SUSTAINABILITY

2018-19 Annual Report

November 17, 2019

FACILITIES
VIRGINIA TECH

CONTENT

EXECUTIVE SUMMARY

Virginia Tech serves as a model community for a sustainable society. Sustainability is an integral part of the fabric of the university as it pursues enhanced economic stability and affordability, diversity and inclusion, environmental stewardship, expansion of knowledge, and education of future leaders. The university's new strategic plan intentionally includes references to these expectations and efforts.

The pursuit of sustainability is achieved through Virginia Tech's administration; physical environment and operations; student life and experience; campus culture and behavior; and academic learning, discovery, and engagement.

The university is rated by the Association for the Advancement of Sustainability in Higher Education (AASHE) using the Sustainability Tracking, Assessment, and Rating System (STARS) every three years. In 2017, Virginia Tech earned a second STARS Gold Rating, with the highest score achieved to date for all institutions in the Commonwealth of Virginia and the Atlantic Coast Conference. Virginia Tech's STARS Gold Rating is a solid demonstration of the university's commitment to advancing sustainability in academics (curriculum and research), engagement, operations, planning, and administration.

Virginia Tech continues to demonstrate its commitment to being a leader in campus sustainability by making significant progress in every component of a university-wide climate action commitment.

Overview

Virginia Tech's Climate Action Commitment defines sustainability as the simultaneous pursuit of environmental quality, economic prosperity, and social justice and equity, through action, education, and engagement to address current needs without compromising the capacity and needs of future generations.

Virginia Tech's sustainability vision is to serve as a model community for a sustainable society. Sustainability is an integral part of the fabric of the university as it pursues enhanced economic stability and affordability, diversity and inclusion, environmental stewardship, expansion of knowledge, and education of future leaders. The university's new strategic plan includes references to these expectations and efforts. The pursuit of sustainability is achieved through Virginia Tech's administration; physical environment and operations; student life and experience; campus culture and behavior; and academic learning, discovery, and engagement.

Virginia Tech is a member of the Association for the Advancement of Sustainability in Higher Education (AASHE). AASHE is an association of colleges and universities that are working to create a sustainable future. AASHE's mission is to empower higher education to lead the sustainability transformation. It provides resources, professional development and a network of support to enable institutions of higher education to model and advance sustainability in everything they do, from governance and operations to education and research.

Virginia Tech is also a member of the Virginia Association for the Advancement of Sustainability in Higher Education (VASHE). VASHE is a consortium of colleges and universities that work collaboratively to advance sustainability within the Commonwealth of Virginia, and its mission is similar and compliments AASHE.

Energy & Sustainability Committee

The university established the Energy and Sustainability Committee (E&SC) on April 30, 2007. It is one of 14 committees within the university governance system. The E&SC charge is "to review and provide advice to the University Administration on broad policy issues relating to the university's pursuit of environmental quality through action, education, and engagement to address current needs without compromising the capacity and needs of future generations."

The E&SC has 19 members and includes faculty, staff, and student representation. It is unique in that it is the only committee in the university governance system that has four student representatives (two graduate students and two undergraduate students). The other committees have a total of two student representatives. Please refer to **https://governance.vt.edu/assets/esc-roster.pdf** for more information.

The E&SC reports to the Commission on University Support who reports to the University Council. Please refer to **https://governance.vt.edu/ccc.html** for more information.

Virginia Tech Climate Action Commitment

During Earth Week in April 2008, former university President Charles W. Steger charged the E&SC "to develop a climate commitment and accompanying sustainability plan that was unique to Virginia Tech, and to have the commitment placed in resolution format for review and action by the University Council in the 2009 spring semester." The E&SC developed the draft Virginia Tech Climate Action Commitment and Sustainability Plan (VTCAC&SP) and spearheaded the review process.

On April 22, 2009 (Earth Day) the University Council voted to recommend approval of the Virginia Tech Climate Action Commitment (VTCAC) and accepted the accompanying Sustainability Plan. On June 1, 2009, at their regularly scheduled meeting, the Virginia Tech Board of Visitors unanimously approved the Virginia Tech Climate Action Commitment and it became Presidential Policy Memorandum 262. Containing 14 points, the VTCAC includes sustainability goals, objectives, and aspirations. In academic year 2012-13, the E&SC revised the VTCAC and added a Sustainability Definition, Vision, and Mission. On May 6, 2013, the University Council approved the revision. Please refer to **https://www.facilities.vt.edu/content/dam/facilities_vt_edu/sustainability/climate-action-commitment.pdf**. See Appendix A.

Sustainability Plan

The initial Sustainability Plan was developed in-house utilizing the expertise of over 75 key stakeholders. It contained a series of actions and measures for each of the sustainability goals, objectives, and aspirations in the VTCAC. The Sustainability Plan was organized into three time horizons or phases: near-term phase (three years), mid-term phase (12 years), and long-term phase (25 years). The team tracked over 80 separate actions and measures.

Subsequent to developing the Sustainability Plan, the Association for the Advancement of Sustainability in Higher Education (AASHE) created the Sustainability Tracking, Assessment & Rating System (STARS) for use as a sustainability management tool to assess sustainability progress. More than 400 institutions have earned a STARS rating, making the program the most widely-recognized framework in the world for publicly reporting comprehensive information related to a college or university's sustainability performance.

Participants report achievements in five overall areas: academics, engagement, operations, planning and administration, and innovation and leadership. Unlike other rating or ranking systems, this program is open to all institutions of higher education, and the criteria that determine a STARS rating are transparent and accessible to anyone. Because STARS is a program based on credits earned, it allows for both internal comparisons as well as comparisons among similar institutions.

Virginia Tech has adopted the AASHE STARS protocol as the foundation of the Sustainability Plan. The STARS protocol consists of over 60 topical areas (called credits) that are placed in one of four categories: Academics, Engagement, Operations, and Planning and Administration. Additional credit is earned for unique initiatives implemented that are not covered in STARS. Data and information submitted is measured against a national standard. Points are earned for each credit. Total points (score) yields an overall rating, Platinum, Gold, Silver, or Bronze.

Virginia Tech has received 4 STARS ratings (2011: Silver; 2013: Silver; 2014: Gold; and 2017: Gold). For the 2017 Gold rating, Virginia Tech earned 71.94 points which at that time represented the highest achieved for any college or university in the Commonwealth of Virginia, and the highest achieved by peer institutions in the Atlantic Coast Conference. The STARS Gold Rating is good for three years. Virginia Tech's STARS report is publicly available on the STARS website at **https://stars.aashe.org/institutions/virginia-tech-va/report/2017-12-19/**.

Office of Sustainability

On June 1, 2009, following the approval of the Virginia Tech Climate Action Commitment (VTCAC) by the Virginia Tech Board of Visitors, the university established the Office of Sustainability. Recognized as the university clearing house for sustainability matters, the Office of Sustainability has the following duties and responsibilities:

a. Coordinate programs for campus sustainability;
b. Oversee the implementation of the VTCAC&SP;
c. Monitor annual electricity and other energy use and GHG emissions;
d. Manage a campus-wide student internship and undergraduate research program using the campus as a sustainability laboratory; and
e. Coordinate communication regarding campus sustainability initiatives and programs to the university community and external audiences.

Office of Sustainability Partners

University Colleges, Departments, and Units

The Office of Sustainability collaborates with faculty and staff in virtually all of the colleges at Virginia Tech to include: College of Agriculture and Life Sciences, College of Architecture and Urban Studies, College of Business, College of Engineering, College of Liberal Arts and Human Sciences, College of Natural Resources and Environment, College of Science, and the College of Veterinary Medicine.

The Office of Sustainability collaborates with nearly all administration departments and auxiliary units to include: Division of Student Affairs (Dining Services, Housing and Residence Life, Residential Leadership Community, Student Engagement and Campus Life, Virginia Tech Corps of Cadets), the Alternative Transportation Department, Athletics Department, Recreational Sports, and YMCA at Virginia Tech.

Student Groups

The Office of Sustainability works with many student groups to include the Student Government Association, Residence Hall Federation, Environmental Coalition, Environmental Student Organization, Food Justice at Virginia Tech, Galileo Living Learning Community, Hypatia Living Learning Community, Society of Renewable Resources, Stroubles Creek Restoration Initiative, Student Chapter of the American Water Resources Association, Students for Sustainable Practice, Sustainable Food Corps, Campus Kitchen at Virginia Tech, and The Green Program - Study Abroad at Virginia Tech.

Community Groups

The Office of Sustainability collaborates often with the Town of Blacksburg, the local citizens group Sustainable Blacksburg, and the Blacksburg Farmers Market.

SUSTAINABILITY PROGRESS 2018-19

The 2018-19 Sustainability Annual Report presents the Office's sustainability progress by showcasing the 14 points of Virginia Tech Climate Action Commitment and a list of accomplishments.

Point 1: Leader in Campus Sustainability

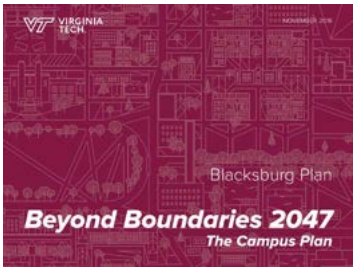
"Virginia Tech will be a Leader in Campus Sustainability. Sustainability is an integral part of the fabric of the university as it pursues enhanced economic stability and affordability, diversity and inclusion, environmental stewardship, expansion of knowledge, and education of future leaders."

Virginia Tech continues to demonstrate its commitment to being a leader in campus sustainability by making significant progress in every component of a university-wide climate action commitment. Infrastructure upgrades, highlighted by the conversion to natural gas as the unviersity's primary fuel source, has resulted in a measurable increase in energy efficiency and a decrease in greenhouse gas emissions (GHG). A Five-year Energy Action Plan is well underway.

Awards and Recognition

Virginia Tech has consistently demonstrated its commitment to being a leader in campus sustainability and has received awards and recognition at both the state and national levels.

- **2019 APPA Sustainability Innovation Award for Facilities Management:** The Office of Sustainability received national recognition for the Green RFP Program from APPA, Leadership in Educational Facilities, earning the 2019 Sustainability Innovation Award for Facilities Management.



- **2019 Campus Master Plan Beyond Boundaries 2047 received the SCUP "Excellence in Planning for an Existing Campus" Merit Award:** The Campus Master Plan provides the first major update of physical planning at Virginia Tech (VT) in over 30 years. The plan integrates the facilities and infrastructure required to support VT's strategic plan. These include a network of amenities and services designed to improve the student experience; provide an integrated approach to accessibility and mobility; and create a series of mixed-use districts featuring new cross-disciplinary academic, research, and partnership facilities. The plan reinforces the academic, research, and outreach mission across VT's three campuses and numerous agricultural stations. In doing so, it responds to five overarching goals: (1) enhance learning and research environments; (2) expand strategic partnerships; (3) protect the land grant legacy; (4) facilitate accessibility and mobility; and (5) foster an inclusive campus experience." View the Campus Master Plan at **https://www.facilities.vt.edu/planning-construction/campus-master-plan.html**.

TREE CAMPUS USA
An Arbor Day Foundation Program

- **2019 Tree Campus USA Reaccreditation:** For the eleventh consecutive year Virginia Tech has been recognized for its best practices in campus community forestry through the Arbor Day Foundation's Tree Campus USA program. Launched in 2008, Tree Campus USA is a national program that honors colleges and universities for effective campus forest management and for engaging students, faculty, and staff in conservation goals. Virginia Tech achieved Tree Campus USA recognition by meeting five national standards, which include maintaining a tree advisory committee, operating a campus tree-care plan, dedicating annual expenditures toward trees, organizing an Arbor Day observance, and executing student service-learning projects. More than 650 trees have been planted across campus since 2008. Trees are among the most visible representations of Virginia Tech's commitment to environmental stewardship, as demonstrated by two recent projects.

- **2019 Governor's Environmental Excellence Award:** The Office of Sustainability Internship Program received the 2019 Governor's Environmental Excellence Award Honorable Mention for its sustainability achievements at the 30th annual Environment Virginia Symposium held in March. Administered annually by the Department of Environmental Quality, in partnership with the Department of Conservation and Recreation, the Governor's Environmental Excellence Awards recognize public, private, and nonprofit organizations for successful and innovative efforts to improve Virginia's environment. Going into its ninth year, the Office of Sustainability Internship Program provides students with invaluable opportunities to gain real-world insights and professional skills in sustainability and university operations. Approximately 20 interns participate in the academic year-long internship program every year. The university has received a total of nine Governor's Environmental Excellence Awards. See Appendix B.

- **Association for the Advancement of Sustainability in Higher Education 2018 "Sustainable Campus Index":** The Association for the Advancement of Sustainability in Higher Education (AASHE) developed the STARS Protocol. This self-reporting and transparent program is nationally recognized as the most effective way to determine the effectiveness of the Virginia Tech Sustainability Program. Each year AASHE publishes their "Sustainable Campus Index" to reflect best practices. The Sustainability Boot Camp was featured in the 2018 Edition.

THE PRINCETON REVIEW
2018
GUIDE TO GREEN SCHOOLS

- **Princeton Review Guide to Green Colleges, 2018 Edition:** The Guide to Green Colleges 2018 Edition profiles colleges with the most exceptional commitments to sustainability based on their academics and career preparation for students, campus policies, initiatives, and activities. The Guide uses the STARS protocol. Virginia Tech has been selected every year since 2008.

- **Featured in the Sierra Club "Cool Schools for 2019":** The Sierra Club's Cool Schools for 2019 ranked Virginia Tech No. 73 (top 25 percent) out of a total list of 282 select institutions. This marks the first time for the university to be featured in this publication. Cool Schools uses data and information from the most recent STARS rating for its publication.

- **Virginia Tech Dining Services Awards:** Dining Services boasts a tradition of award-winning programming, venues, and service. Dining Services is committed to being the leader of college and university food service and a leader in sustainability, and has received numerous awards for their efforts.

    - No. 1, The Best College Dining Program in Each State, FoodService Director
    - Reusable To-Go Program - Honorable Mention for the 2018 Governor's Environmental Excellence Awards
    - Best of Show - 2018 Best Concept Award, Food Management
    - College Food Truck of the Year, Mobile Cuisine
    - No. 2, Best Campus Food, Niche
    - No. 9, Best Colleges for Food in America, The Daily Meal
    - No. 2, 50 Best Colleges with the Best Food 2017-18, Best Value Schools
    - No. 3, 2018 College Power Players, Food Management
    - No. 3, The Ten Colleges with the Best Dining Halls, College Magazine
    - No. 6, Best Campus Food, "Best of 382 Colleges: 2018 Edition," The Princeton Review
    - Top 15 Best Universities for Healthy Eaters, Healthline
    - Top 25 Best College Dining Halls - The College Consensus Best Campus Dining Halls, College Consensus
    - The 30 Colleges with The Best Campus Food You've Ever Seen, Delish
    - A Report Card for Vegan Offerings, for going above & beyond to provide all students with exceptional vegan food, Peta2

Point 2: VTCAC&SP represented in the Strategic Plan

"Virginia Tech will represent the VTCAC&SP in the university's Strategic Plan."

The new Virginia Tech Strategic plan, "The Virginia Tech Difference: Advancing Beyond Boundaries" was approved by the Board of Visitors on June 2, 2019. The Strategic Plan can be viewed at: **https://strategicaffairs.vt.edu/StrategicPlanning/the-vt-difference-advancing-beyond-boundaries.html**).

Strategic Priority 4 (Ensure Institutional Excellence) highlights the Virginia Tech Climate Action Commitment by stating the following:

> "Approved by the Board of Visitors on June 1, 2009, the Virginia Tech Climate Action Commitment envisions Virginia Tech as a model community for a sustainable society. The Virginia Tech Climate Action Commitment affirms that Virginia Tech will be a leader in campus sustainability and outlines several goals and milestones for improving sustainability. Areas of focus include reducing emissions, improving sustainability of the built environment, minimizing waste, and improving electricity, heating, and transportation efficiency. Virginia Tech engages and involves the university community in these efforts through multiple activities including the development and implementation of sustainability-related academic programs and innovative strategies for efficient and sustainable use of energy, water, and materials in all university-owned facilities."

The 2018 Campus Master Plan Beyond Boundaries 2047, approved by the VT Board of Visitors in November 2018, integrates the facilities and infrastructure required to support Virginia Tech's new strategic plan. It includes a network of amenities and services designed to improve the student experience; an integrated approach to accessibility and mobility; and a series of mixed-use districts featuring new cross-disciplinary academic, research, and partnership facilities. The plan reinforces the academic, research, and outreach mission across VT's three campuses and numerous agricultural stations. In doing so, it responds to five overarching goals: (1) enhance learning and research environments; (2) expand strategic partnerships; (3) protect the land grant legacy; (4) facilitate accessibility and mobility; and (5) foster an inclusive campus experience."

Beyond Boundaries 2047 can be viewed at **https://www.facilities.vt.edu/content/dam/facilities_vt_edu/planning-construction/campus-master-plan/BGO3_ii_Campus%20Master%20Plan_November%202018_UPDATE.pdf**

Sustainability Outcomes are featured on pages 322-331. The intent is to:

- Minimize consumption of natural land, and reduce vehicular emissions, via a land use strategy focusing on infill development rather than sprawl (including a growth boundary established by the proposed Western Perimeter Road);
- Reduce vehicular emissions via an alternative transportation-focused mobility system (e.g. transit, walking, bicycles), the relocation of parking to the perimeter of campus, and the construction of a transit hub at the academic core;
- Advance green stormwater and carbon sequestration efforts through strategic reforestation along major campus corridors and the integration of substantial landscape elements into the proposed accessible pathway system (particularly the Green Links);
- Conserve energy by promoting energy-efficient building siting and design, as well as conversion to alternative energy sources (in keeping with the university's climate action commitment).

