](#)) and students (BEAM petition) have called for action on Climate Change.

The Climate Action Task Force (Task Force), under the direction of the UMW President, will develop a detailed Climate Action Plan for the implementation of the University's commitment to climate leadership. With our plan, UMW will join the broad movement of colleges and universities fighting climate change. We will join with local communities and seek synergies to decrease climate change. The plan will 1) identify specific actions and policies, 2) provide measurable objectives, and 3) include timeframes for implementation.

The Task Force will recommend immediate and longer-term actions and policies for the consideration of the President. These actions and policies will be guided by the following questions:

- What is UMW currently doing to minimize negative impacts on the global environment? What can be done to improve the reach and effectiveness of current actions?
- What visible and impactful action(s) can be implemented immediately, i.e., within 6 months?
- What can be done to empower individuals and campus groups to join senior leadership in promoting and supporting university-wide climate actions?
- What new programs, resources, and policies should be implemented, including ongoing mechanisms, that will decrease UMW's negative impacts on the global environment?

The grave threats posed by global climate change must be recognized and addressed by individuals and institutions alike. Climate action success will require students, faculty, and staff to work together to transform the University. The Task Force should seek out ways to engage students and faculty in the classroom, in student-driven projects, and in broad collaborations between students, faculty, and staff.

Timeline: UMW Climate Plan should plan a pathway by which UMW will be carbon neutral by 2035. The Task Force will deliver a completed action plan by July 2023.

Communication Plan: The President will announce to the University community the charge of the Task Force and the significance of its work upon his approval of the Task Force Charge. Task Force co-chairs will meet with the Chief of Staff bi-monthly. Task Force co-chairs will update the President at the end of summer 2022. Further updates will be planned at that time.

2.2. Letter from the Task Force

The grave threats posed by global climate change must be addressed by individuals and institutions alike. For the University of Mary Washington, climate action success will require students, faculty, and administrators to work together to transform the University. The recommendations of the Climate Action Task Force envision projects and programs that build carbon reduction into University infrastructure, engage students and faculty around carbon reduction in the classroom, and support student-driven projects.

The primary goal of the proposed UMW Climate Action Plan is to reach carbon neutrality at the University by 2040. Our proposals is ambitious, but the present dangers driven by climate change necessitate ambitious actions. Global climate change is one of the most important challenges facing the modern world. Daily, the UMW community and the world experience the consequences of increasing greenhouse gases and the resulting rise in global temperatures. Guided by our Strategic Vision, the University of Mary Washington (UMW) must commit to addressing this challenge on behalf of its students, the institution, and our local community. We must act now as leaders within the community and in recognition of the impacts of climate change we experience daily. It is clear from the history of sustainability and climate action at UMW that students, faculty, and staff are interested, committed, and ready to slow and reverse climate change.

In 2019, the student group known as Better Energy Awareness and Mobilization (BEAM), delivered a letter to President Troy Paino urging immediate action towards renewable energy. This came at an important time within the community, when the City of Fredericksburg had adopted its [100% renewable energy resolution](#). The student-written letter resulted in a meeting between the President's Council on Sustainability (PCS) and Dr. Paino to discuss an approach to achieving this goal. In March 2022, President Troy Paino assembled a small group of students, faculty, and staff as the Climate Action Task Force (CATF). We, the members of the CATF, represent the aspirations, skills, and experiences of the broader UMW community. We were guided by President Paino's charge (Appendix A), which proposed four main questions:

- What is UMW currently doing to minimize negative impacts on the global environment? What can be done to improve the reach and effectiveness of current actions?
- What visible and impactful action(s) can be implemented immediately, i.e., within 6 months?
- What can be done to empower individuals and campus groups to join senior leadership in promoting and supporting university-wide climate actions?
- What new programs, resources, and policies should be implemented, including ongoing mechanisms, that will decrease UMW's negative impacts on the global environment?

The product of this task force is a proposed UMW Climate Action Plan. The overarching goals of this plan reflect the University's commitment to leadership and action. With this plan, UMW would join the broad movement of colleges and universities to fight climate change. The University has a strong history of sustainability and climate action. Our Climate Action recommendations detail actions necessary to achieve the University's Carbon Neutrality goal. Actions that the University might take would showcase UMW's willingness to be a leader and commitment to developing future leaders in climate action. The proposed plan 1) identifies specific actions and policies, 2) provides measurable objectives, and 3) includes recommendations for implementation in five areas:

- Energy Management
- Operations
- Transportation
- Research & Curriculum
- Community & Engagement

The Climate Action Task Force, while developing the UMW Climate Action recommendations, has also taken significant steps to launch climate action projects. In consultations with the Offices of Facilities Operations and Procurement, the University has explored three climate action projects: 1) installation of an EV charger on campus, 2) significant energy savings projects for multiple buildings, and 3) installation of solar panels on multiple buildings. We know that part of the public's concern about purchasing electric vehicles is the current lack of EV charging infrastructure. UMW will be part of the solution by installing EV chargers on campus. Next, much of the University's energy usage comes from heating and cooling air and water in campus buildings. Through contracts called Energy Savings Performance Contracts (ESPCs), UMW can partner with energy service companies to implement energy management projects. Importantly, these ESPCs are designed to pay for themselves through energy savings. For the University, energy saved means lower carbon emissions. Finally, the task force has explored locations for and financing for rooftop solar panel installation on campus buildings. Many of our buildings will likely support high-output solar electricity to reduce our demand for electricity from the grid, a large proportion of which is produced from burning natural gas.

2.3. Members of Climate Action Task Force

Members of the Climate Action Task Force came from across the University: students, faculty, and staff. We brought a breadth and depth of experiences and perspectives to the work of the task force. The single attitude we had in common was a focus on the goals of our work, the University's work, and the significance of accomplishing this work. The names and affiliations of task force members are listed below.

Sean Morrow (co-chair)	Sustainability Coordinator (past)	Office of Sustainability
Alan Griffith (co-chair)	Professor	Biological Sciences
Samira Fallah	Assistant Professor	Management
Pamela Grothe	Associate Professor	Earth and Environmental Sciences
Sarah Kerner	Graduate student	Geospatial Sciences
Melva Kishpaugh	Director	Procurement Services
Katherine Stoneman	Student	Earth and Environmental Sciences
Jay Sullivan	Project Manager (retired)	Capital Outlay
Pamela Taggert	Executive Director	Budget and Financial Analysis
John Tippett	Adjunct Professor	Earth and Environmental Sciences

3. Overview

Global climate change, driven by human production of greenhouse gases, is one of the most important challenges facing the world today. The University of Mary Washington is well positioned to join individuals, communities and institutions who have responded positively to this global challenge. As a partner with local, regional, and state communities, the University should act in concert with the Paris agreement to limit "the increase in the global average temperature to well below 2°C above pre-industrial levels" and even "to limit the temperature increase to 1.5°C above pre-industrial levels (UNFCCC 2015)." As an academic body, the University should follow the evidence amassed by the Intergovernmental Panel on Climate Change that predicts continuing and worsening extreme weather conditions as a result of climate change. Any actions toward carbon emissions reduction should also be supported by a continued focus of UMW's curriculum on climate change as a problem to solve.

This Climate Action Plan lays out a path to decrease the University's production of greenhouse gases and to reach carbon neutrality in the next 15 years. We urge the University of Mary Washington, guided by our Strategic Vision, to commit to this challenge on behalf of its students, the institution, and our local community. The University Strategic Plan places Climate Action in the broader context of sustainability.

"Sustainability is ... a defining value for the future of the University of Mary Washington, reflecting a balance of economic, environmental, and socially responsible values (UMW Strategic Planning Steering Committee 2009)."