Point 3: Reduction of Campus GHG Emissions

"Virginia Tech will establish a target for reduction of campus GHG emissions to 80% below 1990 emission level of 188,000 tons by 2050. Interim targets from 2006 emissions of 316,000 tons will be: for 2012, 295,000 tons (on path to 2025 target); for 2025, 255,000 tons (2000 emission level); and for 2050, 38,000 tons (80% below 1990 emission level)."

Virginia Tech has achieved steady progress in reducing GHG emissions while at the same time having a robust construction program. Much of that reduction is attributable to the increased use of natural gas as the university's primary fuel source and the introduction of Boiler Pollution Reduction initiatives, and many energy conservation measures. Figures 1 and 2 show the decline in GHGs both from a calendar year and fiscal year perspective. FY 19 shows a 5 percent decrease in total emission compared to FY 18.

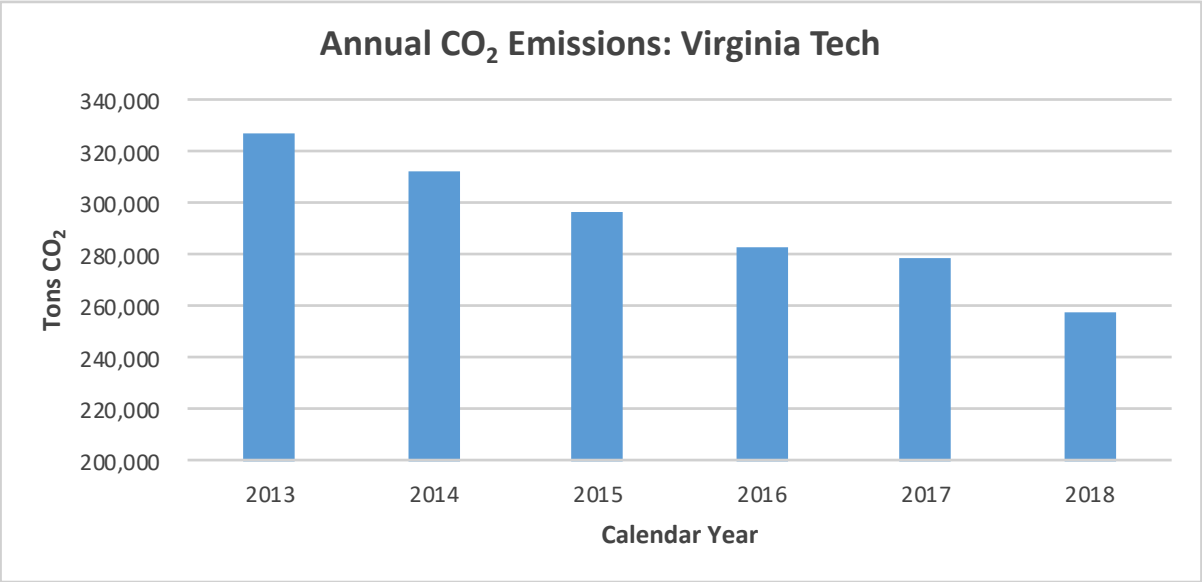


Figure 1

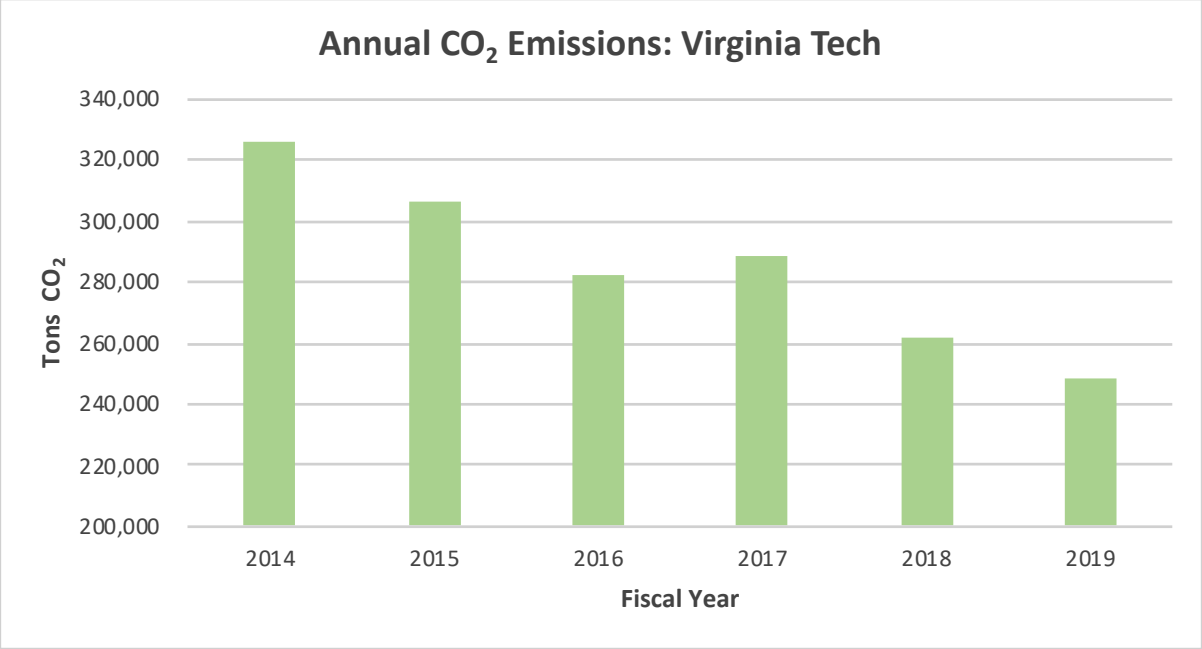


Figure 2

The graph below shows the university's GHG emissions from 1990 to 2006. At that point, if the university had taken a business as usual (BAU) approach the GHG emission would have continued on an upward trajectory as shown in the blue dotted line. However, at that point, Virginia Tech began to introduce its Boiler Pollution Reduction initiatives and energy conservation measures. The university established reduction targets for 2025 (dark green line) and 2050 (dashed light green line). The red dotted line depicts the university's actual GHG emissions which is on a downward trend line. The Office of Sustainability projects the university is on pace to reach its interim goal in 2025. Reaching the 2050 goal will require a considerable investment in renewable energy.

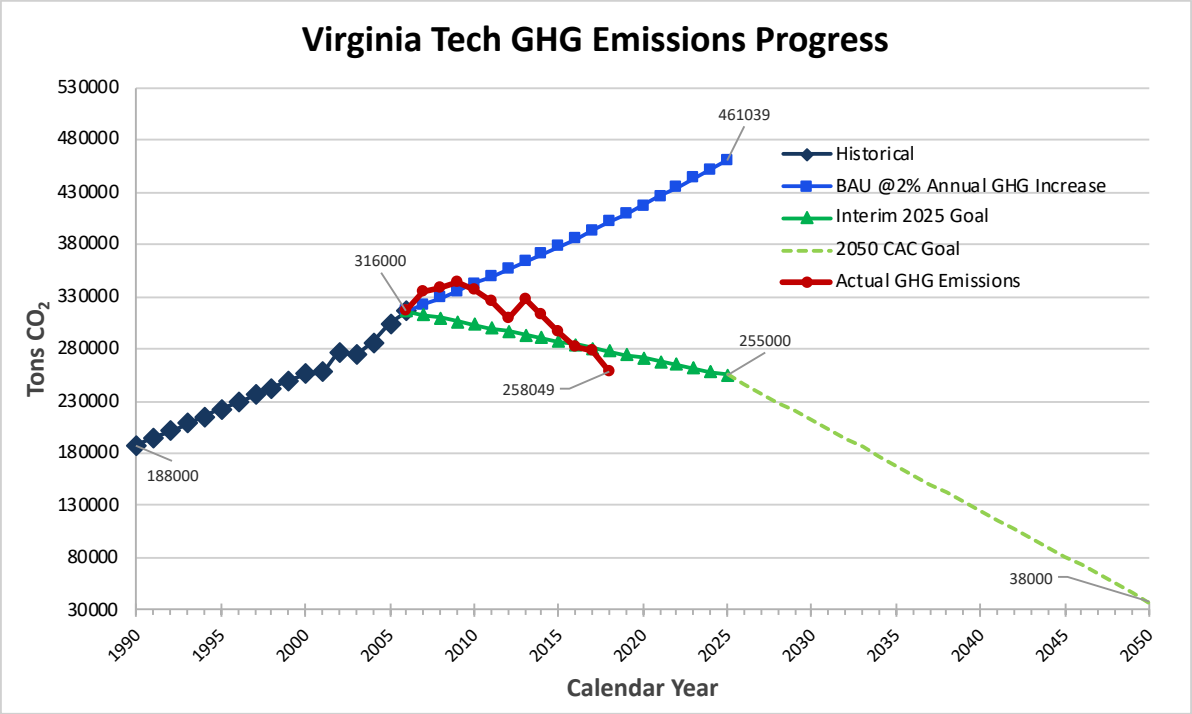


Figure 3

The pie chart below shows the distribution of GHG emissions by source for the 2019 fiscal year. The largest sources of GHG emissions are purchased electricity (51.9 percent) followed by natural gas (23.7 percent) used in the co-generation steam plant.

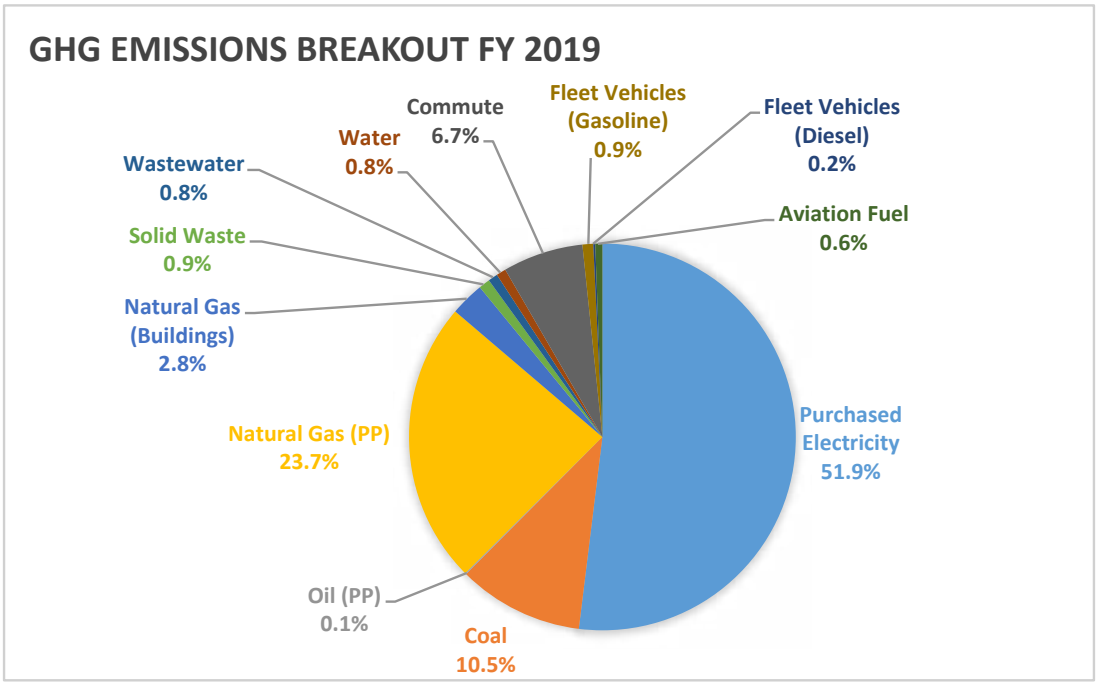


Figure 4

Figures 5, 6, and 7 below show power plant fuel consumption, usage, and GHG emissions between FY2010 and FY 2019. The main point to note is that power plant fuel consumption has remained relatively steady with a 75 percent decrease in coal use as Virginia Tech has switched to cleaner burning natural gas. Power plant GHG emissions have been reduced over the past 5 years due to this change in fuel source.

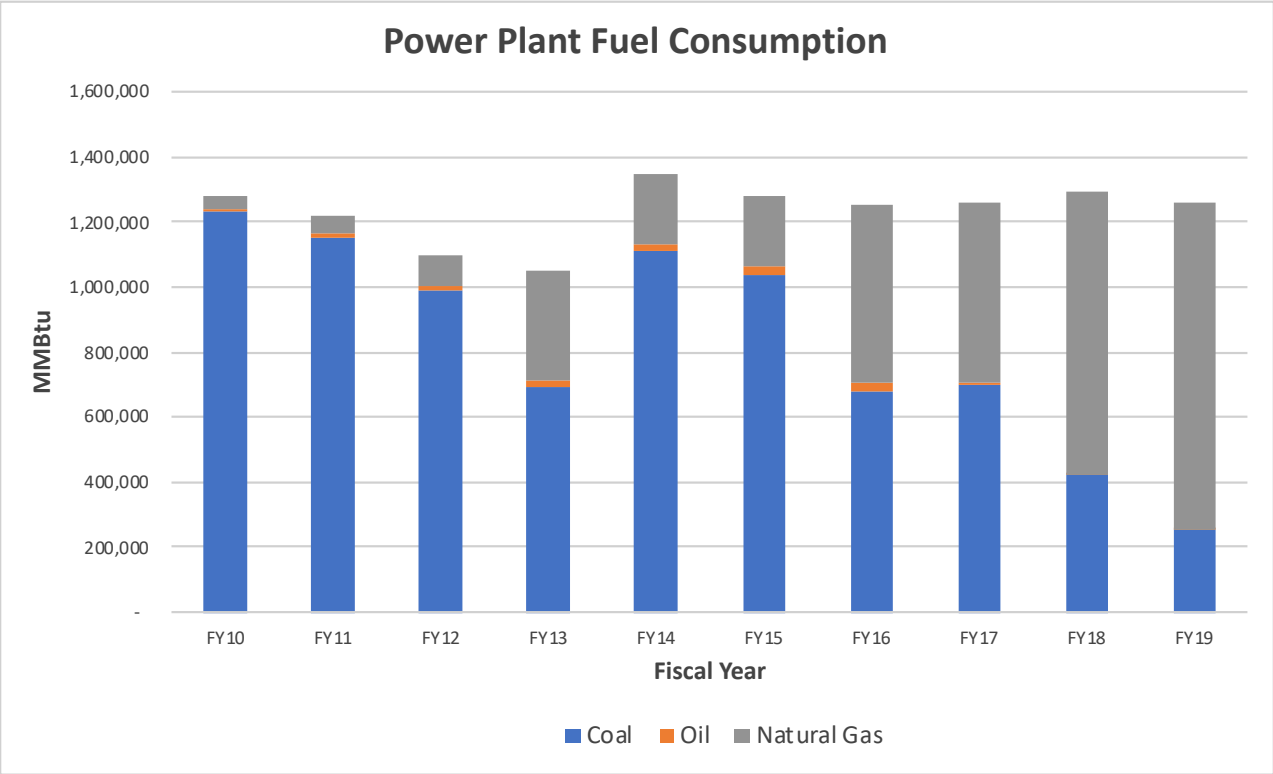


Figure 5

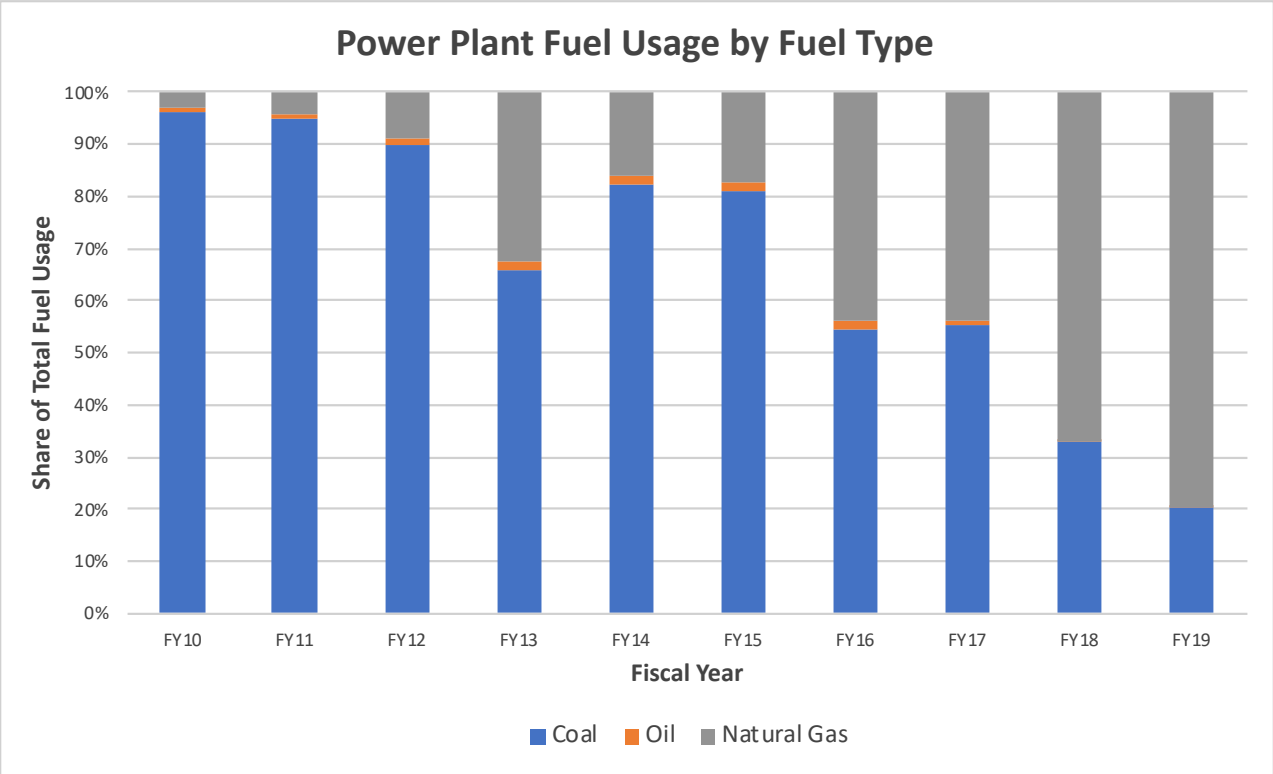


Figure 6

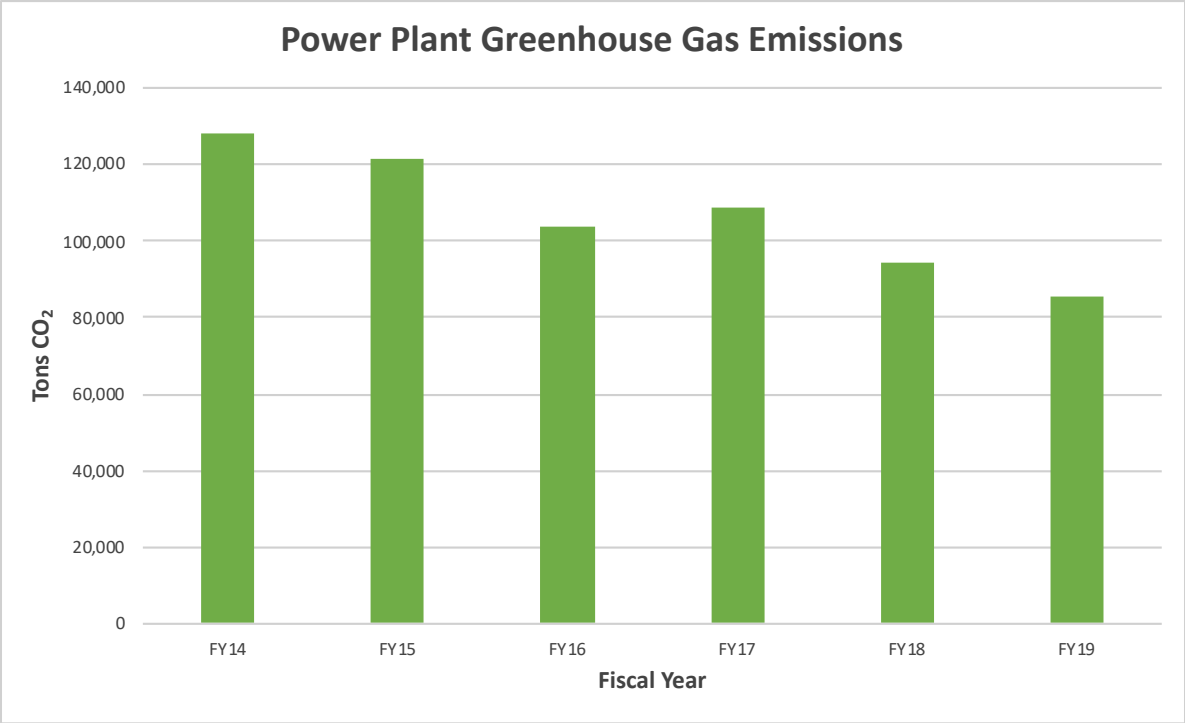


Figure 7

Point 4: Improved Energy Efficiency

"Virginia Tech will work toward these emission reduction targets through improved energy efficiency, reduction of energy waste, replacement of high-carbon fuels, and other measures identified in the VTCAC&SP."

The Office of Energy Management within the Facilities Department guides the operations of the university to achieve tangible reduction in energy consumption on campus through the development and implementation of various Demand Side Management (DSM) policies, initiatives, and projects.

DSM promotes energy efficiency by means of upgrading, retrofitting, and commissioning mechanical, lighting, building automation and electrical systems in university buildings. The Office of Energy Management launched a Five-Year Energy Action Plan in 2016 to address the energy efficiency improvements within a group of the 50 most energy-intensive buildings on campus. Additionally, numerous other ongoing projects are in effect to successfully manage energy consumption on campus.

While DSM is primarily concerned with reducing on-site energy consumption and related costs, it has the potential to support the university's commitment to sustainability. The benefits gained from the program include carbon footprint reduction, improvement of indoor air quality, and conservation of resources. The DSM program will help the university to be less vulnerable to sudden changes in the energy market and set its way towards a net zero energy future.

Virginia Tech Guidelines for Energy Efficient Design

The Facilities Department is in the process of formalizing standards to ensure that the design and construction of buildings at Virginia Tech comply with the Virginia Energy Conservation code. The purpose of Virginia Tech Guidelines for Energy Efficient Design (**https://www.facilities.vt.edu/energy-utilities/energy-reduction-efforts/energy-efficiency-design-guidelines.html**) is to formulate additional requirements which go beyond the applicable Energy Code and are specific to the university. This document presents recommended design elements in ten sections each representing a vital interrelated component of an energy-efficient design and includes running a building energy simulation, efficient building shell design, windows and daylight harvesting, efficient use of lighting and power, heating and cooling, ventilation, local service water heating, building automation, renewable energy systems, and energy metering.

Design and Construction Standards

The university's Design and Construction Standards (**https://www.facilities.vt.edu/planning-construction/principles-and-standards/construction-standards.html**) outline the philosophy, standards, recommendations, and requirements for the design and construction of campus buildings. As a component of the Design and Construction Standards, Guidelines for Energy Efficient Design address the energy-efficiency and on-campus renewable energy utilization requirements. These standards apply to all new construction, addition, and renovation projects on campus.

Energy Star®

Energy Star® provides labels for appliances and other products that are superior in energy efficiency. Virginia Tech's goal is to set a minimum standard for all energy consuming equipment to be Energy Star® rated or better, assuming that the performance criteria are met.

Five-Year Energy Action Plan

When the Virginia Tech Office of Energy Management conducted an energy benchmarking analysis of buildings on the main Blacksburg campus in 2015-16, it discovered just 50 buildings accounted for over 70 percent of overall university energy costs. That is only 35 percent of all buildings on campus. This discovery was the catalyst for the Five-Year Energy Action Plan, a comprehensive blueprint to improve energy efficiency and reduce energy costs within five years in the 50 most energy-intensive, "energy hog" buildings.

Managed by the Office of Energy Management within the Facilities Department, the Energy Action Plan combines energy data analysis with a range of retrofitting projects to achieve significant energy cost reductions. Since 2016, four phases of the Five-Year Energy Action Plan have been implemented, with 10 new energy-intensive buildings incorporated into each phase. Under the Energy Action Plan and its first four phases, the university has already reduced its carbon emissions by about 23,000 tons per year and saved over $3 million in energy costs; full integration of the plan is expected to yield more than $6 million in overall energy cost savings.

- FY 2016: 3,819 tons CO_2
- FY 2017: 6,852 tons CO_2
- FY 2018: 6,280 tons CO_2
- FY 2019: 5,844 tons CO_2

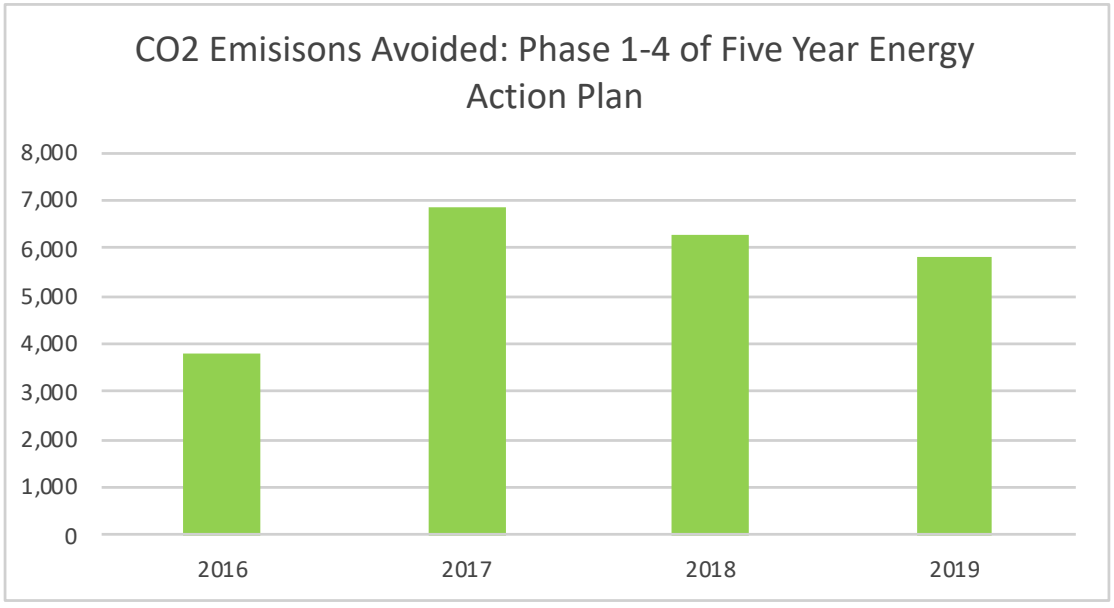


Figure 8

Optimizing Energy Usage with Data

Using data to guide decisions and achieve energy efficiency at scale is at the core of the Energy Action Plan. The Office of Energy Management utilizes a central energy management platform to monitor energy usage in real-time. Ten new buildings are added to the platform during each project phase.

Through newly-installed smart meter and sub-meter infrastructure and ongoing energy audits in the field, energy data is collected in the platform. Practitioners can then identify energy consumption patterns to optimize lighting, ventilation, heating, and air based on demand. Data visualization can also help detect irregular spikes in energy usage. Coupled with thermal imaging, this data can help direct repairs in specific fault areas.

Addressing Operational Inefficiencies

Under the Energy Action Plan, ongoing retrofitting projects help to improve energy efficiency in energy hog buildings. Retrofitting projects implemented under the plan so far include LED lighting replacement, smart meter and sub-meter installation, building automation improvements, insulation upgrades, HVAC upgrades, and more. Addressing energy inefficiencies in laboratories, large-scale energy usage contributors on campus, are also included under the Energy Action Plan.

Phase 4: Looking to the Future of Energy Efficiency on Campus

More than $3.5 million in funding approved in October 2018 helped propel the Energy Action Plan into its fourth phase and deepen the university's energy conservation efforts. Phase 4 looked to the future of energy efficiency by diversifying the university's energy portfolio with a new solar project. In addition, retrofitting and energy accounting projects under Phase 4 helped ensure the longevity of mechanical and lighting systems for years to come. Projects under Phase 4 included implementation of energy retrofit projects identified in Phase 3: LED lighting overhaul, lab ventilation optimization, steam pipe insulation, and building envelope improvements; integration of 10 additional energy-intensive buildings into energy management platform; and implementation of a rooftop solar project (one building). Phase 5 to be completed durning 2019-20.

FY2018-19 DSM efforts included new initiatives including a pilot control banding study, rooftop photovoltaic (solar energy) project study, and energy reduction projects on the campus compressed air supply-side system. The pilot control banding study is a laboratory risk assessment to determine minimum laboratory ventilation rates based on the chemicals used, and other lab control measures. Often minimum laboratory ventilation rates can be lowered from conservative levels, saving energy while still maintaining all established lab safety standards and limits.

Retro-Commissioning (RCx)

Commissioning of existing buildings or "retro-commissioning," is a systematic process applied to existing buildings for identifying and implementing operational and maintenance improvements and for ensuring their continued performance over time. Beginning in 2018, the Office of Energy Management increased this effort significantly in Phase 4 buildings, as well as those buildings in previous plan years. Phase 4 results are conservatively estimated at $225,000 per year at an investment of approximately $75,000 dollars. Over 250 RCx measures have been proposed in Phase IV with almost an equal amount of other RCx measures in study or development.

The Five-Year Energy Action Plan supports the Virginia Tech Climate Action Commitment, which serves as a cornerstone for guiding the university toward a greener, more sustainable future. It touches on all aspects of university sustainability and energy efficiency, including campus operations, facilities, curriculum, and research. While the Energy Action Plan addresses energy efficiency in existing buildings, the Climate Action Commitment ensures all new construction and renovation projects meet Silver LEED (Leadership in Energy and Environmental Design) certification standards. LEED is the most widely used green building rating system and provides a framework to create healthy, highly efficient, and cost-saving green buildings.

Point 5: VT will Maintain a Sustainability Office

"Virginia Tech will maintain a sustainability office to:

a. ***Coordinate programs for campus sustainability,***
b. ***Oversee implementation of the VTCAC&SP,***
c. ***Monitor annual electricity and other energy use and GHG emissions,***
d. ***Working with faculty and departments, manage a campus-wide student internship and undergraduate research program using the campus as a sustainability laboratory,***
e. ***Coordinate communication regarding campus sustainability initiatives and programs to the university community and external audiences."***

The Office of Sustainability was established within the Facilities Department and acts as a central hub to connect the many sustainability champions and efforts taking place all across campus. Creating positive change requires the input and cooperation of the entire university community. The office routinely coordinates with other departments to bring about sustainable change and partners with students to educate the Virginia Tech community about how to live a more sustainable and low-impact lifestyle through behavior change and an understanding of the impacts one's personal actions can have on a global scale. The office works with the understanding that even the smallest behavior changes can create a more sustainable world.
The Office of Sustainability houses or partners with the following programs:

- Undergraduate Student Internship Program (see Point 10)
- Green Graduates (see Point 12)
- Green Day Green Tailgate (see Point 8)
- Green Request for Proposals Program (see Point 14)
- Y-Toss (see Point 8)
- Sustainability Week (see Point 12)
- Earth Week (see Point 10)

Point 6: LEED Standards for New Construction, Major Renovations, and Existing Buildings

"Virginia Tech will improve the sustainability of its built environment by:

a. Achieving LEED Silver certification or better for all eligible and applicable new buildings and major renovations.

b. Evaluating the feasibility of LEED for Existing Buildings certification for its existing buildings."

The U.S. Green Building Council provides a green building certification program known as LEED®, or Leadership in Energy and Environmental Design. This program scores buildings on their level of energy efficiency based on a point system. Currently, the university has 32 LEED Registered Buildings totaling nearly 2.5 million gross square feet (16 Certified, 4 occupied and pending Certification, 5 under construction, and 7 in design). The university has specified that all new buildings entering the design phase of construction that are greater than 5,000 gross square feet in area, or the renovation of such buildings where the cost of renovation exceeds 50 percent of the value of the building, shall conform to LEED® Silver standards. See Appendix C.

Virginia Tech's campus physical footprint will continue to expand over the 2019-20 fiscal year as the following projects are scheduled to move from the design phase to construction phase:

- Multi-Modal Transit Facility
- Holden Hall Renovation
- Student Athlete Performance Center
- Student Wellness Improvements
- Undergraduate Science Laboratories

For a complete list of LEED certified buildings separated by LEED Gold, Silver, and Certified along with gross square footage (GSF) and completion status, see the table below:

VT LEED PROJECT SUMMARY

LEED GOLD PROJECTS	GSF	STATUS
Henderson Hall Renovation & Theater 101 Addition	38,750	Complete
Institute for Critical Technology & Applied Science Ph.II (ICTAS II)	42,190	Complete
Ambler Johnston Hall	269,463	Complete
Moss Arts Center	147,382	Complete
Human & Ag Biosciences Building I (HABBI)	93,860	Complete
Goodwin Hall	154,935	Complete
	746,580 GSF	

LEED SILVER PROJECTS	GSF	STATUS
Football Locker Room Addition	42,145	Complete
Lavery Hall	77,301	Complete
Vet Med Addition	24,600	Complete
Chiller Plant Phase I	16,655	Complete
Indoor Athletic Training Facility	91,600	Complete
Pearson Hall	111,191	Complete
Oak Lane Phase IV	20,508	Complete
New Cadet Hall	108,765	Complete
New Classroom Building	72,275	Complete
O'Shaughnessy Hall Renovation	69,200	Complete
Rector Field House	43,949	Complete
Baseball Facilities	49,872	Complete
Sandy Hall	19,889	Construction
Liberal Arts Building	15,394	Construction
Davidson Hall	25,151	Construction
Undergrad Science Labs - Renovation (Derring Hall)	13,127	Construction
VT Carillon	139,586	Construction
Corps Leadership & Military Science Building	60,500	Design
Multi-Modal Transit Facility	13,606	Design
Holden Hall Renovation	101,240	Design
Student Athletic Performance Center	25,800	Design
Student Wellness Improvements	263,000	Design
Undergrad Science Labs - New Construction	102,000	Design
Creativity & Innovation District Living Learning Community (CID-LLC)	224,500	Design
	1,731,854 GSF	

LEED CERTIFIED PROJECTS	GSF	STATUS
Visitors & Undergraduate Admissions Center	18,155	Complete
Renovate Davidson Hall	44,845	Complete
	63,000 GSF	

Figure 9

Point 7: Electricity and Heating Efficiency

"Virginia Tech will improve electricity and heating efficiency of campus facilities and their operations by:

- ***a. Exceeding the most current version of ASHRAE 90.1 energy performance by 10% for all new buildings and major renovations. Capital budgets should account for future energy price, life cycle cost of building operation, and environmental benefits of achieving this level of performance.***
- ***b. Improving the heating and cooling infrastructure and operation, lighting efficiency, equipment efficiency, and metering and controls of its existing buildings."***

The Facilities Department operates and maintains an electric distribution utility, a Co-Generation steam plant, two central chilled water plants, and the associated distribution systems required to transport these services. Few universities serve the electrical needs of their surrounding communities - none to the extent of Virginia Tech and the Virginia Tech Electric Service (VTES). VTES has been in the business of providing primary electrical distribution service to the campus and other customers for more than 100 years. VTES is the electric utility provider for the Blacksburg campus and about 6,000 residential and commercial customers in the Town of Blacksburg. Over 1,300 "Hokie" lights and 650 street lights on the Blacksburg campus are maintained by VTES as well as more than 1,000 street lights and 370 dusk to dawn lights within the Town of Blacksburg.