"Our institutional values of service to community and civic engagement lead us to act sustainably. The University will "promote stewardship of the planet and the region's abundant natural resources through educational and community-based sustainability initiatives which enhance the University's visibility and reputation as a 'green' campus" (UMW Strategic Planning Steering Committee 2022)

Goal 1 for the next 5 years.... "Promoting the values of service and community and civic engagement." "Action Step 1:4. Sustainability. Promote stewardship of the planet and the region's abundant natural resources through educational and community based sustainability initiatives which enhance the University's visibility and reputation as a "green" campus that aims along with the City of Fredericksburg to be carbon neutral by 2035." (UMW Strategic Vision – 2022-2027. Approved by the Board of Visitors, November 18, 2022)

In March 2022, President Paino asked the Climate Action Task Force to address four questions:

- What is UMW currently doing to minimize negative impacts on the global environment? What can be done to improve the reach and effectiveness of current actions?
- What visible and impactful action(s) can be implemented immediately, i.e., within 6 months?
- What can be done to empower individuals and campus groups to join senior leadership in promoting and supporting university-wide climate actions?
- What new programs, resources, and policies should be implemented, including ongoing mechanisms, that will decrease UMW's negative impacts on the global environment?

In this report, the Climate Action Task Force presents:

- I. Actionable Goals organized by
 - a. Facilities & Energy Management

- b. Transportation
- c. Operations
- II. History of Climate Action at UMW
- III. UMW's inaugural Greenhouse Gas Inventory
- IV. Three Core Projects begun by the task force
- V. Principles for Financing Future Energy Savings and Transportation Projects

4. Actionable Goals

As sustainability is a defining goal of UMW, the Task Force recommends to the University the following goals and objectives designed to decrease our carbon emissions. The recommended programs and policies outlined below are common actions planned or implemented by peer institutions. As the University implements these actions, we would take our place in the community as a leader and partner for sustainability and climate actions.

4.1. Facilities & Energy Management

The University of Mary Washington should create short-term and long-term reductions in energy costs and consumption through investments in renewable energy and detailed, data-driven planning. The University should utilize innovative ideas to create energy and facilities operations solutions that are engaging, efficient, cost-effective, and provide educational value.

Goal 1: Accelerate transition to renewable energy systems

Objective #	Objective Statement	Priority Level
G1.01	50% of electricity on the Fredericksburg campus facilities is carbon-free. In the next 10 years.	High
G1.02	Achieve 100 % renewable energy in all campus facilities. In the next 15 years.	Medium
G1.03	Pursue LEED GOLD certification in all new campus construction and renovations. Beginning in 2026.	High
G1.04	Consider removing buildings from steam energy distribution system, during the earliest planning for new campus construction and major renovations. Beginning in 2026.	High

The long-term goal of the University is a transition to 100% renewable energy sources, because renewable energy sources do not produce greenhouse gases. The objectives under Goal 1 are pieces of the puzzle to supply all of our energy needs from renewable energy. Setting standards, Objective 3, can produce a singular, institutional focus on our energy management goals. This focus is important because 1. policies lead to implementation, and 2. policies can be shared with public audiences. Setting institutional standards leads to implementation because decision makers can adopt standard requirements into long-term planning. In this case, planning for renewable energy would become standard operating procedure.

The majority of the energy that the University must manage, by far, comes from electricity consumption and the burning of natural gas. The University can and should employ solar electricity panels where

feasible and visible to the public. However, solar panels on campus alone cannot supply 50% of our electricity needs. We must work with our electricity supplier, Dominion Power, to tap carbon-free sources that are sufficient to supply our needs. The College of William and Mary, for example, now purchases about 50% of their electricity from an off-campus solar farm operated by Dominion Power.

The University's consumption of natural gas flows through our steam generation plant. So, our long-term goal to move toward 100% renewable energy sources must consider the efficiency and scale of steam production and use on campus. Decreased steam production, in conjunction with electrification of building and water heating, is necessary to move the University toward this goal. Recent repairs and upgrades to the steam distribution system on campus were a significant investment in this portion of the University's energy systems. New or largely renovated buildings in the future will provide important opportunities to shift our energy needs away from natural gas.

Goal 2: Increase and support sustainable, energy-efficient upgrades throughout campus buildings

Objective #	Objective Statement	Priority Level
G2.01	Maximize energy savings in campus lighting upgrades by installing LEDs and / or occupancy sensors. In the next 5 years.	Medium
G2.02	Set internal goals that target energy reduction, cost-effectiveness and optimization of all automation & control systems, air conditioning (HVAC), and lighting systems. In the next year.	High
G2.03	Improve and expand the measurement and reporting of energy consumption in individual buildings. In the next 5 years.	High

Energy management standards should be set for energy efficiencies in building design, operation, and use, as well as type of fuels we employ. Energy management planners suggest that energy users increase energy efficiencies in facilities first. Greater energy efficiencies translate to decreased energy consumption, regardless of the energy source. With decreased energy consumption comes less energy demanded from renewable energy sources.

Goal setting, i.e. setting institutional standards, for energy efficiencies in buildings and improved measurement of energy consumption in buildings are the highest priority for this goal. The University has monitoring systems in place, but measurements from these systems can be improved and reporting can be expanded. Furthermore, measurement is the first step to increased efficiencies because measures of energy usage can focus our limited resources on places of highest need.

We have also seen, in the process of developing ESPC's, that these cost-neutral programs include, at least, periodic measurement and reporting of energy use in buildings. Energy use measurement in buildings undergoing upgrades and improvements is how energy savings are verified.

Lighting technologies have advanced quickly with the advent of LED lighting. LED lighting systems require much less energy than previous types of lighting, e.g. incandescent or gas vapor lighting. They are also adaptable to different needs, think the classroom versus the indoor tennis courts. Updated lighting systems, especially in high demand areas like the tennis center, have some of the shortest payback times of any energy-related renovations. In fact, the most recent ESPC proposal includes replacement of all lighting systems, indoor and outdoor, with LED lighting technologies.

Goal 3: Establish carbon-free energy efficiency and conservation as a core value in future maintenance and operations

Objective #	Objective Statement	Priority Level
G3.01	Develop "Energy Action" team to actively monitor and report on energy systems and data in order to establish new strategies for conservation and efficiency. By 2028.	High
G3.02	Maintain a minimum silver LEED standard and pursue gold LEED standard for all new construction. By 2026.	High
G3.03	Research and implement IT-related energy-saving measures through technology improvements. By 2026.	Medium
G3.04	Introduce and establish Climate Resiliency as a core concept in future planning and construction. By 2026.	High

The Climate Action Task Force talked to constituents from across campus as we developed the Climate Action Plan. The reactions to these kinds of objectives would typically be “Aren’t we already doing this?” Sometimes we are and sometimes we are not. Many colleges and universities, like the College of William and Mary, employ an Energy Manager to oversee institutional goals and policies on energy efficiency and conservation. George Mason University has a policy for “Energy Conservation, Efficiency, and Management, Including Elimination of Greenhouse Gas Emissions.” Policies like this one, under the eye of an Energy Manager or Energy Action Team, become the drivers of institutional change. The policies are also tangible elements to be implemented by students, faculty, and staff.

These objectives are examples of institutional structures and policies that might drive and make visible the University's values about energy use and carbon emissions reduction. These structures and policies focus on potentially high, long-term, energy savings. For instance, are there policies and / or technologies to decrease power consumption when computers are not in use? Maintaining a minimum LEED certification for new construction may help us comply with state laws that mandate higher efficiencies in new and renovated state buildings, e.g. VA High Performance Buildings Act 2021 (General Assembly of VA 2021). Climate resiliency planning adds another lens by which we view our policies and future actions. We know that weather extremes will increase and institutions and communities can plan how to minimize the impacts of these extremes or how we can recover more quickly.

4.2. Transportation

The University of Mary Washington will reduce or offset all transportation-related emissions and support new campus initiatives to increase the presence and accessibility of electric vehicles and infrastructure.

Goal 1: Reduce UMW's carbon emissions by evaluating and changing fuel sources of fleet vehicles, all types.