The Central Steam Plant is a Co-Generation asset that produces centralized steam and simultaneously uses some of that steam as a by-product to generate up to 6.25 mega-watts of electricity. That electricity production offsets the electricity purchased by the university for distribution across campus and within Blacksburg. Co-generation continues to gain importance in United States energy planning because it helps to increase thermal efficiency of the Central Steam Plant; reduce greenhouse gases and other harmful emissions; consume no cooling water in generating electricity; and refocuses infrastructure investments on distributed generation and smart energy options. The university is in the process of installing a nearly $7 million, 100,000 pound-per-hour gas-fired boiler in place of the decommissioned boiler. Beyond the long-term financial benefits, a new gas boiler will result in a reduction of carbon dioxide emissions and increase the plant's overall capacity to meet future campus growth. Project completion is anticipated during spring 2020.

Virginia Tech also has two districts served by chilled water plants that leverage a complex system of water cooling that is then pumped to nearby buildings to help reduce room temperatures and cool research equipment. In general, a chilled water plant is 50 percent more efficient than cooling systems in individual buildings. Long-range plans call for building more centralized chilled water plants in various parts of campus. This will improve energy efficiency, reduce costs, and allow for additional growth. A project to upgrade existing chiller plant equipment is underway and should be complete in summer 2021.

Point 8: Minimize Waste; 50 Percent Recycling Rate

"Virginia Tech will minimize waste and achieve a 50% recycle rate by 2020."

Virginia Tech, the Town of Blacksburg, the Town of Christiansburg, and Montgomery County are the four jurisdictional members of the Montgomery Regional Solid Waste Authority (MRSWA). Located in Christiansburg, MRSWA operates a transfer facility that receives the majority of the university's principal recyclable materials (PRMs), and all of municipal solid waste (MSW).

Virginia Tech transitioned to a "Single Stream Recycling System" on July 1, 2015. Recyclable materials are transported from the university to MRSWA, weighed, and further transported to "Recycling & Disposal Solutions (RDS) in Roanoke, Va. RDS serves as the recycling hub for the region receiving materials from both the New River and Roanoke Valleys. Food waste is collected from 11 on-campus dining facilities and stored temporarily at a consolidated campus location in a 10-ton sledge container (see photo). When the sledge container is full, composting company Royal Oak Farm (ROF) delivers an empty container and transports the full container to their location in Lynchburg, Va.

Royal Oak Farm's 10-ton sledge container for food waste

Solid waste materials are transported from the university to MRSWA, weighed, and further transported to the local landfill operated by the New River Resource Authority (NRRA) in Pulaski County in Dublin, Va.

MRSWA prepares a consolidated recycling rate report for the region to include the four jurisdictional members and submits it to the Department of Environmental Quality (DEQ). Virginia Tech uses the DEQ format and formula to calculate its recycling rate and waste diversion rate. The waste diversion rate includes all additional materials diverted from the local landfill. For calendar year 2018, the university's recycling rate was 40.8 percent and the waste diversion rate was close to 70 percent. The 40.8 percent recycling rate was made possible by simultaneously decreasing campus waste going to the landfill while increasing campus recycling and composting. In comparison to 10 years ago in 2008, Virginia Tech has decreased MSW by 746 tons and increased recycling by 716 tons. See Appendix D.

The graph below gives a historical perspective of Virginia Tech's recycling progress since 2004. The university has increased recycling by over 20 percent during this time period. The dip in recycling rate during the period 2015 -2017 was due to the unexpected closing of nearby composting facility Poplar Manor Enterprises (PME) located in Riner, Va in April 2015.Royal Oak Farm is the only permitted composting facility within 100 miles of Virginia Tech and for various reasons it took nearly two years to establish a contract with them. In calendar year 2018, the university composted 679 tons of food waste from campus dining facilities which represents nearly 25 percent of the total PRMs.

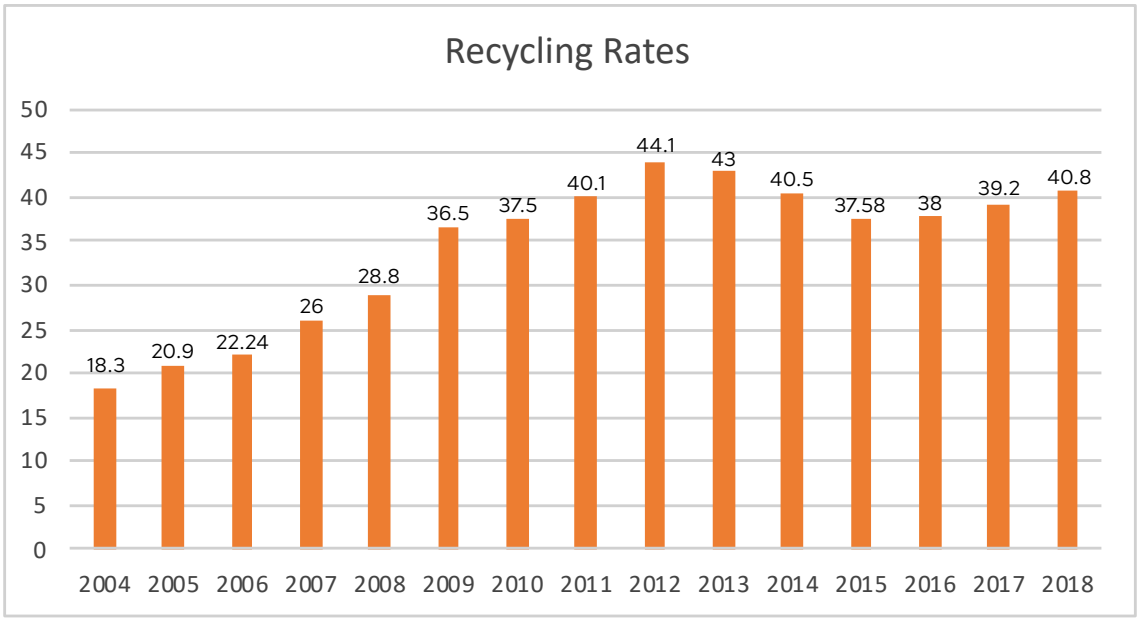


Figure 10

Game Day Green Tailgate

The Game Day Green Team promotes tailgate recycling during home football games by passing out blue recycling bags to tailgaters in the six highest impact parking lots surrounding Lane Stadium, including the Coliseum, Stadium, Maintenance, Track and Field, Chicken Hill, and Litton-Reaves Parking Lots. See map below. The Green Team educates tailgaters on what can and can't be recycled, and how to green their game day experience.

Ways to green your game day:

1. Carpool to the game.
2. Use propane to grill.
3. Bring reusable plates/cups/utensils/grocery bags.
4. Recycle bottles, cans, and glass in bags provided by volunteers.
5. Buy in bulk - not single serving snacks (reduces packaging waste).
6. Buy local from the Blacksburg Farmers Market.

High Impact Parking Lots:

Y-Toss Program

The YMCA at Virginia Tech facilitates one of the largest student-run waste diversion projects on campus called Y-Toss. Y-Toss is the YMCA at Virginia Tech's largest sustainability initiative. At the end of each academic year, collection pods are placed strategically around campus to collect gently used household items from residence halls, academic buildings, and the surrounding community. Then, at the start of the following academic year, items are re-sold during move-in week at Cassell Coliseum. The Y-Toss program successfully diverted 10.7 tons of materials from the landfill in 2018-19, which is three tons more than the previous academic year. In past years, the Green RFP program has provided support through signage and marketing materials to ensure the collection was a success. Thanks to continued support from the Green RFP program, Y-Toss has expanded to add in-hall collection bins so that collections can occur year-round in select residence halls. This will help facilitate a new Y-Toss "Pop-up Thrift Shop" where students can go to buy the used items that are collected.

Dining Services

Dining Services offers a free reusable to-go program which reduces waste to landfill and allows for a sustainable way to eat on the go. The program follows three simple steps of eat, return, repeat! Over 250,000 meals have been served in reusable to-go containers since 2014! This program has also kept 4,700 pounds of packaging out of the landfill since its inception. Dining Services also works with Campus Kitchens at Virginia Tech to recover unused food to give to those in need within the New River Valley. Since 2015, the program has recovered over 125,626 pounds of food. In the winter of 2018, Virginia Tech banned styrofoam within Dining Services. This included getting rid of styrofoam at the campus Chick-fil-A and Dunkin Donuts. Only compostable and reusable containers are used on campus now. See Appendix E.

Point 9: Energy Star Equipment; Product Life Cycle Analysis

"Virginia Tech will:

a. Require purchase or lease of Energy Star rated equipment and maximum practicable recycled content paper, in accordance with University Policy 5505, with exceptions for special uses.

b. Consider a product's life cycle cost and impact when making purchasing decisions."

University Policy 5505 Campus Energy, Water and Waste Reduction (**https://policies.vt.edu/5505.pdf**) is an integral part of Virginia Tech's procurement process. This ensures that the university minimizes waste at the front-end of the process and not just the back-end which typically only promotes the recycling part of the 3R's of waste reduction (reduce, reuse, recycle).

Policy 5505 states in section 3.3 Operations and Maintenance, "the university shall purchase or lease Energy Star® rated appliances and equipment for all classification when designation is available, provided performance criteria are met." Section 3.5 Waste Reduction states, "purchase only recycled paper except where equipment limitations or the nature of the document preclude the use of recycled paper." Section 3.2 Building and Construction states, "a new building entering the design phase of construction that is greater than 5,000 gross square feet in size, or the renovation of such a building where the cost of renovation exceeds 50 percent of the value of the building, shall meet the Virginia Department of General Services (DGS), Division of Engineering and Buildings, Virginia Energy Conservation and Environmental Standards for energy performance and water conservation. All such buildings shall conform to U.S. Green Building Council Leadership in Energy & Environmental Design (LEED) Silver standards, consistent with the Virginia Tech Climate Action Commitment."

These protocols ensure the consideration of a product's life cycle cost and impact when making purchasing decisions. The current Virginia Tech Design and Construction Standards are being revised and updated to reflect the use of Life Cycle Analysis when appropriate." Also, Policy 5505 is currently being reviewed by the Energy and Sustainability Committee in order to recommend revisions during the 2019-20 academic year in order to make the policy more robust.

Point 10: Engage Students, Faculty, and Staff

"Virginia Tech will engage students, faculty, and staff through education and involvement to develop and implement innovative strategies for efficient and sustainable use of energy, water, and materials in all university-owned facilities."

Undergraduate Student Internship Program

The internship program's reach extends to both the campus and the surrounding community. The Office of Sustainability's vision is to create a sustainability network of student and community leaders throughout Virginia Tech, Blacksburg, and the greater New River Valley. The program utilizes campus as a sustainability living-learning laboratory; providing students with experiential learning opportunities to explore real-world problems and lead in the development of innovative solutions. Operations, engagement, and academics are integrated into impactful projects that benefit students and the local community.

The mission of the Student Internship Program is to provide students with valuable opportunities to create lasting, sustainable change at Virginia Tech while developing their professional skills and expanding their knowledge of the inner workings of the university. The program encourages ownership, creativity, and collaboration to solve some of the toughest sustainability problems the world is facing today. The program blends real-world projects with practical, skills-based professional development workshops to prepare students for an ever-changing career in the sustainability field. Karlee Siepierski, previously sustainability planner in the Office of Sustainability, was integral to managing the internship program and developed the 2018-19 Intern Manual. See Appendix F.

The projects the students complete, paired with professional development classes and other trainings, allow students to sharpen and expand their environmental professional skill sets. Intern teams work on a variety of tasks, including:

- **Partner Projects:** Teams partner with various departments such as Energy Management, Stormwater Management, Sustainable Dining, and Housing and Residence Life to complete technical projects.
- **Education and Outreach:** Teams plan and execute outreach events in partnership with community organizations such as The YMCA, Town of Blacksburg, and Blacksburg Farmers Market. Past events include Thrift Swaps, Pop-up Farmers Market, and seed plantings.
- **University-Wide Campaigns:** Teams will assist in executing large-scale campaigns including Earth Week, Sustainability Week, and RecycleMania.

Green Graduates

The Green Graduates of Virginia Tech program asks graduating students to take a personal sustainability pledge that encourages them to think about the environmental impact of their jobs, travel, and other adventures after leaving Virginia Tech. The pledge gives students an opportunity to reflect on the values and lessons they gained during their time on campus and to think about which of those lessons and values they will take with them as they depart.

By pledging, students are committing to foster sustainable behaviors both in their own lives and in the lives of their friends, family, and coworkers. To honor the students who wish to take such a pledge, the Office of Sustainability awards all pledge signers with a free green cord to wear at graduation. All undergraduate and graduate students are eligible to participate.

In 2018-19, over 250 graduates participated in the program.

Sustainable Dining

Homefield Farm is a partnership between Dining Services and the College of Agriculture and Life Sciences. This six-acre farm grows fruits, vegetables, and herbs for Virginia Tech Dining Services, and serves as a site of experiential student learning, interdisciplinary research, and community outreach. Over 196,545 pounds of produce were produced at Homefield Farm. In Fall 2018, Dining Services held the first ever Homefield Farm Pop-up Farm Stand. Students were able to purchase fresh, local campus-grown veggies from Virginia Tech's very own Homefield Farm.

Dining Services is also making composting in the dining halls more efficient by removing 90 percent of water from compost waste at Turner Place in Lavery Hall through the use of their waste reduction technology. Nearly 5,000 tons of organic waste have been sent from Virginia Tech dining facilities for composting since 2009.

Virginia Tech is increasingly using products that promote a sustainable dining program and food systems. Local products are considered to be products sourced from within 250 miles of Blacksburg or within the Commonwealth. Produce, beef, lamb, pork, eggs, milk, herbs, fruits, and vegetables are all campus-sourced products. See Appendix E.

Earth Week

With the mission to "build a more just and sustainable community through education, action, and appreciation for our world," Virginia Tech's annual Earth Week events are led by The Environmental Coalition at Virginia Tech, with support from nearly a dozen other groups, including:

- Virginia Tech Office of Sustainability
- Virginia Tech Students for Sustainable Practice
- Virginia Tech Environmental Student Organization
- Food Justice at Virginia Tech
- Sustainable Dining at Virginia Tech
- Virginia Tech Office of Alternative Transportation
- YMCA at Virginia Tech
- Student Government Association
- Hokie Bike Hub
- Blacksburg Farmers Market

Each day of Earth Week is themed around an important sustainability topic, such as clean energy, waste and recycling, local food, social justice, and community. The particular events change each year, but the basic mission to take action for and celebrate a sustainable campus and beyond is carried through year to year. 2018-19 events included:

- SolarFest at Glade Road Growing
- Campus Tree Planting at the Grove (see photo below)
- Duck Pond and Stroubles Creek Clean-Up
- Smart Cycling Class with the Alternative Transportation Department
- YMCA Thrift Pop-Up Shop
- Drive Electric Event
- Stadium Woods Walk
- Moonlight Yoga
- Campus Kitchen Dry Meal Pack
- TimeBank Repair Cafe with Sustainable Blacksburg

The Grove is the President's Residence on campus.

Point 11: Transportation Energy Efficiency

"Virginia Tech will improve transportation energy efficiency on campus through parking, fleet, and alternative transportation policies and practices. The university will continue to implement programs that encourage the use of alternative transportation methods and will continue to implement programs and services that promote eco-responsible fleet management."

The Alternative Transportation Department is housed within the Office of Parking and Transportation and coordinates the university's alternative transportation efforts. The following programs are offered by the Alternative Transportation Department:

Commuter Alternatives Program

The Commuter Alternatives Program, provided by Parking Services, offers two permit programs to meet employee and student commuting needs and encourage the use of alternative modes of transportation.

The first is a carpool permit which two or more people have to register together to receive. Participants are allowed to park in reserved carpool spaces in preferred areas across campus.

The second is the Bike, Bus & Walk permit, which gives participants 16 discounted daily parking permits per semester (6 per summer session). This acknowledges that it might not always be feasible to commute using alternative modes and allows for some flexibility for people who do.

BEST Workplaces for Commuters℠

Virginia Tech has been designated as a Gold Level Best Workplaces for Commuters.

The Hokie Bike Hub had 3,073 visits during Fiscal Year 2018

Hokie Bike Hub

BICYCLE FRIENDLY UNIVERSITY 2017-2021 BRONZE THE LEAGUE OF AMERICAN BICYCLISTS

The Hokie Bike Hub is a free, self-service bike repair and maintenance facility for Virginia Tech affiliates. Cyclists have access to tools and one-on-one help for self-service bike repair. They can also attend bike maintenance workshops and Smart Cycling classes. The Hokie Bike Hub has become the home of bicycling on campus and serves as a social space for cyclists to interact with and learn from one another. Additionally, Virginia Tech is designated a Bronze Level Bicycle Friendly University.

Public Transportation

Several transit partners provide service locally (Blacksburg Transit and Radford Transit), regionally (Smart Way and Smart Way Express), and long distance (Campus Connect, Virginia Breeze, CollegeTransit, Abbott HomeRide, and Amtrak) from Virginia Tech's campus.

> Blacksburg Transit's ridership increased by 14.6 percent during Fiscal year 2019, with a 44 percent growth over the last four years.

Roam New River Valley bike share launched in July of 2018 through a regional partnership with Virginia Tech, the Town of Blacksburg, the Town of Christiansburg, and Montgomery County. There are 75 bikes distributed across 12 bike hubs, and eight of the hubs are on campus.

Statistics from Roam's first year in operation

- 8,337 trips taken
- 20,163.36 miles biked
- 806,534 calories burned
- 17,780.42 pounds of CO_2 emissions prevented
- $11,694 saved (when comparing the cost associated with driving a car the same distance)

Rideshare and Carshare

RIDE Solutions provides ride matching for the New River Valley. Their platform allows users to instantly find and communicate with potential carpool partners, join vanpools, and find transit or bike buddies to help them navigate their transportation choices, all via their smartphone or the web. Users can log their trips and earn rewards at over 2,000 local and national businesses.

RIDE Solutions' Guaranteed Ride Home Program provides any registered member a free ride home in the event of an emergency. This commuting "insurance policy" is your assurance that you will not get stranded at work.

Zipcar provides car sharing service to Virginia Tech affiliates, a greener alternative to car ownership. Membership gets you access to their national fleet for on-demand hourly and daily rentals. The service covers gas, insurance, parking and maintenance.

> Virginia Tech has over 2,000 Zipcar members who share just 3-4 vehicles

The Alternative Transportation Department reports on the use of each alternative transportation mode in the biennial Commuter Survey. The most recent survey was completed in 2018. It found that 49 percent of Virginia Tech affiliates use an alternative mode of transportation to get around. For students, Blacksburg Transit is the most popular alternative mode, and for faculty/staff, biking is the most popular.

> Only 29 percent of Virginia Tech students listed single-occupancy vehicles as their primary mode of transportation.

Point 12: Sustainability-Related Academic Programs

"Virginia Tech will continue to develop and implement innovative sustainability-related academic programs in instruction, research, and outreach, and will coordinate and communicate these programs to the university community and external audiences."

Sustainability Offerings

Virginia Tech's STARS report (**https://reports.aashe.org/institutions/virginia-tech-va/report/2017-12-19/**) notes that the university offers 525 sustainability courses and an additional 341 courses that include sustainability in class topics. Over 68 percent are engaged in sustainability research. A total of 83 percent of students adopt at least one sustainability learning outcome prior to graduation and new student orientation continues to be a focus of the Office of Sustainability. Every July, the Office of Sustainability staff help train orientation leaders to equip them with the most accurate information on sustainability programs and offerings. The Office of Sustainability also sets up an informational table at "Gobblerfest", the premier festival to introduce students to community, clubs, and other organizations on campus in the fall.

Green Engineering Program

The Charles Edward Via, Jr. Department of Civil and Environmental Engineering offers an undergraduate and graduate program that facilitates development of critical analytical abilities and the necessary core of knowledge and skills for entry into the environmental engineering profession or graduate studies. This body of knowledge includes the scientific procedures for formulating and testing theories and the procedures for applying theory to enhance welfare through engineering analysis, synthesis, and design. The engineer plays a key role in the design, construction, maintenance, and management of society's physical infrastructure, including transportation and communication systems, structural facilities for housing human activities, water resource management systems, natural resource development systems, and facilities and programs for environmental protection. A 2018 U.S. News & World Report gave the department a #9 national ranking in Environmental Engineering (**https://vtnews.vt.edu/articles/2018/10/eng-usnews-undergrad-ranking18.html**) .

Students are progressively exposed to civil engineering design, culminating in a focused design course experience. The projects assigned in design courses are open-ended, incorporate appropriate engineering standards, and require the application of knowledge from earlier courses in the curriculum. Projects apply technical knowledge to design appropriate physical facilities, but also include consideration of non-technical constraints that confront real-world projects. These additional considerations include such interdisciplinary issues as economics, environmental impact, and sustainability.

Undergraduate Student Intern Program

As mentioned previously, the Office of Sustainability continues to develop and refine an award-winning student internship program that has been operating for nine years. The program offers 20 students the opportunity to research, coordinate, and implement various sustainability projects that range from outreach to operational changes on campus. Students partner with Virginia Tech Career Services to take part in a Cooperative Education and Internship Program (CEIP 3084) where they receive professional development with a mentor on a sustainability topic. The class is reflected on the student's official transcript and they learn valuable skills to give them a headstart in their chosen career. Some examples of projects that interns have worked on from the academic year include Sustainability Week, Stormwater Days, hot water recirculation retrofits for select residence halls, and a Green Lab initiative.

Campus as a Living Learning Community

All of the items mentioned above, including Dining Services/Residence Life programming around sustainable living, help to create a Living Learning Community (LLC) or "laboratory" for students to experience while they attend Virginia Tech. Students are given the opportunity to see and experience how sustainability is woven into every aspect of their life on campus including buildings, energy, air, dining, waste, water, transportation, and many more. Some specific examples include:

- Tours of the campus co-generation steam plant.
- Class tours of building mechanical systems in LEED buildings.
- Alternative Transportation tours and bike maintenance workshops.

- The Dining Services Farm allows students hands-on experience growing food for campus.
- Multiple presentations by Office of Sustainability staff to classes and the broader campus community on sustainability programs.
- On-campus recycling and composting programs.
- Dining Services' "Pop-up Stands" in dining halls throughout the academic year.

Sustainability Week - Flagship Outreach Program

In 2007, Virginia Tech, the Town of Blacksburg, local citizen group Sustainable Blacksburg formed a "Green Partnership" and launched what has become the flagship sustainability outreach program, "Sustainability Week." The goal was to plan a program to help the community life a more sustainable lifestyle through practical applications, workshops, presentations, tours, fairs, and guest speakers. Sustainability Week 2007 far exceeded expectations and received a 2008 Governor's Environmental Excellence Bronze" Award. Sustainability Week has been held during the third week in September consistently for the past 13 years.

Point 13: Virginia Tech will Monitor Energy Use and GHG Emissions

"Virginia Tech will monitor energy use and GHG emissions as well as changing internal and external conditions, prepare an annual 'report card' showing progress towards targets, and periodically re-evaluate targets, making adjustments to targets as appropriate based on changing internal and external conditions and evolving technologies."

The Office of Energy Management and the Office of Sustainability monitor and report campus emissions data through this publication each year. Please refer to VTCAC Point #3 for detailed energy use and GHG emissions data. Also, the Office of Sustainability updates their campus STARS report every three years in order to evaluate sustainability in all areas of the university setting. Please refer the following link to view and access previous annual reports at **https://www.facilities.vt.edu/sustainability/sustainability-reports.html**.

The Office of Sustainability prepares a sustainability annual report for presentation to the Virginia Tech Board of Visitors.

Point 14: Virginia Tech will Fund Sustainability Programs

"Virginia Tech will work to provide funding to support sustainability programs. With regard to all the items in this resolution, major personnel and investment decisions, including capital projects, associated with implementing the VTCAC&SP will be based on a joint review of costs and benefits by university financial and facilities staff and be subject to availability of funds."

Green Request for Proposals Program

Since 2010, student-generated campus sustainability projects have spurred over $1 million in energy-efficient upgrades across the Virginia Tech campus. Each fall, through the award-winning Green RFP Program, the Office of Sustainability seeks proposals from student groups for campus sustainability projects that support Virginia Tech's Climate Action Commitment. Submitted proposals are reviewed by the Office of Sustainability and submitted to the university Energy and Sustainability Committee for consideration. The committee prioritizes the proposals and forwards their recommendations to the Office of Budget and Financial Planning for further review, approval, and funding consideration.

Nine years after launch, momentum doesn't seem to be slowing for the Green RFP program. In fact, the Office of Sustainability received a record 66 proposals in fall 2018. Of those proposals, 18 were selected to receive funding. For more information on the Green RFP or to see projects funded prior to 2018, please refer to **https://www.facilities.vt.edu/sustainability/sustainability-programs/green-rfp-program.html**.
See Appendix G.

A list of all the projects funded during the 2018-19 academic year are as follows:

2018-19 GREEN RFP RESULTS

	Title (In Priority Order)	Student Organization	Cost
1	Indoor LED Lights - Math Emporium	Office of Energy Management - Student Interns	$194,300
2	HVAC Upgrade - Math Emporium	Office of Energy Management - Student Interns	$8,000
3	Hallway LED Lights - Payne Hall	Environmental Coalition	$10,700
4	Newman Library & University Bookstore Outdoor LED Lights	Environmental Coalition	$14,300
5	Cassell Coliseum Parking Lot LED's	UAP 3354	$16,700
6	Green Lab Initiative	Office of Sustainability - Student Intern Waste Team	$3,700
7	Indoor Sink LED Lights for 10 Residence Halls	Environmental Innovation	$103,600
8	Stroubles Creek Watershed Restoration	Stroubles Creek Coalition, VT StREAM Lab, Environmental Coalition, and American Water Resource Association (VT Chapter)	$5,500
9	Mixed Paper Recycling Bins - Cowgill & Burchard Hall (16)	UAP 3354	$2,000
10	Reusable To-Go Containers	UAP 3354 & REAL 3024	$16,100
11	Rainwater Catchment System Hahn Horticulture Garden	UAP 3354	$2,200
12	Water Bottle Refill Stations - Kelly Hall (2)	Biomedical Engineering Society - VT Student Chapter	$5,000
13	Hot Water Recirculation - Several Residence Halls	Office of Sustainability - Student Intern Water Team	$150,000
14	Electronic Waste Recycling Bins (2)	UAP 3354	$400
15	Bat Boxes - Duck Pond Area	UAP 3354	$200
16	Battery Powered Blower - Hahn Horticulture Garden	Hahn Horticulture Garden - Student Maintenance Staff	$200
17	Solar Power Charging Table - Bishop-Favrao Hall	Department of Building Construction - BioBuild Studio Course	$9,700
18	Outdoor Dog Run - VetMed	Virginia-Maryland College of Veterinary Medicine Classes of 2019 & 2020	$10,000
		Total Amount	**$552,600**

Figure 11

CONCLUSION

Virginia Tech continues to demonstrate its commitment to being a leader in campus sustainability by making significant progress in every component of a university-wide climate action commitment. Infrastructure upgrades, highlighted by the conversion to natural gas as the university's primary fuel source, has resulted in a measurable increase in energy efficiency and a decrease in greenhouse gas emissions. The university has completed the fourth year of its Five-Year Energy Action Plan, and is experiencing a measurable decrease in energy consumption as well as greenhouse gas emissions.

During 2018-19, Virginia Tech received numerous awards and recognition at the national and state levels. The university received a 2019 Sustainability Innovation Award in Facilities Management from APPA (Leadership in Educational Facilities) for our student Green RFP Program. The university received 2019 "Tree Campus USA Reaccreditation" from the National Arbor Day Foundation which marks our 11th consecutive year. The university's Sustainability Tracking, Assessment, and Rating System (STARS) Gold Rating from the Association for the Advancement of Sustainability in Higher Education rates the university near the top of all institutions in the Commonwealth of Virginia and the Atlantic Coast Conference, and directly contributed to our being featured in the 2018 Princeton Review's Guide to Green Colleges and top 25 percent ranking in the 2019 Sierra Club's list of Cool Schools. The Office of Sustainability's Student Internship Program received an Honorable Mention for the 2019 Governor's Environmental Excellence Award Program. Since 2008, the university has received nine GEEA awards. Dining Services has consistently been recognized as having one of the best food programs (if not the best) in the country, and they continue to strive to be one of the best sustainable dining programs too. Virginia Tech is nationally recognized as a bike friendly campus and best workplace for commuters.

Our new strategic plan The Virginia Tech Difference: Advancing Beyond Boundaries, features the Virginia Tech Climate Action Commitment. The Campus Master Plan, Beyond Boundaries 2047, integrates the facilities and infrastructure required to support the new strategic plan, and it received a 2019 SCUP "Excellence in Planning for an Existing Campus" Merit award.

The conversion to natural gas and improved energy efficiency has resulted in a significant reduction in greenhouse gas emissions, and the university is on target to achieve our 2025 target of 255,000 tons of CO_2. To continue this downward trend the university will pursue renewal energy options and opportunities.

Virginia Tech continues to expand its robust new construction and major renovation program. There are 32 LEED (Leadership in Energy and Environmental Design) registered projects with the U.S. Green Building Council which represents nearly 2.5 million Gross Square Feet (nearly 20 percent) of the built environment.

The university has a single stream recycling system and the goal is to achieve a 50 percent recycle rate as soon as possible. For calendar year 2018, the university achieved a 40.8 percent recycling rate and a 70 percent waste diversion rate (waste kept out of the local landfill). The recycling rate trend line continues upward due in large measure to the strong food waste composting partnership with Royal Oak Farm (ROF). ROF has the only DEQ-permitted composting facility west of Charlottesville, Virginia. Last year the university composted 679 tons of food waste - a quarter of the university's principal recycling material total.

Sustainable procurement is a primary component of university policy 5505: Campus Energy, Water and Waste Reduction. The Director of Procurement and the Energy and Sustainability Committee (university governance system) are collaborating to develop a sustainable Procurement Policy.

The Facilities Department has maintained its commitment of having the university infrastructure serve as a learning laboratory platform for our students, faculty and staff so as to enhance learning and research. Student internship opportunities are numerous and appreciated for the value they have for all involved. The Office of Sustainability's award winning Student Internship Program had 20 participants organized into four teams (Energy, Water, Food, and Waste Management) with five students per team assigned working on real-world campus issues.

Sustainability at Virginia Tech is a partnership among colleges, departments, auxiliary units, students and the Blacksburg community. It represents a Town-Gown model for the Commonwealth of Virginia and the Nation. At the end of the day, all members of the university are sustainability Champions with a goal of making Blacksburg a "Special Sustainable Place."

2018-19 Sustainability Annual Report Prepared by the Office of Sustainability:

Jon Clark Teglas
Chief of Staff to the Associate Vice President and Chief Facilities Officer

Denny Cochrane
Director of Sustainability

Nathan King
Sustainability Manager

Karlee Siepierski
Former Sustainability Manager

Kaitlyn Franczek
Graduate Assistant

Emily Vollmer
Student Intern

With assistance from:

Blake Bensman
Sustainability Manager, Dining Services and Residence Life

Nick Quint
Transportation Network Manager, Alternative Transportation

Alexa Briehl
Communication Manager, Operations

Meishel DeSouto
Graphic Designer, AVP-Business Services

APPENDIX

Appendix A - The Virginia Tech Climate Action Commitment
Appendix B - 2019 Governor's Environmental Excellence Award
Appendix C - Virginia Tech LEED Program Summary
Appendix D - Calendar Year 2018 Recycling Rate Report for Virginia Tech
Appendix E - Office of Sustainability Student Intern Manual
Appendix F - Sustainable Dining
Appendix G - 2018-19 Green RFP Program Results

Charles W. Steger, President

VirginiaTech

210 Burruss Hall (0131)
Blacksburg, Virginia 24061
540/231-6231 Fax: 540/231-4265
www.president.vt.edu president@vt.edu

Presidential Policy Memorandum No. 262
Revision 1

TO: All Virginia Tech Employees and Students

FROM: Charles Steger

DATE: May 9, 2013

SUBJECT: Update to the Virginia Tech Climate Action Commitment

Approved by the Commission on University Support:	**April 18, 2013**
Approved by the University Council:	**May 6, 2013**
Approved by the President:	**May 6, 2013**
Effective Date:	**Upon Approval by the President**

University Council approved a resolution regarding an update to the Virginia Tech Climate Action Commitment

Following is the text of the resolution.

WHEREAS, the Virginia Tech Climate Action Commitment (VTCAC) was approved by the Board of Visitors on June 1, 2009; and

WHEREAS, the initial phase (2009-2012) of the VTCAC implementation plan has elapsed; and

WHEREAS, the Energy & Sustainability Committee (E&SC) established a subcommittee in the spring of 2012 to review the language of the VTCAC and recommend changes; and

WHEREAS, the E&SC subcommittee recommended several updates, as outlined in the attached; and

WHEREAS, the full E&SC has reviewed and recommended the proposed changes to the VTCAC for University Council approval;

THEREFORE LET IT BE RESOLVED, that the Virginia Tech Climate Action Commitment be amended as follows:

1. Virginia Tech will be a Leader in Campus Sustainability. Sustainability is an integral part of the fabric of the university as it pursues enhanced economic stability and affordability, diversity and inclusion, environmental stewardship, expansion of knowledge, and education of future leaders.