Objective #	Objective Statement	Priority Level
G1.01	All vehicles in University fleet, purchased or leased, beyond 2030 are electric vehicles. This includes sedans, multi-passenger vans, facilities services vans, and facilities services trucks.	Medium
G1.02a	All golf carts <i>owned</i> by the University are electric vehicles, in the next year.	High
G1.02b	All golf carts <i>leased</i> by the University are electric vehicles. Within the next year.	High
G1.03a	All service equipment <i>owned</i> by University are electric vehicles. Within the next 10 years. Examples: ATVs, in board motors, out board motors	Low
G1.03b	All service equipment <i>leased</i> by University are electric vehicles. Within the next 10 years. Examples: ATVs.	Low

In 2022-2023, the University partnered with Virginia Clean Cities for an analysis of the potential to transition fleet vehicles to electric power. From the final report, " Virginia Clean Cities (VCC) conducted an alternative fuel fleet analysis with the University of Mary Washington (UMW) focused on the feasibility and implementation of alternative fuel vehicle adoption (encompassing full battery electric vehicles (EV), plugin hybrid electric vehicles (PHEV), and hybrid electric vehicles (HEV))." The Clean Cities final report points to several challenges that make this transition difficult in the short term: limited EV vehicle availability for our vehicle types, low operating costs, i.e. low annual mileages logged, by most University vehicles, and ineligibility for Federal EV tax credits. But, a commitment now, by developing vehicle purchasing policies, will facilitate the University's transition to a low or no emissions fleet in the longer term. As current vehicles reach end of life, all options for replacement with EV vehicles should be considered. As auto manufacturers green their fleets, the options to replace University vehicles will increase. Policies in place can position the University to take advantage of future legislation and/or programs designed to facilitate the transition to green our fleet.

Golf carts are an interesting vehicle use type for the University. They are in common use by offices from Admissions to Landscape and Grounds. The on-campus ownership of golf carts seems decentralized as users purchase carts for their departmental use. Their presence on pedestrian walkways makes their burning of fossil fuels more obvious than vehicles on the street. While these vehicles may be a small source of carbon emissions, they are an obvious source of carbon emissions. A central policy requiring or motivating the purchase of electric powered carts will help decrease University carbon emissions in a publicly visible way.

Service equipment transition to zero carbon emission may be the most constrained by the lack of alternatively fueled equipment. As such, this transition is a low priority. Landscape management equipment, e.g. lawn mowers, while related are addressed by Goal 3 under Operations.

Goal 2: Reduce Transportation Related Scope 3 Emissions

Objective #	Objective Statement	Priority Level
G2.01	Reduce greenhouse gas emissions from student commuters by 25%. Within 10 years.	Low
G2.02	Reduce greenhouse gas emissions from staff commuting by 25%. Within 10 years.	Medium/High
G2.03	Reduce greenhouse gas emissions from faculty commuting by 25%. Within 10 years.	Medium/High
G2.04	Reduce University greenhouse emissions from directly financed travel by 25%. Within 10 years.	Low
G2.05	Offset 25 – 50% of greenhouse gas emissions from student commuting. Within 10 years. Begin by implementing voluntary offset purchase programs.	Low
G2.06	Offset 25 – 50% of greenhouse gas emissions from staff commuting. Within 10 years. Begin by implementing voluntary offset purchase programs.	Medium/High
G2.07	Offset 25 – 50% of greenhouse gas emissions from faculty commuting. Within 10 years. Begin by implementing voluntary offset purchase programs.	Medium/High
G2.08	Offset 25 – 50% of greenhouse gas emissions from directly financed travel. Within 10 years. Begin by implementing voluntary offset purchase programs.	Low
G2.09	Offset 25 – 50% of greenhouse gas emissions from study abroad air travel. Within 10 years. Begin by implementing voluntary offset purchase programs.	Medium/High
G2.010	Add question to parking ticket purchase process about fuel type of vehicle. By 2026.	High

Commuter and financed travel emissions are directly tied to the University's Scope 3 emissions. While commuter emissions are not likely to reach carbon neutrality without the purchasing of offsets, numerous low-cost programs support a University reduction in emissions. For example, [Virginia Tech's sustainable transportation programs](#) work in tandem with the University's [Climate Action Commitment](#) to provide an array of alternative commuter programs. Examples include programs that would incentivize and educate the UMW community on carpooling/rideshare, partnerships with local buses to offer free rides to UMW ID holders. Increasing safety and security surrounding carbon-zero methods of transportation (i.e. bikes, scooters, or walking) also encourages more commuters to transition away from a single car commute. In regard to directly financed travel, we would recommend cutting down expenses on unessential financed travel or increasing restrictions surrounding this type of travel.

Remaining Scope 3 emissions reduction goals can be reached using offsets. Offsets, according to [Second Nature](#), are a tool used to eliminate emissions that cannot be eliminated through other means. Offsets are crucial in helping university communities achieve neutrality in Scope 3 or indirect sources, such as commuter emissions. Offset programs can draw from the motivation of the university community and

self-fund through voluntary payments by commuters. The [University of Connecticut’s Carbon Neutral Commuter Program](#) is an example of this idea. When registering your vehicle on campus, the University offers a \$5 voluntary donation used to purchase carbon offsets.

At UMW, voluntary donations to a similar program could offset a significant portion of personal vehicle CO₂ emissions. A \$5 donation can purchase about 1 metric ton CO₂ offset. An average gasoline-powered vehicle emits about 4.6 metric tons of CO₂ / year. An annual donation would amount to just over a 20% offset of annual emissions for many commuters.

4.3. Operations

The University of Mary Washington will implement sustainable and climate-positive initiatives in facilities, business services, IT, and procurement operations. The University should adopt sustainable principles by which we operate to ensure proactivity and accountability in reducing our contribution to climate change.

Goal 1: Increase opportunities and availability for students to make low-footprint decisions in dining operations

Objective #	Objective Statement	Priority Level
G1.01	Contractor shall support the University's Food Recovery Program. Contractor shall establish measurement tools by 2026.	High
G1.02	Contractor shall support the University's Sustainability initiatives by phasing out single-use plastics, using s compostable greenware and paper products, establishing a trayless dining hall, and establishing bag-free retail locations, by 2026.	High
G1.02	Contractor shall develop, with University faculty and students, programs to increase Locally Grown food sources. Local is defined as within 150 miles of the University, by 2026.	Low
G1.03	Contractor shall recycle according to University sustainability regulations and policies, and costs shall be borne by the Contractor, by 2026.	High
G1.04	Contractor shall establish measurement tool(s) that will allow the University and Contractor to measure and monitor food qualities and food services, by 2026.	High

The University recently signed a 5-year Dining Services Operations (Dining Services) contract with Sodexo Management Inc (Sodexo-UMW 2023). Contract language ensures that Dining Services will follow sustainable principles by 1. Supporting the University's Sustainability initiatives, 2. Aligning products and services with the Climate Action Plan, 3. Developing a variety of sustainable dining services, e.g. Virginia Green Restaurant certification, and 4. Measuring and reporting on sustainable dining practices.

This contract provides several opportunities to reduce carbon emissions. Food waste reduction means that resources for transportation and preparation are reduced. Food composting operations mean that

carbon emissions as methane are exchanged for CO₂ emissions, a weaker greenhouse gas. Locally-sourced food means that transportation-related carbon emissions are reduced and local producers are supported. Requirements for sustainable food designations ensure, through third party-evaluators, that food services supplied have been produced using best current practices that will sustain healthy ecosystems.

These food services objectives point to the importance of ongoing cooperation between the University and Sodexo, our food services provider. These objectives also highlight priorities to collect information about food sources, food waste, food recovery, and food type consumption. These data should be first priority in our compliance work with Sodexo.