2. Virginia Tech will represent the VTCAC&SP in the university's Strategic Plan.

3. Virginia Tech will establish a target for reduction of campus GHG emissions to 80% below 1990 emission level of 188,000 tons by 2050. Interim targets from 2006 emissions of 316,000 tons will be: for 2012, 295,000 tons (on path to 2025 target); for 2025, 255,000 tons (2000 emission level); and for 2050, 38,000 tons (80% below 1990 emission level).

4. Virginia Tech will work toward these emission reduction targets through improved energy efficiency, reduction of energy waste, replacement of high-carbon fuels, and other measures identified in the VTCAC&SP.

5. Virginia Tech will maintain a sustainability office to:
   a. Coordinate programs for campus sustainability,
   b. Oversee implementation of the VTCAC&SP,
   c. Monitor annual electricity and other energy use and GHG emissions, and
   d. Working with faculty and departments, manage a campus-wide student internship and undergraduate research program using the campus as a sustainability laboratory, and
   e. Coordinate communication regarding campus sustainability initiatives and programs to the university community and external audiences.

6. Virginia Tech will improve the sustainability of its built environment by:
   a. Achieving LEED Silver certification or better for all eligible and applicable new buildings and major renovations.
   b. Evaluating the feasibility of LEED for Existing Buildings certification for its existing buildings.

7. Virginia Tech will improve electricity and heating efficiency of campus facilities and their operations by:
   a. Exceeding the most current version of ASHRAE 90.1 energy performance by 10% for all new buildings and major renovations. Capital budgets should account for future energy price, life cycle cost of building operation, and environmental benefits of achieving this level of performance.
   b. Improving the heating and cooling infrastructure and operation, lighting efficiency, equipment efficiency, and metering and controls of its existing buildings.

8. Virginia Tech will minimize waste and achieve a 50% recycle rate by 2020.

9. Virginia Tech will:
   a. Require purchase or lease of Energy Star rated equipment and maximum practicable recycled content paper, in accordance with University Policy 5505, with exceptions for special uses.
   b. Consider a product's life cycle cost and impact when making purchasing decisions.

10. Virginia Tech will engage students, faculty, and staff through education and involvement to develop and implement innovative strategies for efficient and sustainable use of energy, water, and materials in all university-owned facilities.

11. Virginia Tech will improve transportation energy efficiency on campus through parking, fleet, and alternative transportation policies and practices. The university will continue to implement programs that encourage the use of alternative transportation methods and will continue to implement programs and services that promote eco-responsible fleet management.

12. Virginia Tech will continue to develop and implement innovative sustainability-related academic programs in instruction, research, and outreach, and will coordinate and communicate these programs to the university community and external audiences.

13. Virginia Tech will monitor energy use and GHG emissions as well as changing internal and external conditions, prepare an annual 'report card' showing progress towards targets, and periodically re-evaluate targets, making adjustments to targets as appropriate based on changing internal and external conditions and evolving technologies.

14. Virginia Tech will work to provide funding to support sustainability programs. With regard to all the items in this resolution, major personnel and investment decisions, including capital projects, associated with implementing the VTCAC&SP will be based on a joint review of costs and benefits by university financial and facilities staff and be subject to availability of funds.

Virginia Tech Sustainability Definition, Vision, & Mission:

Sustainability Definition:

Sustainability is the simultaneous pursuit of environmental quality, economic prosperity, and social justice and equity, through action, education, and engagement to address current needs without compromising the capacity and needs of future generations.

Sustainability Vision:

Virginia Tech serves as a model community for a sustainable society. Sustainability is an integral part of the fabric of the university as it pursues enhanced economic stability and affordability, diversity and inclusion, environmental stewardship, expansion of knowledge, and education of future leaders.

Sustainability Mission:

The pursuit of sustainability is achieved through Virginia Tech's administration; physical environment and operations; student life and experience; campus culture and behavior; and academic learning, discovery, and engagement.

Acronyms:

ASHRAE – American Society of Heating, Refrigerating and Air Conditioning Engineers
GHG – Greenhouse Gas
LEED – Leadership in Energy and Environmental Design
VTCAC&SP - Virginia Tech Climate Action Commitment & Sustainability Plan

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2019 GOVERNOR'S ENVIRONMENTAL EXCELLENCE AWARD

Virginia Tech - Office of Sustainability

WHEREAS, Article XI of the Constitution of Virginia states that "it shall be the Commonwealth's policy to protect its atmosphere, lands, and waters from pollution, impairment, or destruction, for the benefit, enjoyment, and general welfare of the people of the Commonwealth;" and

WHEREAS, the Commonwealth seeks to recognize those who have demonstrated leadership, innovation, and commitment to implement pollution prevention practices to reduce environmental impacts and improve our natural environment; and

WHEREAS, pollution prevention is a cost-effective and environmentally sound approach to environmental management that strives to eliminate or reduce pollution at its source by minimizing the use of energy, water, and other natural resources through increased efficiency and conservation;

NOW, THEREFORE, I, Ralph S. Northam, Governor, do recognize the Virginia Tech, Office of Sustainability, as an Honorable Mention recipient of the 2019 Governor's Environmental Excellence Award for its demonstrated commitment to the stewardship of Virginia's natural resources through its Student Internship Program.

Governor

Secretary of Natural Resources

MARK R. WARNER
VIRGINIA

UNITED STATES SENATOR
WASHINGTON, D.C.

March 28, 2019

Ms. Karlee Siepierski
University Sustainability Manager
Virginia Tech Office of Sustainability
230 Sterrett Drive
Blacksburg, VA 24061-1031

Dear Ms. Siepierski,

I am pleased to extend my warmest congratulations to the Virginia Tech Office of Sustainability upon receiving the 2019 Governor's Environmental Excellence Award Honorable Mention in the Sustainability Program category.

This honor recognizes that your commitment to environmental sustainability has made a lasting impact on the Commonwealth. We are at a decision point and must act now to promote environmental conservation. This award is a testament to the Virginia Tech Office of Sustainability's work in this area; you have exemplified your dedication to protecting the Commonwealth's natural resources through the conservation focus of your student internship program. I commend all those who work with your institution to promote sustainability efforts in Virginia.

On this important occasion, I am very pleased to join with your families, friends, and community in saluting the Virginia Tech Office of Sustainability's accomplishments and wishing you continued success.

Sincerely,

Mark R Warner

MARK R. WARNER
United States Senator

2019
Governor's Environmental Excellence Awards

Environment Virginia Symposium, Lexington • March 28, 2019

The Governor's Environmental Excellence Awards recognize successful and innovative efforts that improve Virginia's environment. The annual awards program is run as a partnership between the Department of Environmental Quality and the Department of Conservation and Recreation.

Capital Region Land Conservancy
Malvern Hill Farm

CAPITAL REGION LAND CONSERVANCY

LAND CONSERVATION **GOLD**

In August 2016, the 871-acre Malvern Hill Farm, which is listed on the Virginia Landmarks Registry and the National Register of Historic Places, was listed for sale for a 515 home residential development project. While many conservation groups had an interest in Malvern Hill, the Capital Region Land Conservancy (CRLC) stepped into a leadership role and ratified a purchase agreement for $6.6 million. As the local land trust for the Richmond region, CRLC coordinated with many partners to finalize a complex arrangement to finance acquisition of the property, secure protections through conservation easements and transfer portions of the land to long-term holders who will manage and make it available for future public access. Preserving Malvern Hill Farm allows the land to continue to be actively farmed and provides the opportunity for cultural tourism and outdoor recreation.

Carilion Clinic
Efficiency and Sustainability Program

CARILION CLINIC

SUSTAINABILITY PROGRAM **GOLD**

Carilion Clinic's Efficiency and Sustainability Program is led by its Environmental Stewardship Council and over 100 Sustainability Champions from various departments who recognize that the health of our environment directly impacts the health of our communities. Carilion Clinic is committed to creating a comprehensive environmental sustainability program and working with its community partners in Southwest Virginia. Through the Efficiency and Sustainability Program, Carilion Clinic has expanded recycling efforts, increased funding to purchase food from local farmers, installed 4,000 solar panels and upgraded lighting. Carilion Clinic has donated over 40 tons of excess medical supplies to support medical education and international missions, sponsored a community bike share program and funded an urban farm which offers produce to anyone who tends the garden or attends on-site health education events.

SPONSORED BY

DEQ Virginia Department of Environmental Quality

DCR Virginia Department of Conservation & Recreation

Chesterfield County Parks and Recreation
Dutch Gap Relic River Trail and Water Access

IMPLEMENTATION OF THE VIRGINIA OUTDOORS PLAN **GOLD**

The Dutch Gap Relic River Trail and Water Access project includes a 430-foot floating boardwalk and launch dock. It is Chesterfield's first interpretive boardwalk featuring a unique portion of the James River that has been separated from the main channel by elimination of oxbows in the river route. The boardwalk's dock includes a fully accessible canoe and kayak launch. This new water access offers a way to reach the non-tidal marsh and, via a wooden portage boardwalk, access the main James River channel. The marsh has a rich history and is unique to the region for the way it was formed and for the fish and wildlife habitat it supports. A need for water access was documented by both the Chesterfield Parks and Recreation Comprehensive Master Plan and the 2017 Virginia Outdoors Demand Survey. Prior to the boardwalk, the non-tidal marsh at Dutch Gap was not accessible to the public.

Hampton Roads Sanitation District (HRSD)
SWIFT Research Center

ENVIRONMENTAL PROJECT **GOLD**

HRSD's Sustainable Water Initiative for Tomorrow (SWIFT) fundamentally changes the way water is managed in eastern Virginia, providing a sustainable source of groundwater to the Potomac aquifer; reducing nutrients discharged to the Chesapeake Bay watershed; protecting the Potomac aquifer from salt water intrusion; and, potentially slowing, stopping or reversing land subsidence related to groundwater withdrawal. The SWIFT Research Center is a multipurpose facility recharging the Potomac aquifer with one million gallons of SWIFT Water daily. SWIFT Water is produced by adding additional advanced water treatment processes to already highly treated wastewater resulting in water that meets safe drinking water standards. Beyond producing SWIFT Water and recharging the aquifer, the SWIFT Research Center is a public education facility, a water treatment and groundwater research facility and an operator training center. Data from the SWIFT Research Center will inform the full-scale implementation of SWIFT at five HRSD facilities over the next 12 years, ultimately recharging the Potomac aquifer with more than 100 million gallons of SWIFT Water daily.

Chesterfield County General Services
Energy Management & Sustainability Program

SUSTAINABILITY PROGRAM **SILVER**

Cfield UNPLUGGED
Don't Be An AMP-Eater

For over 15 years, Chesterfield County has been committed to and continually developing an Energy Management and Sustainability Program. The main functions of the program have been to track and monitor energy use, identify facility improvement measures and consistently work toward improved energy efficiency and sustainability. The facility has conducted energy audits, facility condition assessments, benchmarking, lighting retrofits, and HVAC replacements in addition to participation in efficiency programs such as demand response. The program activities have developed over the years to increasingly include community outreach and education through placement of real-time utility educational kiosks in each middle school, the library system's energy monitoring equipment check-out program, and, most recently, an employee behavior-based energy efficiency initiative called Cfield Unplugged. Energy management initiatives over the past five years have saved the County nearly $5 million dollars.

Prince William County - Department of Fire and Rescue Smarter Chemicals Program

ENVIRONMENTAL PROJECT **SILVER**

Prince William County (PWC) Department of Fire and Rescue worked with others in the County to develop a Smarter Chemicals product list. It was found that the average station had over 40 different cleaning products, compared to an average of eight for custodial companies hired by PWC. At the same time, a review of employee injuries revealed that many "slips and falls" were related to inappropriate dilutions of cleaners leaving floors slick and many "strains and sprains" were related to heavy products. The program has reduced employee injuries, decreased damage to facilities due to improper dilutions, limited exposure to potentially hazardous substances, cut excessive purchasing and the resulting disposal costs, and minimized the effort to maintain Safety Data Sheets. On average, 116 cleaning chemicals with safety hazards were eliminated from each fire station.

Roanoke County Parks, Recreation & Tourism Jae Valley Park

IMPLEMENTATION OF THE VIRGINIA OUTDOORS PLAN **SILVER**

Jae Valley Park resulted from a partnership between Roanoke County and Roanoke City to develop a canoe and kayak launch facility, opening up five miles of Back Creek, which connects to the Roanoke River Blueway. Jae Valley Park encompasses 10 acres along Jae Valley Road with 2,200 linear feet of natural surface walking trails and 1,400 linear feet of frontage along Back Creek with several launch points. The Chairman of Friends of the Rivers of Virginia noticed the property sitting fallow and worked with both the City and County, leading to the City selling the property to the County for $1 as part of a 2016 land swap agreement. Roanoke County will continue to expand and promote the County's outdoor recreational advantages, like Jae Valley Park, which support watershed management protection by encouraging recreational use, protection and environmental stewardship.

Town of Appalachia Powell River Trail & Trailhead

IMPLEMENTATION OF THE VIRGINIA OUTDOORS PLAN **SILVER**

Completed in October of 2017, the Powell River Trail & Trailhead is a rails-to-trails project in the Town of Appalachia that converted an abandoned Louisville & Nashville Railroad line into a multi-use recreation trail that is wheelchair accessible. The project consists of approximately 1.5 miles of paved trail that follows the scenic Powell River and includes two tunnels and two bridges. Additionally, the trailhead area includes parking and is highlighted by a refurbished Norfolk & Western train caboose. Funded by VDOT and maintained by the Town of Appalachia, the project is an outstanding addition to the regional outdoor recreation initiative which has stimulated recreational and economic growth in the area. To capitalize on the success and interest the project has generated, the Town is developing a Comprehensive Outdoor Recreation Plan.

Virginia State University
Simms Hall Demolition and Site Redevelopment

ENVIRONMENTAL PROJECT BRONZE

In April 2017, the Virginia State University (VSU) Board of Visitors approved the demolition of Simms Hall following a 2016 fire that caused significant structural damage to the building. VSU contacted the Virginia Department of Corrections (VADOC) about partnering for the project. As part of the Governor's Re-entry Initiative, offenders gain job experience in general construction while also learning about green projects.

VSU and VADOC strove to reduce the amount of material disposed. Due to meticulous separation of building materials, 64 tons of wood and 94 tons of steel were diverted from landfills. The Simms pad site is now being redeveloped as a river overlook area with improved stormwater drainage and safety features such as site lighting and railings.

Wärtsilä Defense, Inc.
WDI Environmental Sustainability Program

SUSTAINABILITY PROGRAM BRONZE

In its work to build and repair propulsion systems, Wärtsilä Defense Inc. (WDI) holds an international, third-party certification for meeting high standards of environmental management system implementation (ISO 14001:2015). The Chesapeake facility touts zero landfill waste and has continually reduced electrical consumption since 2009. Since initiating the phased LED re-lamping, electrical consumption is down 313 MWh, reducing CO2 emissions by about 231 tons and saving the company around $25,000. In 2018 WDI recycled or repurposed over 38 tons of trash. The priority is: repurpose for company use, repurpose by employees, recycle, send to incinerator for energy production. In addition, WDI sponsored the first "Seabin" on the East Coast to collect marine debris at Nauticus.