Goal 2: Explore strategies and alternatives to current printing standards to lower our environmental impact and promote a climate-positive mindset

Objective #	Objective Statement	Priority Level
G2.01a	All paper products purchased for printing and copying meet University-wide sustainability and sourcing standards by end of 2025.	High
G2.01b	All printers and copiers owned or leased beginning 2026 by the University should be certified energy efficient (EnergyStar, etc.). Requirement established in current Copy Services contract.	High
G2.02a	Implement strategies on consolidating, or in some cases eliminating, campus paper-use including, but not limited to, departmental reporting and departmental printing limits within the next 3 years.	Medium
G2.02c	Implement policies to eliminate the use of personal, in-office printers when not required by regulation or law within the next year.	High
G2.03	Establish "Paper-Free" course designation. Ensure that 25% of courses offered through UMW are "Paper-Free" within the next 5 years.	Medium

The University should expand its implementation of policies and procedures that reduce the demand for printing and paper. Current examples of paperless forms, i.e., electronic storage strategies, include Course Out of Sequence Forms and ODR Student Accommodation Announcements. Benefits of paperless operations go beyond decreased costs and carbon emissions. Online forms and processes can increase security of confidential information and raise awareness of our sustainability work across campus.

Paper consumption, printer use, and electronic storage strategies are varied and complex across the University. Our emphasis should be placed on the development of policies that lead to changes in the need for paper consumption and less efficient printer configurations. Because of the complexities surrounding paper, printers, and electronic storage strategies, we foresee opportunities for collaboration between students, faculty, and staff in order to develop and implement improvements.

Goal 3: Pursue carbon-negative approaches to support our natural and sustainable environment using strategies that improve green space operations and leverage carbon capture opportunities on University grounds

Objective #	Objective Statement	Priority Level
G3.01	By 2025, UMW will create a <i>Tree Conservation Policy</i> that states the University will plant 2 trees for every tree that is cut down or lost on campus. This 2:1 policy shall be adjusted on a 5-year basis, to account for available budget and space.	Low
G3.02	The University shall publish yearly tree coverage and carbon sequestration studies beginning 2026.	Low
G3.03	The University will reduce emissions from landscape and grounds equipment by 50% by 2030, and 100% by 2035.	Medium
G3.04	The University will compost excess organic materials from all landscape and grounds work by 2025.	Low

University green spaces are a key part of what makes us The University of Mary Washington. Faculty, staff, students, and visitors often recall our outdoor spaces as their first memory of campus. The University's Fredericksburg campus has been recognized time and again for its unique beauty, e.g., Tree Campus Higher Education from the Arbor Day Foundation. University green spaces sustain us by creating an environment that makes us feel at home, and they sustain important biological diversity in our urban environment.

The Office of Landscape and Grounds and the Office of Sustainability have developed the UMW Campus Tree Care Plan ([2022](#)). This plan specifies the policies and procedures to sustain the diversity of trees on campus. Unlike other University operations, landscape and grounds operations support potentially important carbon sequestration processes, e.g. as plants grow they remove CO₂ from the atmosphere. These Goal 3 objectives support and augment the Tree Care Plan and point to a broadened partnership between The Office of Landscape and Grounds, the Office of Sustainability, and the President's Council on Sustainability. A stronger partnership, supporting these specific objectives, will bring focus to operations that maintain and potentially increase carbon sequestration by University green spaces.

The Office of Landscape and Grounds, since 2024, has also supported the University's carbon-neutral goals through the purchase of a variety of battery-powered units, supporting grounds operations. These purchases were partly made possible through the generous donation of a community partner.

The Landscape Care Industry, equipment manufacturers and sellers alike, recognize the demand for electric-powered equipment will continue. So, more and better options will likely continue to become available. Purchasing policies and procedures should be developed that help the Office of Landscape and Grounds add to their electric power equipment tool chest, as needed.

5. History and Context of Climate Action at UMW

5.1. History of Sustainability at UMW

The University's journey toward sustainability began in 2009. An appendix of the 2009 UMW Strategic Plan states:

The challenges of climate change, energy and water resource management, environmental health and waste management come at a time of economic strain. This is further compounded by demands of higher education to provide higher level services for a growing student population and expanding campuses. By supporting decisions that strategically and competitively balance environmental resources, economic objectives and social systems we better reflect the unique position of colleges and universities, as we operate our business. Institutions of higher learning influence generations of students whose future behaviors and decisions are shaped by what they learn from their campus experience and the actions of the University's leaders. Sustainability is no longer an option; it is now a defining value for the future of the University of Mary Washington, reflecting a balance of economic, environmental, and socially responsible values. (UMW Strategic Planning Steering Committee 2009)

In our 2009 Strategic Plan, UMW committed "to sustainability as the means for managing resources to meet the social, economic, and environmental needs of the present without compromising the ability to meet the needs of future generations. Furthermore, the University strategic plan recognized 'the very nature of sustainability promotes the values captured in the [UMW . . .] Mission Statement: expecting our students, faculty and staff to take active responsibility for what they do, what they believe, what they know, and what they do not know'" (UMW Strategic Planning Steering Committee. 2009). In short, sustainability is part and parcel of who we are and what we do. Sustainability remains an important component of the most recent UMW Strategic Plan (UMW Strategic Planning Steering Committee 2022) approved by the UMW Board of Visitors (BOV) in November 2022. Among the action steps in Goal 1: Promoting the values of service and community and civic engagement, the strategic plan states:

Sustainability. Promote stewardship of the planet and the region's abundant natural resources through educational and community-based sustainability initiatives which enhance the University's visibility and reputation as a "green" campus that aims along with the City of Fredericksburg to be carbon neutral by 2035.

The President's Council on Sustainability (PCS) was formed in the fall of 2009 and consists of faculty, staff, and students. Its leadership consists of our Sustainability Coordinator and three co-chairs chosen from students, faculty, and staff. The PCS represents all communities on campus through its organization which allows the PCS to gather ideas from and represent all communities on campus.

The PCS plays a critical role in shaping administrative goals and objectives relating to campus sustainability. It makes recommendations on the following:

- Sustainability issues and policy
- Strategies for implementation of sustainability initiatives
- Presentation of a cohesive public face for UMW sustainability efforts.

The work of the PCS is built around goal development in four action areas:

- Administration and Finance
- Education and Research
- Operations
- Innovation and Awareness

Goal development and action plans are shaped by coordination between the President, Vice President, Provost, Executive Board, and PCS members. PCS members spearhead action on goals by forming action groups that can include anyone from the UMW community. Each PCS member becomes an integral part of improving sustainability at UMW as they lead, co-lead, or participate in one or more action groups.

UMW launched the interdisciplinary minor Environmental Sustainability in 2011 (University of Mary Washington 2011), on the heels of these sustainability commitments and the inauguration of the President's Council on Sustainability. Students in Environmental Sustainability build foundational knowledge and skills around a core of environmental science and sustainability issues. Minors elect other courses from across the university, e.g. Anthropology, Economics, Geography, Modern Foreign Languages, based on their personal interests.

UMW is also proud to be recognized nationally for sustainability on campus and in our curriculum, like our Environmental Sustainability minor. UMW first earned a place in The Princeton Review's Guide to Green Colleges in 2021 (The Princeton Review 2021). Green colleges are chosen through surveys of administrators and students that consider 1) campus quality of life, 2) preparation for life and career in a clean-green economy, and 3) environmentally friendly policies (The Princeton Review 2023). Our campus has also been recognized since 2015 by the Arbor Day Foundation in its Tree Campus Higher Education program (No Author 2022). We know that the biodiversity of the UMW campus is one of the first things to capture our students' hearts. The Tree Campus Higher Education program recognizes UMW for its tangible steps to develop and maintain our beautiful green spaces through multiple events and programs:

- Arbor Day celebrations
- A tree advisory committee
- A tree care plan
- An annual budget for the tree care plan
- Service-learning projects incorporating students which focus on green space maintenance

To support all UMW sustainability projects and programs, the UMW Office of Sustainability was established in 2018. The first full-time Sustainability Coordinator came onboard in 2021. The Office of Sustainability works to "inspire students to participate in the sustainability mission through engaging activities, academics, programs, policies and practices. [They]... promote sustainable life routines that students [will] maintain after their time at UMW; these [routines] will lead to practices that impact neighborhoods, cities, states, and ultimately the world (Morrow 2022)." In practice, the Sustainability Coordinator works to educate and engage students, faculty and staff on the connection between sustainability and UMW's values and frameworks. The coordinator works closely with UMW committees, departments, and student groups to promote environmentally conscious behavior that directly benefits cost, community, and environmental health.