Virginia Tech - Office of Sustainability
Student Internship Program

SUSTAINABILITY PROGRAM – HONORABLE MENTION

Wild Wolf Brewing
Every Day is Earth Day

SUSTAINABILITY PROGRAM – HONORABLE MENTION

For information about the Governor's Environmental Excellence Awards, visit
www.deq.virginia.gov/Programs/PollutionPrevention/GovernorsEnvironmentalExcellenceAwards.aspx

VIRGINIA TECH
LEED PROGRAM SUMMARY

GOODWIN HALL – LEED GOLD
Academic Building - (GSF 154,935)

MOSS ARTS CENTER – LEED GOLD
Center for the Arts – (GSF 147,382)

	Number of Buildings	Gross Sq. Ft. (GSF)
❑ **Projects Completed:**		
✓ LEED Certification - *Achieved*	16	1,302,345
▪ LEED Certification - *Pending*	4	235,296
❑ **Projects under Construction:**		
▪ LEED *Registered*	5	213,147
❑ **Projects under Design:**		
▪ LEED *Registered*	7	790,646
❑ **Total:**	32	2,541,434

AMBLER JOHNSTON HALL – LEED GOLD
Residence Hall (GSF 269,463)

OFFICE OF SUSTAINABILITY
FACILITIES DEPARTMENT

HUMAN & AGRICULTURAL BIOSCIENCES BUILDING I – LEED GOLD
Research Building (GSF 93,860)

VIRGINIA TECH LEED BUILDINGS STATUS - 2019-07-09

PROJECT	PROJECT #	BUDGET	GSF	CONSTRUCTION START	OCCUPANCY DATE	STATUS	LEED CERTIFICATION ACHIEVED	DATE OF CERTIFICATION
PROJECTS COMPLETED - LEED CERTIFICATION ACHIEVED								
Henderson Hall Renovation & Theater 101 Addition	208-16758-001	$15,838,792	38,750	02/18/08	08/14/09	Project Complete	Gold	02/01/10
Football Locker Room Addition	208-L00016-000	$14,004,621	42,145	07/08/09	06/21/11	Project Complete	Silver	10/01/11
Institute for Critical Technology & Applied Science Ph.II (ICTAS II)	208-17291-000	$34,587,710	42,190	04/08/09	04/06/11	Project Complete	Gold	11/01/11
Visitors & Undergraduate Admissions Center	208-L00012-000	$10,338,192	18,155	03/23/10	08/29/11	Project Complete	Certified	08/01/12
Academic & Student Affairs Building (Lavery Hall)	208-17859-000	$44,302,610	77,301	07/29/10	09/05/12	Project Complete	Silver	04/01/13
Vet Med Instructional Addition	208-19791-000	$12,343,316	24,600	07/26/11	11/05/12	Project Complete	Silver	06/01/13
Ambler Johnston Hall - Improve Residential & Dining Halls	208-17557-000	$66,968,679	269,463	05/26/09	06/25/12	Project Complete	Gold	11/01/13
Chiller Plant Phase I (Southwest Chiller Plant)	208-17657-000	$20,097,729	16,655	03/22/12	06/14/13	Project Complete	Silver	11/01/13
Moss Arts Center (Center for the Arts)	208-16758-002	$100,087,000	147,382	08/10/10	08/21/13	Project Complete	Gold	05/01/14
Human & Agricultural Biosciences Building I (HABBI)	229-17681-000	$53,759,344	93,860	12/22/11	03/10/14	Project Complete	Gold	04/17/15
Indoor Athletic Training Facility	208-17296-000	$21,300,000	91,600	04/23/14	06/25/15	Project Complete	Silver	10/05/15
Goodwin Hall (Signature Engineering Building)	208-17658-000	$95,218,249	154,935	09/13/11	05/29/14	Project Complete	Gold	10/28/15
Renovate Davidson Hall	208-17662-000	$32,003,099	44,845	02/17/12	06/08/14	Project Complete	Certified	03/11/16

VIRGINIA TECH LEED BUILDINGS STATUS - 2019-07-09

PROJECT	PROJECT #	BUDGET	GSF	CONSTRUCTION START	OCCUPANCY DATE	STATUS	LEED CERTIFICATION ACHIEVED	DATE OF CERTIFICATION
PROJECTS COMPLETED - LEED CERTIFICATION ACHIEVED								
Pearson Hall (Upper Quad Residential Facilities)	208-L00031-000	$45,500,000	111,191	10/14/13	01/24/17	Project Complete	Silver	12/16/16
Oak Lane Phase IV	208-L00021-002	$5,132,300	20,508	08/29/11	01/04/13	Project Complete	Silver	10/04/17
New Cadet Hall (Upper Quad Residential Facilities)	208-L00031-000	$45,000,000	108,765	10/14/13	04/27/17	Project Complete	Silver	06/01/18
Total GSF:			1,302,345					

VIRGINIA TECH LEED BUILDINGS STATUS - 2019-07-09

PROJECT	PROJECT #	BUDGET	GSF	CONSTRUCTION START	OCCUPANCY DATE	STATUS	LEED CERTIFICATION PENDING	DATE OF CERTIFICATION
PROJECTS COMPLETED - LEED CERTIFICATION PENDING								
New Classroom Building	208-17995-000	$40,851,740	72,275	01/26/15	08/17/16	Project Complete	Silver	Pending
O'Shaughnessy Hall Renovations	208-L00044-000	$21,593,211	69,200	05/17/17	08/01/18	Construction	Silver	Pending
Rector Field House (Athletic Facilities Improvements)	208-L00037-001	$18,595,000	43,949	12/01/16	02/03/18	Construction	Silver	Pending
Baseball Facilities (Athletic Facilities Improvements)	208-L00037-002	$18,496,000	49,872	02/01/17	02/03/18	Construction	Silver	Pending
Total GSF:			235,296					

VIRGINIA TECH LEED BUILDINGS STATUS - 2019-07-09

PROJECT	PROJECT #	BUDGET	GSF	CONSTRUCTION START	OCCUPANCY DATE	STATUS	LEED CERTIFICATION ANTICIPATED	DATE OF CERTIFICATION
PROJECTS UNDER CONSTRUCTION LEED REGISTERED								
Sandy Hall (Renovate/Renew Academic Bldgs.)	208-18065-000	$30,563,000	19,889	01/04/17	05/01/19	Construction	Silver	-
Liberal Arts Building (Renovate/Renew Academic Bldgs.)	208-18065-000	(see above)	15,394	01/04/17	05/01/19	Construction	Silver	-
Davidson Hall (Renovate/Renew Academic Bldgs.)	208-18065-000	(see above)	25,151	01/04/17	05/01/19	Construction	Silver	-
Undergraduate Science Laboratories - Renovations (Derring Hall)	208-L00046-000	$600,000	13,127	10/15/18	10/14/19	Construction	Silver	-
VT Carilion (VTC Biomedical Research Expansion)	208-18269-000	$85,574,000	139,586	02/05/18	04/20/20	Construction	Silver	-
Total GSF:			213,147					

VIRGINIA TECH LEED BUILDINGS STATUS - 2019-07-09

PROJECT	PROJECT #	BUDGET	GSF	CONSTRUCTION START	OCCUPANCY DATE	STATUS	LEED CERTIFICATION ANTICIPATED	DATE OF CERTIFICATION
PROJECTS UNDER DESIGN - LEED REGISTERED								
Corps Leadership & Military Science Building	208-L00043-000	$40,000,000	60,500	TBD	TBD	Design	Silver	-
Multi-Modal Transit Facility	CP-2029	$38,000,000	13,606	05/18/20	05/23/22	Design	Silver	-
Holden Hall Renovation	208-18267-000	$73,500,000	101,240	08/15/19	10/29/21	Design	Silver	-
Student Athlete Performance Center	208-L00056-000	$16,681,500	25,800	08/08/19	01/31/21	Design	Silver	-
Student Wellness Improvements	208-18357-000	$58,000,000	263,000	12/11/19	08/18/21	Design	Silver	-
Undergraduate Science Laboratories - New Construction	208-18332-000	$74,800,000	102,000	03/27/20	01/17/22	Design	Silver	-
Creativity & Innovation District Living Learning Community (CID-LLC)	208-L00060-000	$105,500,000	224,500	03/04/19	06/15/21	Design	Silver	-
Total GSF:			790,646					

Locality Recycling Rate Report **For Calendar Year 2018**

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Commonwealth of Virginia Locality Recycling Rate Report For Calendar Year 2018

Contact Information

Reporting Solid Waste Planning Unit: Virginia Tech

Person Completing This Form: Dennis C. Cochrane

Title: Director, Office of Sustainability, Facilities Department

Address: Sterrett Center (Mail Code 0529), 230 Sterrett Drive, Blacksburg, Virginia 24061

Phone #: (540) 231-5184 **Email Address:** denniscc@vt.edu

Summary: Virginia Tech, the Town of Blacksburg, the Town of Christiansburg, and Montgomery County are the four jurisdictional members of the "Montgomery Regional Solid Waste Authority (MRSWA). Located in Christiansburg, MRSWA operates a transfer facility that receives the majority of our principal recyclable materials (PRMs), and all of our municipal solid waste (MSW). Virginia Tech uses a "Single Stream" Recycling System. Recyclable materials are transported from the university to MRSWA, weighed, and further transported to "Recycling & Disposal Solutions (RDS)." RDS serves as the recycling "hub" for our region receiving materials from both the New River and Roanoke Valleys. Food waste is collected from our 11 on-campus dining facilities and stored at a central location in a 10 ton "sledge" container. When the container is full, "Royal Oak Farm (ROF)" transports it to their composting facility located near Lynchburg, Virginia. Solid Waste materials are transported to MRSWA, weighed, and further transported to the local landfill operated by the "New River Resource Authority (NRRA)" in Pulaski County near Dublin, Virginia. MRSWA prepares a consolidated recycling rate report for our region to include the four jurisdictional members, and submits it to the Commonwealth of Virginia Department of Environmental Quality (DEQ). Virginia Tech uses this DEQ format to calculate our base recycling rate, our waste diversion rate, and our final recycling rate. **For Calendar Year 2018 our base recycling rate was 35.5%, our waste diversion rate was 69.9% (percentage of waste kept out of the local landfill), and our final recycling rate was 40.8% (see data and calculations on page 2).**

Data in this report was collected from our recycling and solid waste facilities and campus stakeholders. I certify that I have personally examined, and am familiar with, the information submitted in this form and any attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Dennis C. Cochrane	Director, Office of Sustainability	March 29, 2019
Authorized Signature	Title	Date

Locality Recycling Rate Report **For Calendar Year 2018**

PART A: Recycling Rate Calculation - Using the formulae provided below and the information reported on Pages 3, 4 and 5 to calculate your recycling rates.

Step 1: [(PRMs) / (PRMs + MSW Disposed)] X 100 = Base Recycling Rate %

2,242	/	2,242	+	4,018	X 100 =	35.8	%
TONS		TONS		TONS			

Step 2: CREDITS calculation

a. Total Recycling Residue	0	tons
b. Total Solid Waste Reused	17	tons
c. Total Non-MSW Recycled	7,056	tons
CREDITS	**7,073**	**tons**

Step 3: [(PRMs + CREDITS) / (PRMs + CREDITS + MSW Disposed)] X 100 = Adjusted Recycling Rate #1*

2,242	+	7,073	/	2,242	+	7,073	+	4,018	X 100 =	69.9	%
TONS		TONS		TONS		TONS		TONS			

Step 4: ☐ **Source Reduction Credit does not apply; or**

☒ **Adjusted Recycling Rate #1 + 2% SRP Credit = Adjusted Recycling Rate #2***

69.9	%	+ 2%	=	71.9	%

Step 5: Final Recycling Rate* for Solid Waste Planning Unit = 40.8 **%**

*** Total credits resulting from Steps 3 and 4 may not exceed 5 percentage points above the Base Recycling Rate achieved by the Solid Waste Planning Unit.**

Locality Recycling Rate Report **For Calendar Year 2018**
PART B: DATA

Part I: Principal Recyclable Materials (PRMs): Report only PRM material generated within the reporting SWPU and recycled, NOT imported PRMs for recycling.

PRM TYPE	RECYCLED AMOUNT (TONS)
Paper	458
Metal	101
Plastic	0
Glass	0
Commingled (also known as Single Stream)	456
Yard Waste (composted or mulched)	260
Waste wood (chipped or mulched)	175
White Goods	8
Tires	4
Used Oil	5
Used Oil Filters	1
Batteries	9
Electronics	7
Fluorescent Bulbs & Ballasts	29
Food Waste Organic - Composting	679
Waste Cooking Oil	50
TOTAL PRMs	**2,242 (PRMs)**

(Enter Total on Page 2, Step 1)

Listing of sources for PRM data ***(consider only Virginia generated waste material)***

1. Permitted solid waste facilities from which MSW disposed/recycled data was collected:
   a. Department of Facilities: Office of Sustainability
   b. Department of Facilities: Operations (Buildings & Grounds)
   c. Department of Facilities: Capital Construction & Renovation
   d. Department of Environmental Health & Safety
   e. Division of Student Affairs: Dining Services
   f. Division of Student Affairs: Housing and Residence Life
   g. Department of Parking & Transportation: Fleet Services
   h. Department of Human Resources
   i. Athletic Department

2. Other facilities/operations (not included in #1 above) from which MSW disposed/recycled data was collected:
   a. Montgomery Regional Solid Waste Authority (MRSWA)
   b. YMCA at Virginia Tech (Ytoss? Partnership with VT)
   c.
   d.
   e.
   f.
   g.
   h.
   i.

Locality Recycling Rate Report **For Calendar Year 2018**

Part II: Credits by Category (see Credits Worksheet, Page 5)

A. Recycling Residue – "Recycling residue" means the (i) nonmetallic substances, including but not limited to plastic, rubber, and insulation, which remain after a shredder has separated for purposes of recycling the ferrous and nonferrous metal from a motor vehicle, appliance, or other discarded metallic item and (ii) organic waste remaining after removal of metals, glass, plastics and paper which are to be recycled as part of a resource recovery process for municipal solid waste resulting in the production of a refuse derived fuel. (§ 10.1-1400 of the *Code of Virginia*) (use only SWPU generation)

MATERIAL DESCRIPTION	FACILITY/OPERATION	TONS OF MATERIAL
_____	from _____	_____
_____	from _____	_____
_____	from _____	_____
	TOTAL RECYCLING RESIDUE	_____

(Enter Total on Page 2, Step 2 a)

B. Solid Waste Re-Used

MATERIAL DESCRIPTION	REUSE METHOD	TONS OF MATERIAL
Furniture/Appliances	Ytoss? Program (Partnership with YMCA)	7
Food Donation	Campus Kitchen Program (Dining Services	10
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	TOTAL SOLID WASTE REUSED	**17**

(Enter Total on Page 2, Step 2 b)

C. Non-Municipal Solid Waste (MSW) Recycled

MATERIAL DESCRIPTION	RECYCLING METHOD	TONS OF MATERIAL
Asphalt	VDOT Roadwork & Parking Lot Milling	6,658
EPDM Materials	Membrane and Roofing (McComas Hall)	2
Concrete/Masonry/Asphalt	Davidson/Sandy/Lib Arts Bldg Halls	396
_____	_____	_____
	TOTAL NON-MSW RECYCLED	**7,056**

(Enter Total on Page 2, Step 2 c)

Locality Recycling Rate Report **For Calendar Year 2018**

D: A credit of two (2) percentage points may be added to the Adjusted Recycling Rate #1 if the Solid Waste Planning Unit has implemented a Source Reduction Program (SRP). Examples of SRPs include Grass-cycling, Home Composting, Clothing Reuse, Office Paper Reduction (duplexing), Multi-Use Pallets, or Paper Towel Reduction. The SRP must be included in the Solid Waste Management Plan on file with the Department:

SRP description: Ytoss? 2018 (partnership with the YMCA at Virginia Tech & the university) collected 7 tons of reusable items in residence halls during spring move-out.

SRP description: Campus Kitchen Program has provided 10 tons of food donations from our dining facilities to families in need in the Blacksburg Community

SRP description: The student Green RFP Program (unique to VT) has providing funding for reusable to-go food containers for use in four on-campus dining facilities.

(Certify on Page 2, Step 4)

Exclusions: For the purposes of this report, the following materials are not considered solid wastes, and should not be included in any of the data categories utilized in calculating the recycling rate.

1. **Biosolids –industrial sludge, animal manures; or, sewage sludge (unless composted)**
2. **Automobiles – unless part of the Inoperable Vehicle Program (DMV)**
3. **Leachate**
4. **Soils – contaminated soils, soil material from road maintenance**
5. **Household hazardous waste**
6. **Hazardous waste**
7. **Medical waste**
8. **Rocks or stone**
9. **Woody waste derived from land clearing for development, VDOT or easement tree trimming/clearing.**

Part III: Total Municipal Solid Waste (MSW) Disposed** - Report only MSW generated within the reporting jurisdiction(s), NOT imported wastes or industrial wastes.

MSW TYPE	TOTAL AMOUNT of MSW DISPOSED (TONS)
Household	
Commercial	
Institutional	
Other (DO NOT INCLUDE INDUSTRIAL WASTES)	4,018
TOTAL MSW DISPOSED	4,018

(Enter Total on Page 2, Step 1 and Step 3)

***Note: MSW DISPOSED** for the purpose of this report means delivered to a permitted sanitary landfill, delivered to a waste-to-energy facility, or managed at a transfer station for transport to a landfill or waste-to-energy facility.*

Locality Recycling Rate Report **For Calendar Year 2018**

Credits Worksheet

I. Reuse of any Solid Waste

√		Material description	Tons
___	PRM		
___	PRM		
___	PRM		
___	Industrial		
___	Construction		
___	Demolition		
___	Debris		
___	Other		
_X_	Ytoss? Program	Res Hall used furniture/appliances	7
_X_	Campus Kitchen	Donated Food Program (Dining Svcs)	10
		TOTAL TONS	**17**

(enter data on Page 4, Solid Waste Re-Used)

II. Recycling of any Non-Municipal Solid Waste

√		Material description	Tons
_X_	Roadwork	Asphalt (New Campus Entrance)	4,460
_X_	Roadwork	Asphalt (Alumni Mall Entrance)	2,198
_X_	Roofing	EPDM Material (McComas Hall)	2
_X_	Construction	Concrete/Msnry/Asphlt (Davidson)	42
_X_	Construction	Concrete/Msnry/Asphlt (Sandy)	300
_X_	Construction	Concrete/Msnry/Asphlt (Lib Arts)	54
___	Other		
		TOTAL TONS	**7,056**

(enter data on Page 4, Non-MSW Recycled)

III. Inoperable Vehicles Removed and Demolished – include number of vehicles that the localities received reimbursement from DMV under §46.2-1207 of the Code of Virginia.

# of vehicles removed/reimbursement received	0
Average tonnage per vehicle	X 1 Ton each
Total Tons	**0**

(enter data on Page 3, PRMs, Inoperative Motor Vehicle Program)

NOTE: Check "Exclusions" on Page 5 to avoid listing of those materials on this worksheet and/or in the data fields of this report.

Locality Recycling Rate Report — For Calendar Year 2018

Part C: Recycling Rate Report Instructions

Amended Regulations for the Development of Solid Waste Management Plans (9 VAC 20-130-10 et seq.) require that Solid Waste Planning Units (SWPUs) in the Commonwealth develop complete, revised solid waste management plans. Section 9 VAC 20-130-120 B & C of the Regulations requires that a minimum recycling rate of the total municipal solid waste generated annually in each solid waste planning unit be maintained. It also requires that the plan describe how this rate shall be met or exceeded and requires that the calculation methodology be included in the plan. Section 9 VAC 20-130-165 D establishes that every solid waste management planning unit with populations over 100,000 shall submit to the department by April 30 of each year, the data and calculations required in 9 VAC 20-130-120 B & C for the preceding calendar year. SWPUs with populations of 100,000 or less are only required to report every 4 years (CY years 2016 and forward).