5.2. History of Climate Action at UMW

Students, faculty, and staff have acted over concerns about climate change, in parallel and in collaboration with UMW sustainability organizations. Actions have been various:

- Climate, Environment, And Resiliency (CLEAR) regional partnership (2012)
- UMWDivest and BOV fossil fuel divestment (2015-2016)
- UMWDivest and George Washington Hall sit-in (2015)
- Better Energy Awareness and Mobilization (BEAM) club (2018)
- UMW Climate Strike (2019)
- BEAM and UMW University Faculty Council resolutions for renewable energy (2019)
- PCS Climate Charge and establishment of the Climate Action Task Force (2022)
- Annual Virginia Student Climate Action Summit (2023)

The CLEAR partnership between UMW, local private and public organizations, and interested citizens is a regional approach to climate action and resiliency. CLEAR, which began in 2012, recognizes the "region's natural systems form a foundation that is critical to the health of our people and our economy, and that climate resiliency is critical to protecting our residents, institutions and infrastructure (CLEAR 2014)." UMW and CLEAR have hosted public forums and conferences highlighting the progress and needs of the region in the context of climate resiliency. In 2014, UMW and CLEAR published the Climate, Environment, and Readiness Plan (CLEAR 2014).

UMW students began a social pressure campaign to end investments in fossil fuels in 2014 that ended in divestment by The University Board of Visitors (BOV) in the spring 2016. Two student leaders first met informally with University administrators in late 2014. In March 2015, a gathering of about 200 marched on campus walk, calling for University divestment. Soon after the BOV asked representatives of UMWDivest to present their request. Perceiving no movement on their requests, UMWDivest members, as well as, UMW students, and other Commonwealth students staged a 21-day sit-in at the President's office in George Washington Hall in April 2015 (UMW President's Council on Sustainability 2016, Global Nonviolent Action Database 2017). Soon after, the George Washington Hall sit-in, UMW President Mr. Richard Hurley directed the PCS to research and make recommendations regarding divestment from fossil fuels. The PCS (UMW President's Council on Sustainability 2016) recommended divestment and the BOV followed the recommendation of the PCS. As of April 2016, UMW Foundation limits investments in Carbon 200 companies to 2% of all investments (UMW Board of Visitors 2016).

UMW students and faculty continued the work to advocate for carbon reduction actions after UMW divested from the largest fossil fuel owners. UMW students launched the Better Energy Awareness and Mobilization Club, or BEAM, in spring 2018. BEAM advocates for bringing solar energy to campus and club members were awarded the "Outstanding New Club Eagle Award" in 2019 for their renewable energy advocacy. BEAM members gathered approximately 1000 signatures on a petition to increase the University's reliance on renewable energy. BEAM members delivered their renewable energy petition to President Troy Paino in the fall 2019. Also in 2019, the PCS sent a resolution to the UMW University Faculty Council "acknowledging the serious threat of climate change and promoting a transition to 100% renewable energy" (PCS Officers personal communication). The UMW University Faculty Council unanimously passed this resolution in October 2019:

- There is an urgent need for a transition to 100% renewable energy in Fredericksburg, the Commonwealth of Virginia, the nation, and beyond;
- UMW administrators and the Board of Directors are encouraged to enact a responsible but ambitious plan to produce renewable energy on campus and to develop other good climate policies, such as increasing campus energy efficiency, composting food waste, and adopting electric vehicles (UMW University Faculty Council 2019).

In response to these calls for action, President Troy Paino tasked the President's Sustainability Council to develop a Climate Action Plan in the fall 2019. The Council organized around actions related to carbon emissions reduction: renewable energy, energy efficiency, food waste and recycling, and transportation. The PCS's initial work was postponed due to COVID-19 priorities, but action planning was re-energized through President Paino's current charge to the Climate Action Task Force in spring 2022.

6. Greenhouse Gas Inventory

In 2023, the University developed its first greenhouse gas inventory. These inventories are methods to quantify and track the emissions of greenhouse gases from local sources, such as transportation and steam production on campus. Our first greenhouse gas inventory is a critical step in defining the University's baseline emission values. The greenhouse gas inventory will be updated and reported annually to track the effectiveness of climate actions and policies. In turn, the University can adjust strategies as necessary. Greenhouse gas inventories are a transparent tool that demonstrates UMW's commitment to reducing its carbon footprint.

6.1. Definitions

Greenhouse gas inventories are reported as carbon accounting systems, or standard measurement, calculation, and reporting systems. These systems also translate all greenhouse gas emissions to CO₂ equivalents, like translating foreign currencies to the US dollar. Carbon accounting systems are organized around measures falling in three scopes, or categories, of greenhouse gas emissions as well as a fourth category called carbon offsets (UNH Sustainability Institute 2018):

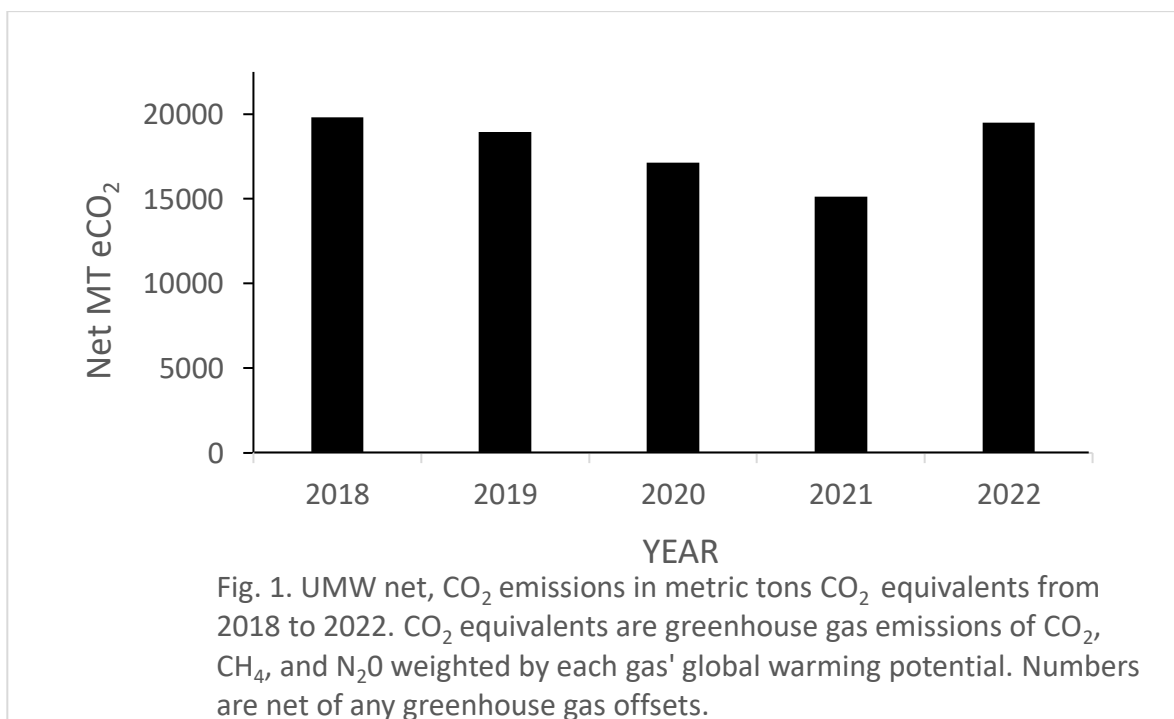
- *Scope 1 emissions* are the amount of carbon and other greenhouse gases emitted directly from all campus operations. A large source of carbon is fuels burned in stationary sources like the natural gas burned in our steam generation plant. Scope 1 emissions also include the carbon produced by University vehicles, the fleet, refrigerants in heating / cooling systems, and fertilizer applications.
- *Scope 2 emissions* are the amount of carbon and other greenhouse gases emitted to generate the electricity we purchase from Dominion Energy. The actual emissions are determined by the mix of fuels used by Dominion to produce electricity in our region. In 2020, Dominion reported our mix of fuels was 10% coal, 45% natural gas, 40% nuclear, and 5% renewable energy. Both renewable energy and nuclear are carbon-free electricity sources.
- *Scope 3 emissions* are the amount of carbon and other greenhouse gases emitted off campus that are used in transportation of people and products to and from campus. For the University, the bulk of Scope 3 emissions likely comes from student, faculty, and staff commuter driving. These emissions also include any travel financed by the University or study abroad travel.

- *Offsets* are the amount of carbon and other greenhouse gases removed from the atmosphere that are attributable to the University. For example, forest preservation in campus woodlots might be used to decrease, i.e. offset, carbon emissions as CO₂ is sequestered in growing trees.
- *Renewable Energy Certificates (RECs)* document that the certificate owner has purchased energy from a renewable energy resource. RECs also offset greenhouse emissions.

University offices from across campus have cooperated extensively to gather the data used in University carbon accounting. Our inventory includes data from all University-owned buildings and operations on the Fredericksburg campus, but not yet the Stafford or Dahlgren campuses. We also do not include UMW Foundation-owned buildings or operations. Because record keeping for these carbon inventory data varies across administrative offices, our current dataset range is 2018 to 2022. Data has come from the Offices of Facilities Operations, Capital Outlay, Budget and Finance, International Education, Accounts Payable, and the Department of Athletics. This data forms the UMW baseline carbon inventory on which future success can be measured.

6.2. UMW's GHG Inventory

Figure 1 shows UMW net greenhouse gas emissions in CO₂ equivalents in metric tons (MT eCO₂). Net emissions are gross emissions minus any CO₂ offsets by University or Renewable Energy Certificates (RECs) purchased or earned. CO₂ equivalents are the standard unit for the amount of gases produced, regardless of the gas produced. CO₂ is the most common gas produced. But other gases like CH₄, N₂O, and various refrigerants are also accounted for. The amounts of these gases produced are weighted by their global warming potential. Global warming potential (GWP) is each gas's capacity to capture energy in the atmosphere relative to CO₂ over a 100-year period. These equivalencies integrate both capacity to capture energy and lifespan of the gas in the atmosphere. Two examples may clarify. CH₄ has an average lifetime in the atmosphere of 12 years (Forster et al. 2021), while N₂O remains in the atmosphere 109 years (Forster et al. 2021). The GWP of 1 MT CH₄ is 28 MT eCO₂ (Forster et al. 2021) and that of 1 MT N₂O is 273 MT eCO₂ (Forster et al. 2021).



The University's mean annual greenhouse gas emissions were 18117 MT eCO₂ from 2018 to 2022. Emissions were highest in 2018 and decreased each year through 2021, while rebounding to near 2018 levels in 2022. Emissions likely decreased in 2020 and 2021 due to decreased campus activities due to COVID-19. Note that the University's net greenhouse gas emissions equal gross greenhouse gas emissions in all of these years, as we had no measured offsets of greenhouse gases or RECs purchased.

The University's total greenhouse gas emissions by Scope are shown in Fig. 2. We report complete UMW carbon emissions data for just Scopes 1 and 2 emissions from 2018 to 2022. UMW is not reporting Scope 3 greenhouse gas emissions with our inaugural greenhouse gas inventory, which is not unusual for first estimates of greenhouse gas inventories. Greenhouse gas emissions from Scope 1 were lower than Scope 2 emissions in every year. Both Scopes' emissions were lowest in 2021 and these 2 Scopes' emissions were closest to parity in 2020.

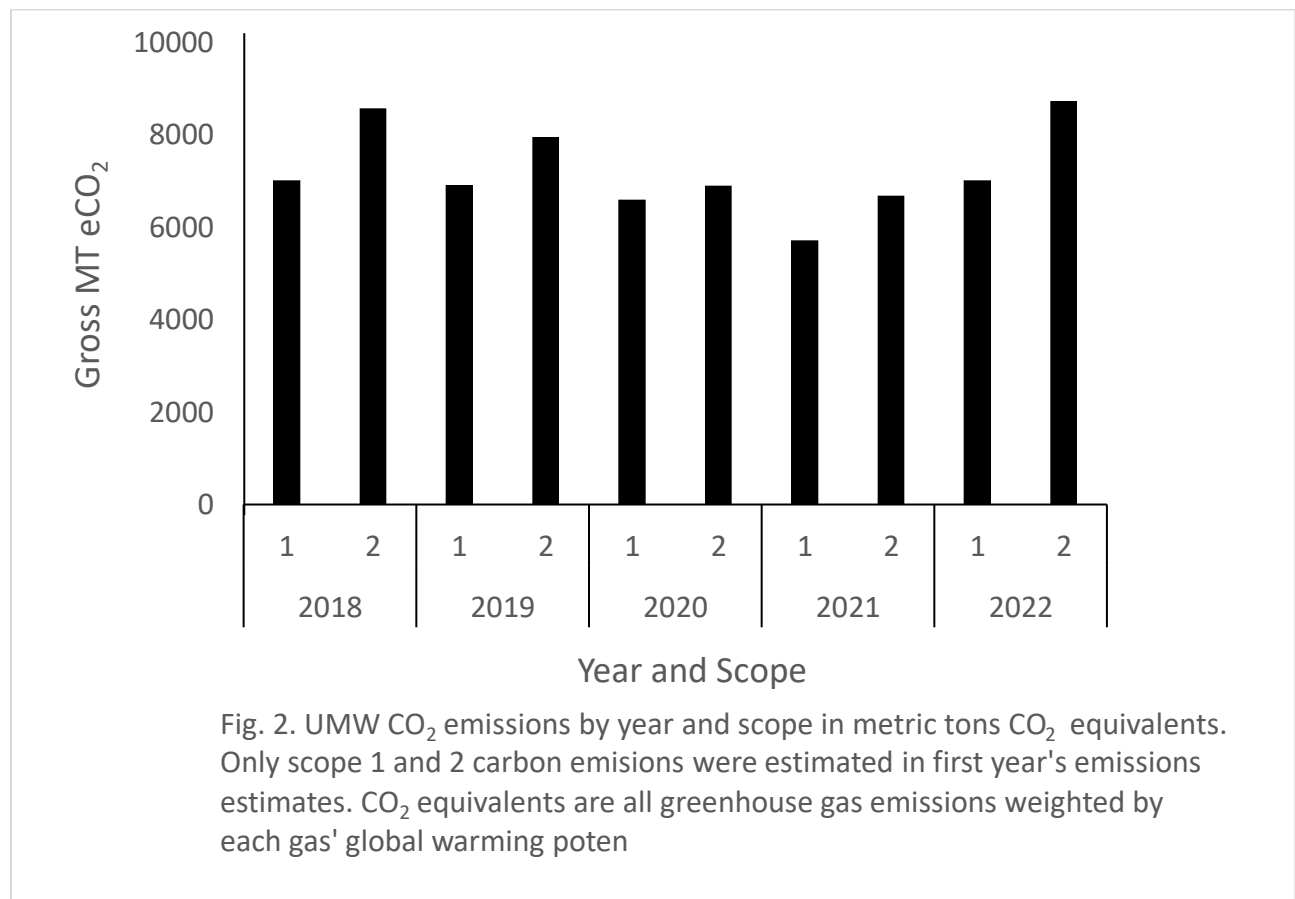
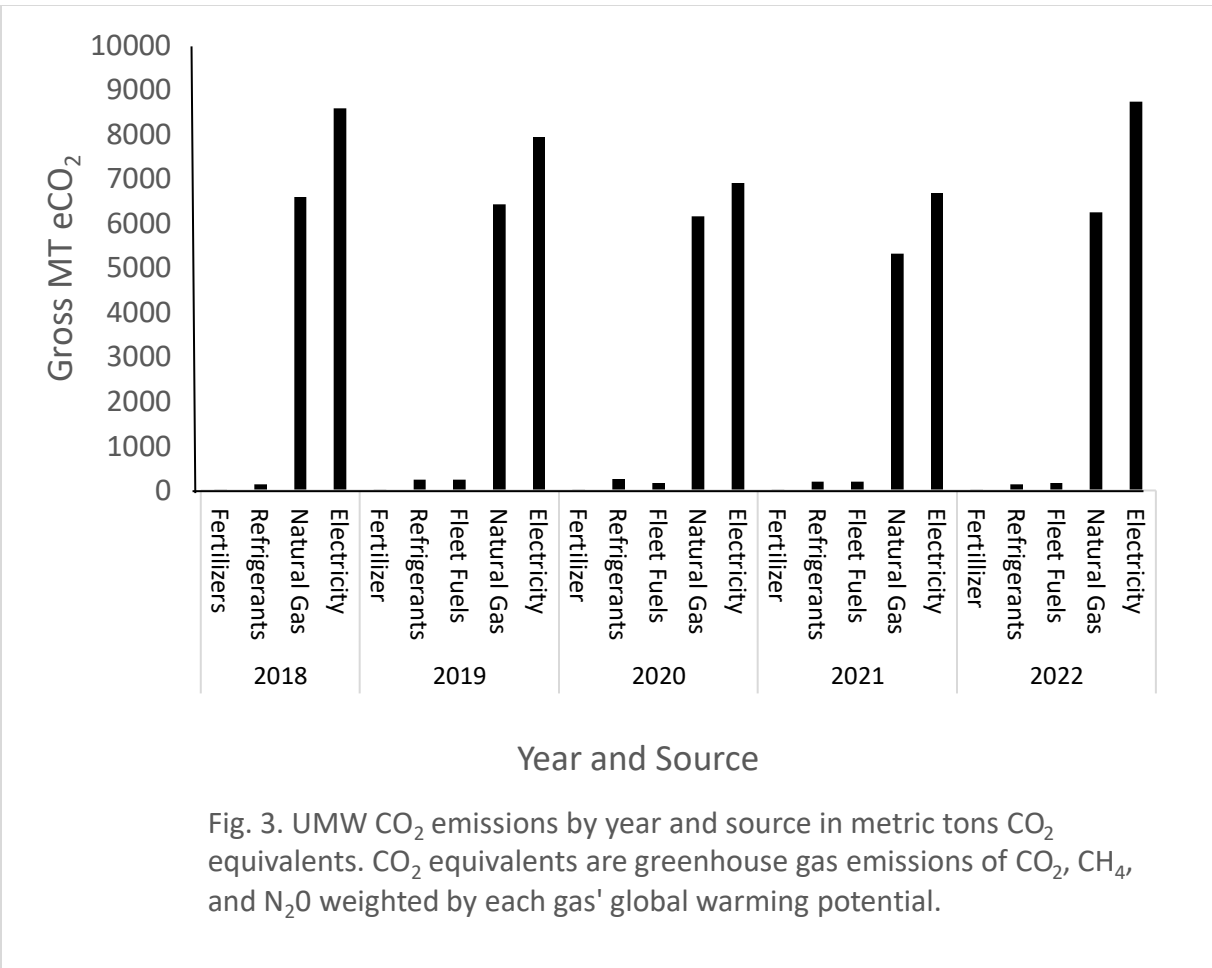


Figure 3 presents total greenhouse gas emissions by greenhouse gas source. UMW fertilizer applications combine all synthetic NPK fertilizers applied on the campus grounds and athletic fields. The University's fertilizer applications are always less than or equal to amounts recommended by standard nutrient



management plans. Refrigerant emissions here combine emissions of all refrigerant types. It is important to note that different refrigerants can vary greatly in greenhouse warming potentials, e.g. HFC-32: GWP=771; CFC-11: GWP=6226. Emissions from natural gas at UMW come almost exclusively from steam production in the University steam generation plant. The highest emissions source in all years was electricity. The University's natural gas consumption fuels steam production in the Heating Plant. Steam is piped to most buildings on campus where it is used for heating air and water. Electricity is used for, but not limited to, lighting, heating, cooling, ventilation, and water heating. The difference in emissions from natural gas and electricity narrowed the most in 2020, likely due to changes in campus operations during COVID-19.

Electricity generated in the UMW electric grid region is mostly from the burning of non-renewable resources, natural gas and coal (Table 1). Nuclear fuels are the largest renewable resource fuel for the electricity the University purchases. UMW sources of greenhouse gas emissions come, by far, from the use of natural gas and electricity.

Table 1. Fuels mix for electricity production in UMW region. Fuels mix for national averages are included for comparison. Estimates are in percent of total fuels consumed from 2021 (Clean Air Markets Division 2021).

Fuel type	SERC Virginia / Carolina Region	National Averages
Natural gas	38.1	38.4
Coal	13.4	21.9
Nuclear	38.8	18.9
Other renewable fuel	9.3	19.7
Other non-renewable fuel	0.5	1.1

7. Core Projects

The Climate Action Task Force was, in part, charged to determine "what visible and impactful action(s) can be implemented immediately." Three projects rose to the top of our priority list as both visible and impactful: 1) an electric vehicle charging station installation on campus – in partnership with a regional EV charging station developer, 2) an Energy Savings Performance Contract – designed to increase energy efficiencies at neutral cost to the University, and 3) solar panel installations on campus – using a Power Purchase Agreement. Each of these projects was attractive as our first steps to decrease UMW carbon emissions because of their cost neutrality or low upfront costs, high visibility, and energy savings potential. In addition, the Office of Facilities Operations and Capital Outlay is implementing tools to monitor energy usage and support carbon reduction actions.

7.1. EV Charging Infrastructure Development

Electric vehicle (EV) ownership, for individuals and fleet managers alike, brings with it the challenge of powering these vehicles. EV charging stations are being built in a distributed network, not at central locations like gasoline pumps. They are built and managed at home, at work, at the mall, and in the parking lot of your favorite big box store. The EV charging network, like gas stations, provide the energy for EV vehicles where and when drivers need the energy.

UMW can support EV ownership with the installation of EV chargers on campus. Through an initiative by the Climate Action Task Force, the UMW Offices of Administration and Finance are developing a partnership with a regional charging station developer Greenspot. This partnership will use a fully funded, revenue sharing model, which requires no upfront costs from UMW. The developer prepares, installs, and maintains EV chargers. Once the costs of installation are paid off, UMW shares a percentage of the revenues from vehicle charging. The EV charger, to be located on the top deck of Alvey parking garage, becomes a charging resource for the campus community and the broader EV vehicle community.

7.2. Energy Savings through Energy Efficiency

The University's long-term goal is to achieve 100% renewable energy sources. To reach long-term goals, short-term energy management strategies first call for increasing energy efficiencies. With increased

energy efficiencies come decreased heating, cooling, and lighting demands. These decreased energy demands then can be more easily met as the University transitions to 100% renewable energy sources.

The University is developing a significant energy savings project through an Energy Savings Performance Contract (ESPC). An ESPC is a contract used to work with an Energy Savings Company to develop, install, and monitor systems that are known to increase energy efficiency in buildings. These systems often include more efficient lighting, and more efficient cooling and heating systems. Importantly, an ESPC is cost neutral to the University. By contract, the Energy Savings Company must deliver energy savings at least equal to the cost of the new systems built to save energy. The University, with support from the VA Department of Energy, is developing an EPSC that includes system upgrades and/or replacements for a number of buildings on the Fredericksburg campus. System improvements that are currently high priorities include upgrading lighting systems to LED technology, replacements of HVAC units, and refurbishment of HVAC units. In the long run, an ESPC will help UMW reduce energy purchase costs, conserve energy, and produce less carbon.

A team of members from the Climate Action Task Force, Facilities Services, Capital Outlay, and Procurement Services chose a major Energy Savings Performance Contractor to develop a detailed Investment Grade Energy Audit. This audit defines the potential scope, costs, and energy savings from energy efficiency projects to be potentially written into a final ESPC.

7.3. Renewable Energy Development

The Climate Action Task Force has investigated options for obtaining electricity from solar energy. Solar panels installed on appropriate rooftops and parking lots on campus may produce a significant portion of campus electricity demand. Solar panels on campus offer three things: 1) electricity costs comparable to our current costs, 2) lower total energy costs, in conjunction with increased energy efficiencies, and 3) highly visible sources of renewable energy with the purpose of highlighting the University's commitment to reduction of greenhouse gases and to the use of renewable energy sources.

Our planning for solar panels has focused on renewable energy production-sales agreements called Power Purchase Agreements (PPAs). The University currently purchases electricity from Dominion Energy, a regional energy provider. PPAs allow utility customers, like UMW, to partner with a non-utility, energy producer to install, maintain, and service solar panels at select locations on our property. Solar panels on, for example, the roof of the University Tennis Center are tied into the electrical systems of the Tennis Center. UMW would contract to purchase electricity from these solar panels at a long-term price per kilowatt-hour. Long-term contracted energy costs can be comparable to current costs and they also hedge against future energy cost increases.

The potential for solar panel installations was also listed in our Investment Grade Energy Audit. The most recent proposal arising from the energy audit includes solar panel installations on the University Tennis Center, the Athletics Complex (Anderson Center, Goolrick Hall, and the Fitness Center), Stafford North, Simpson Library, George Washington Hall, and Woodard Hall.

7.4. Energy Dashboards

UMW's Office of Facilities Operations and Capital Outlay is currently developing an energy management resource, called Energy and Carbon Dashboards. These dashboards will display energy usage and carbon emissions based on UMW data, by individual building. These dashboards and the data that drives them

are the information we need to see campus carbon emissions, review our greenhouse gas inventory, and, therefore, target actions that can reduce those emissions.

8. Financing Future Energy Savings and Transportation Projects

The Climate Action Task Force has been mindful of the costs of energy efficiency and energy transformation projects. Each of our projects under development is built around cost neutrality principles, over the long term. Project planners moving forward will have an array of resources designed to defray costs of new energy projects. This is important because upfront costs of projects designed from long term savings can be an issue. Both federal and state governments have signed laws "offering funding, programs, and incentives to accelerate the transition to a clean energy economy" (Green Power Markets 2023). Public / private partnerships like Power Purchase Agreements will likely continue to ease the initial costs of transitions to carbon neutral, energy systems. Loan programs, designed for energy systems development, can also ease the costs of transition.

The federal government has historically developed strong incentives for the adoption of energy reduction programs by state, local, and private organizations. While many of the provisions of the Inflation Reduction Act (H.R. 5376 2022) have been reversed, we might expect to see old and new incentives in the future. Federal technology adoption incentives, including energy reduction incentives, often come in the form of tax credits. Tax credits will likely be available to energy management companies with whom the University might partner on energy management and reduction projects. Tax credits are used by private companies to decrease their costs and those cost reductions can be passed on to tax exempt entities like the University. A new financing tool has also been introduced to support technology adoption, direct payments to tax exempt institutions. Because the University has tax exempt status, we can only take advantage of tax credit programs indirectly. Direct payments, potentially available through future legislation, would decrease costs of energy reduction projects in the future.

Two Virginia Treasury Board leasing programs offer financing for energy efficiency programs deemed to be cost effective by a Virginia state institution, like UMW. The Master Equipment Leasing Program can finance equipment, including energy efficiency equipment, for terms up to 10 years (Treasury Staff 2023). The Energy Leasing Program can finance improvements or retrofits to a variety of heating, cooling, electrical, or lighting systems. This program is designed for financing terms of 12 or 15 years (Treasury Staff 2023; VA Treasury Board 2020).

Standard contractual agreements like Power Purchase Agreements (PPAs) and Energy Savings Performance Contracts (ESPCs) facilitate private / public partnerships for the purchase of solar energy or to build energy reduction infrastructure. Power Purchase Agreements are contracts between an energy consumer, like the University, and a non-utility company that produces solar or wind generated energy. One form of PPAs allows the non-utility company to build and maintain solar panels on University property, e.g. on campus rooftops. In exchange, the University contracts to purchase the electricity produced at favorable, long-term rates. All construction and maintenance costs are born by the non-utility company. ESPCs are developed through a structured process to partner Energy Service Companies and large energy users, like the University. These partnerships result in decreases in energy consumption by fixing, maintaining, or replacing energy-consuming infrastructure. ESPC projects are financed by guaranteed, decreased energy costs in the future.

9. Conclusion

The President's Council on Sustainability, on behalf of The Climate Action Task Force, presents these recommendations to UMW President Troy Paino and the University community. Global climate change, driven by CO₂ emission, is one of the most important challenges facing the world today. The University of Mary Washington has a role to play in decreasing CO₂ emissions from our community. Our Climate Action Plan serves as the final recommendations of the Climate Action Task Force charged in spring 2022. The UMW Climate Action Plan is our roadmap to reach carbon neutrality in the next 15 years. The Climate Action Task Force's report and recommendations include

1. the University's first Greenhouse Gas Inventory,
2. three significant projects that can lead to reductions in CO₂ emissions,
3. state and federal programs designed to promote and finance our CO₂ emissions reductions, and
4. the actions the University should take to reduce our CO₂ emissions.

The University's mean annual greenhouse gas emissions were 18117 MT eCO₂ from 2018 to 2022. Emissions were highest in 2018 and decreased each year through 2021, while rebounding to near 2018 levels in 2022. Emissions likely decreased in 2020 and 2021 due to decreased campus activities due to COVID-19. The large majority of the University's CO₂ emissions come from natural gas to fuel steam production and electricity consumption across campus.

Since the Climate Action Task Force began its work in March 2022, the University has begun the planning and implementation of three projects that will decrease our carbon emissions. First, we installed a level 2 EV charger on the Alvey Parking Deck. The charger was installed and will be managed by Greenspot, a regional EV charging station developer. Second, the University has in hand an investment grade energy audit, as a result of preliminary planning for an Energy Savings Performance Contract. The Office of Facilities Services and Capital Outlay continues to pursue these energy savings, and therefore carbon reduction, opportunities. The most recent proposals highlighted the potential energy reductions from 1. LED light installations in all University buildings, 2. sealing building envelopes in many, but not all buildings, and 3. solar panel installations on select buildings.

Both state and federal governments have passed laws and developed programs to support and finance energy savings and carbon emissions reductions. While many of the provisions of the Inflation Reduction Act (H.R. 5376 2022) have been reversed. This legislation opened the door for direct, federal financing to non-profit organizations like UMW. In the past, non-profits could only take advantage of tax incentives through their for-profit contractors. This kind of direct financing may in the future supplement the tax incentives for energy conservation. Closer to home, Virginia has two low interest loan programs, i.e. leasing programs, to finance increased energy efficiency projects. Both of these programs provide favorable loan terms for state organizations.

The recommended goals and objectives of the University's Climate Action Plan focus on three non-academic areas: 1. facilities and energy management, 2. transportation, and 3. operations. The objectives within goals are of two types: changing technology and writing procedures that support carbon emissions reduction. The goals for facilities and energy management are:

1. Accelerate transition to renewable energy systems.
2. Increase and support sustainable, energy-efficient upgrades throughout campus buildings.

3. Establish carbon-free energy efficiency and conservation as a core value in future maintenance and operations.

The goals for transportation are:

1. Reduce UMW's carbon emissions by evaluating and changing fuel sources of all fleet vehicles.
2. Reduce transportation Related Scope 3 Emissions.

The goals for operations are:

1. Increase opportunities and availability for students to make low-carbon footprint decisions in dining operations.
2. Explore strategies and alternatives to current printing standards to lower our environmental impact and promote a climate-positive mindset.
3. Pursue carbon-negative approaches to support our natural and sustainable environment using strategies that improve green space operations and leverage carbon capture opportunities on University grounds.

The Climate Action Task Force knows that the University of Mary Washington community is ready to commit to the objectives and actions outlined here. We are ready to commit because we can contribute to decreasing climate change through technological and policy change. We are ready to commit because we should model change for students, faculty, staff, and the broader Fredericksburg community. We are ready to commit because we will be joining other colleges, universities, and their host communities to make a difference.

10. References

Available upon request. Available online.