NOTE: ONLY RECYCLING RATE REPORTS FROM AN APPROVED SOLID WASTE PLANNING UNIT (SWPU) WILL BE ACCEPTED FOR PROCESSING. JURISDICTIONS WITHIN A SWPU MUST SUBMIT THEIR RECYCLING DATA TO THE SWPU FOR INCORPORATION INTO THE ANNUAL REPORT.

It is requested that all amounts included on the form be listed in **tons (2,000 pounds)**, rounded to the nearest whole ton. If actual weights are not known, volumes can be converted to weight estimates. To assist you with these estimates, a standardized volume-to-weight conversion table is attached.

Contact Information Section: Please provide information on the Reporting SWPU and information on the individual completing this form. Under Member Governments, please list the local governments identified in the applicable solid waste management plan.

Calculated Recycling Rate Section: Using the formulae provided, calculate your recycling rates for the reporting period from information identified in the Recycling Rate Calculations Section.

Signature Block Section: Please provide an authorized signature prior to submitting the completed form. Authorized signatories include Executive Officer, Administrator, or other legally designated representative of the SWPU reporting entity.

Recycling Rate Calculations Section: Please provide the requested information:

Part I: Principal Recyclable Material (PRM) - Report the amount in tons of each PRM collected for recycling in the named jurisdiction(s) during the reporting period. PRMs include paper, metal, plastic, container glass, commingled, yard waste, waste wood, textiles, tires, used oil, used oil filters, used antifreeze, batteries, electronics, and other materials approved by the Director taken from the Municipal Solid Waste (MSW) generation. A one ton credit may also be entered for each inoperable motor vehicle for which a locality receives reimbursement from the Virginia Department of Motor Vehicles under §46.2-1207 of the *Code of Virginia*. The total weight in **TONS** of all PRMs collected for recycling is represented as **PRMs** in the Recycling Rate Calculation. **New for CY 2015: Provide source information for the PRMs reported on the report (permitted and unpermitted facilities).**

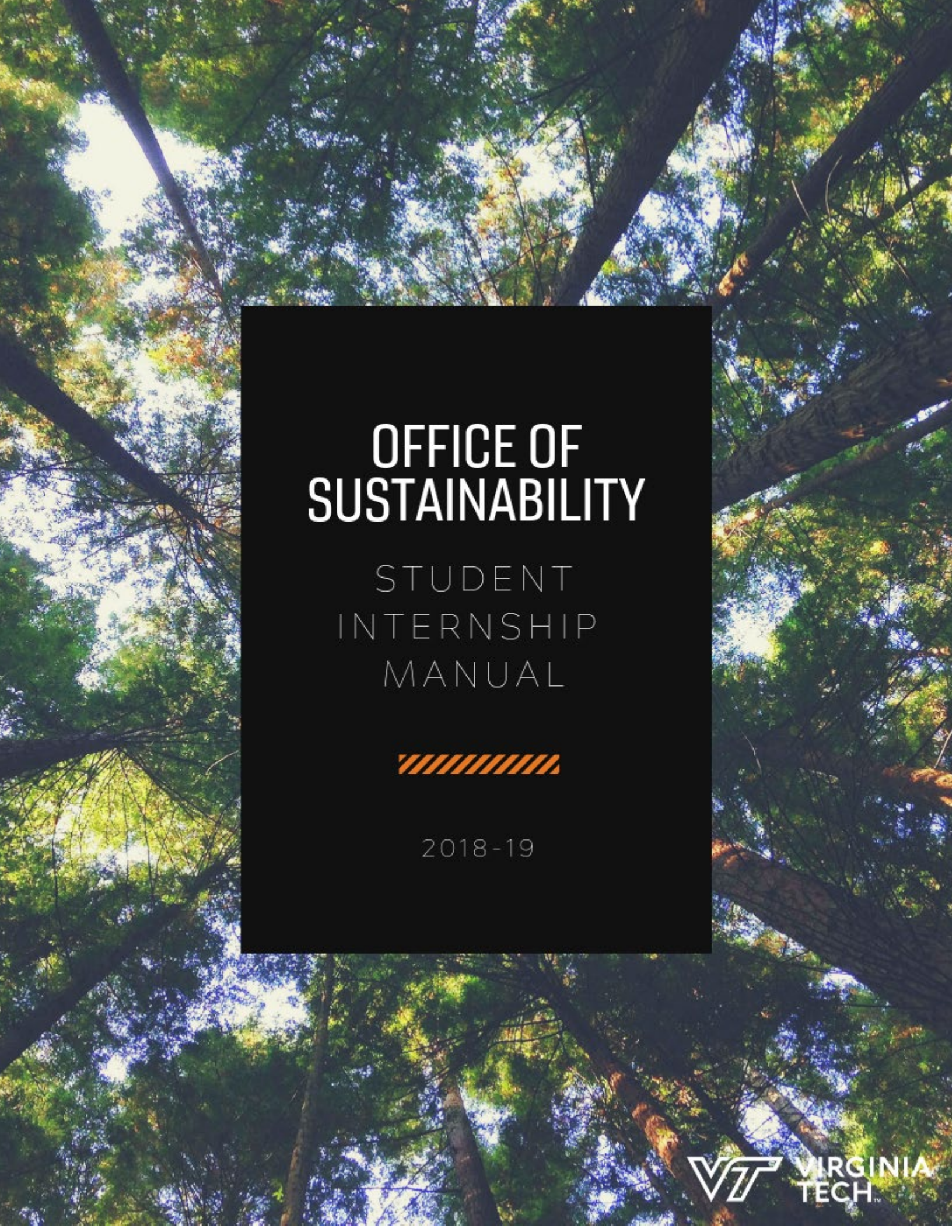
Part II: Credits - Report the amount in **TONS** of each material for which recycling credit is authorized in §10.1-1411.C of the *Code of Virginia*: (i) one ton for each ton of recycling residue generated in Virginia and deposited in a landfill permitted under §10.1-1408.1 of the *Code of Virginia*; (ii) one ton for each ton of any solid waste material that is reused; and, (iii) one ton for each ton of any non-municipal solid waste that is recycled. The total weight in **TONS** of all material for which credits are authorized is represented as **CREDITS** in the Recycling Rate Calculation. A credit of two percentage points of the minimum recycling rate mandated for the Solid Waste Planning Unit (SWPU) may be taken for a source reduction program that is implemented and identified in its Solid Waste Management Plan. Total credits may not exceed five percentage points above the Base Recycling Rate achieved by the SWPU.

Part III: Total Municipal Solid Waste (MSW) Disposed: Report the total amount in **TONS** of MSW that was disposed of by the Solid Waste Planning Unit (SWPU) during the reporting period for each of the source categories (Household, Commercial, Institutional, and Other). For the purpose of this report, "disposed," means delivery to a permitted sanitary landfill or waste incinerator for disposal, and excludes industrial wastes. Industrial waste and by-products should not be included in the MSW or Recycling calculation. The total weight in tons of MSW disposed is represented as **MSW Disposed** in the Recycling Rate Calculation.

Locality Recycling Rate Report Volume to Weight Conversion Table

Material	Volume	Weight in Pounds
Metal		
Aluminum Cans, Whole	One cubic yard	50-74
Aluminum Cans, Flattened	One cubic yard	250
Aluminum Cans	One full grocery bag	1.5
Ferrous Cans, Whole	One cubic yard	150
Ferrous Cans, Flattened	One cubic yard	850
Automobile Bodies	One vehicle	2,000
Paper		
Newsprint, Loose	One cubic yard	360-800
Newsprint, Compacted	One cubic yard	720-1,000
Newsprint	12" stack	35
Corrugated Cardboard, Loose	One cubic yard	75-100
Corrugated Cardboard, Baled	One cubic yard	1,000-2,000
Plastic		
PETE, Whole, Loose	One cubic yard	30-40
PETE, Whole, Loose	Gaylord	40-53
PETE, Whole, Baled	30" x 62"	500
Film, Baled	30" x 42" x 48"	1,100
Film, Baled	Semi-Load	44,000
Film, Loose	Standard grocery bag	15
HDPE (Dairy Only), Whole, Loose	One cubic yard	24
HDPE (Dairy Only), Baled	32" x 60"	400-500
HDPE (Mixed), Baled	32" x 60"	900
Mixed PET & Dairy, Whole, Loose	One cubic yard	32
Mixed PET, Dairy & Other Rigid (Whole, Loose)	One cubic yard	38
Mixed Rigid, No Film	One cubic yard	49
Glass		
Glass, Whole Bottles	One cubic yard	600-1,000
Glass, Semi-Crushed	One cubic yard	1,000-1,800
Glass, Crushed (Mechanically)	One cubic yard	800-2,700
Glass, Whole Bottles	One full grocery bag	16
Glass, Uncrushed to Manually Broken	55 gallon drum	125-500
Arboreal		
Leaves, Uncompacted	One cubic yard	200-250
Leaves, Compacted	One cubic yard	300-450
Leaves, Vacuumed	One cubic yard	350
Wood Chips	One cubic yard	500
Grass Clippings	One cubic yard	400-1,500
Other		
Battery (Heavy Equipment)	One	60
Battery (Auto)	One	35.9
Used Motor Oil	One gallon	7.4
Used Oil Filters (Uncrushed)	55 gallon drum	66 Lbs./Used Oil + 110 Lbs./Ferrous Metal
Used Oil Filters (Crushed)	55 gallon drum	16.5 Lbs./Used Oil + 368 Lbs./Ferrous Metal
Tire - Passenger Car	One	20
Tire - Truck, Light	One	35
Tire - Semi	One	105
Antifreeze	One gallon	8.42
Food Waste, Solid & Liquid Fats	55 gallon drum	412
Electronics: CRT/CPU/LapTop/TV	Each (avg wt from NCER)	38/26/8/49 respectively

This Table For General Guidance Only.



OFFICE OF SUSTAINABILITY

STUDENT INTERNSHIP MANUAL

2018-19

VIRGINIA TECH

Table of Contents

Office of Sustainability Overview

The Office of Sustainability acts as a central hub to connect the many sustainability champions and efforts taking place all across campus. The Office of Sustainability strives to create a more sustainable future for Virginia Tech through engaging the entire university community and creating positive change. The Office of Sustainability also works to educate the Virginia Tech community about how to live a more sustainable lifestyle through behavior change and an understanding of the impacts one's personal actions can have on a global scale.

The Office of Sustainability was formed through the Virginia Tech Climate Action Commitment (VTCAC), which was affirmed in 2009 and serves as the guiding document to steer the university toward a greener, more sustainable future. Among the 14 goals in the plan, it commits the university to reaching a 50 percent recycling rate by 2020, improving energy efficiency where and whenever possible in campus buildings, achieving a minimum LEED Silver rating for all new construction, and reducing carbon dioxide emissions by 80 percent below 1990 levels by 2050.

The Climate Action Commitment defines sustainability as: "*the simultaneous pursuit of environmental quality, economic prosperity, and social justice and equity, through action, education, and engagement to address current needs without compromising the capacity and needs of future generations."* The Climate Action Commitment also defines the duties of the Office of Sustainability:

"5. Virginia Tech will maintain a sustainability office to:

a. Coordinate programs for campus sustainability,

b. Oversee implementation of the VTCAC,

c. Monitor annual electricity and other energy use and GHG emissions, and

d. Working with faculty and departments, manage a campus-wide student internship and undergraduate research program using the campus as a sustainability laboratory, and

e. Coordinate communication regarding campus sustainability initiatives and programs to the university community and external audiences."

Internship Program Vision & Mission

Our vision extends to both the campus and the surrounding community. Our vision is to create a sustainability network of student and community leaders throughout Virginia Tech, Blacksburg, and the greater New River Valley. To reach this vision, we utilize our campus as a sustainability living-learning laboratory; providing students with experiential learning opportunities to explore real-world problems and lead in the development of innovative solutions. Operations, engagement, and academics are integrated into impactful projects that benefit students and the local community.

The mission of the Student Internship Program is to provide students with valuable opportunities to create lasting, sustainable change at Virginia Tech while developing their professional skills and expanding their knowledge of the inner workings of the university. The program encourages ownership, creativity, and collaboration to solve some of the toughest sustainability problems our world is facing today. Our program blends real-world projects with practical, skills-based professional development workshops to prepare students for an ever-changing career in the sustainability field.

Expectations

What you can expect from the Office of Sustainability:

You can expect to develop your professional skills, work on outcome-driven projects, and have the opportunity to make lasting, sustainable change on campus and in the surrounding community. You can expect communication, support, and resources from the Office of Sustainability. You can also expect career-based opportunities such as conferences, peer networking, and guest speakers from relevant fields.

What the Office of Sustainability expects from you:

- **Commitment**: You are expected to work 8-10 hours per week on internship duties. This includes group meetings, team meetings, individual project work, and planning or attending events. You will be evaluated each semester on your performance and commitment to your team.
- **Participation**: Volunteer for other teams' events; engage and contribute to the group during meetings. Each intern is required to participate in 5 hours of event assistance for a team/organization other than your own.
- **Punctuality**: Show up on time and ready to go at meetings, events, and workshops.
- **Professionalism**: Always conduct yourself in a professional manner. You will be expected to exercise the following skills: time management, strategic decision making, adaptability, and project management. This experience is preparing you for a real-world career in a fast-paced field.
- **Attendance**: You are expected to attend all meetings and workshops, as well as events hosted by your team. Missing 3 or more meetings is subject to dismissal from the program.
- **Authenticity**: Leave your comfort zone, learn something new, listen with an open mind, and connect to something you are passionate about. But most importantly, have fun!

Team Descriptions

Energy

The energy team works to reduce energy use on and off campus and decrease Virginia Tech's carbon footprint. The team will complete projects in partnership with the Office of Energy Management as well as other campus departments and organizations. Members will also engage students, faculty, and staff to educate individuals on energy saving practices.

Water

The water team works to improve a variety of site, infrastructure, and water issues on campus; including stormwater management, grounds maintenance & development, and water conservation practices. The team will work with the Office of University Planning, Site & Infrastructure Development, and other campus departments and organizations. Members will also engage the campus community to promote water conservation practices that can be applied in everyday life.

Food

The food team works to critically assess the sourcing, consumption, and disposal of food on Virginia Tech's campus and within the dining halls. The team will work with Sustainable Dining as well as other campus departments and organizations. Members will also promote locally sourced food and work to decrease food waste on campus through campaigns marketed toward the university community.

Waste

The waste team works to reduce the amount of waste that is produced at Virginia Tech, and to dispose, recycle, or reuse where appropriate. Waste is inclusive of trash, recycling, and compost material. The team will work with Sustainable Dining, the Office of University Planning, and other campus departments and organizations. Members will also engage the campus community to promote proper waste sorting and reuse of items to decrease Virginia Tech's environmental footprint.

Team Leaders

Team leaders will be responsible for ensuring project work is completed, deadlines are met, and promoting cohesive team work. Team leaders will report directly to the Campus Sustainability Planner and project partners, and will be accountable for the team's performance.

Communications Representatives

Communications Representatives (comms reps) will be responsible for social media management, content creation, and photo/video coverage of campus events. Comms reps will also serve as the liaison to the Event Planning office to create reservations for space, a-frames, advertising, etc. Members are expected to meet weekly with the Campus Sustainability Planner to discuss each team's communication needs and schedule social media posts.

Program Components

Work Plans

Each semester, your team will put together a work plan that contains the following components:

- **Team Charter**: This is a document that outlines how your team will function together successfully. It will include team roles, decision-making guidelines, conflict resolution process, work distribution, team expectations, and communication between team members. Over the summer, you will be developing Team Charters with assistance from the Campus Sustainability Planner.

- **Projects, events, & campaigns**: In this portion of the work plan, you will list the projects or campaigns your team will be completing. With each project, you will also need to list the purpose, goals, dates & deadlines, metrics to track for success, and anticipated needs (partner organizations, supplies, communications).

Partner Projects

Each team will be working in partnership with a campus department on a project with measurable sustainability outcomes. Over the summer, the Campus Sustainability Planner will provide each team with their Partner Project Portfolios, outlining important contacts, goals, deadlines, and outcomes.

Major Outreach Events

The Office of Sustainability takes part in many major outreach events around campus, including:

- **GobblerFest**: Gobblerfest is an annual festival intended to engage students in campus activities and connect with the surrounding community while inspiring curiosity, civility and self-understanding. Gobblerfest was conceived in the fall of 2008 as a welcome festival for students, staff, faculty and members of the Blacksburg community. This free event has become a highlight of the start of the academic year. At this event, you will table along with your fellow teammates to educate the campus community on Office of Sustainability programs.

- **Sustainability Week**: This is a partnership with the Town of Blacksburg and the citizens group Sustainable Blacksburg that began in 2007. It is a week-long event that engages campus and the broader New River Valley community. The goal of Sustainability Week is to celebrate all of the wonderful progress both the Town and the university have made in creating a more sustainable community, educate students and citizens alike about how to make their personal lives more sustainable, and motivate them to take real, tangible actions towards being a model green citizen. Sustainability week usually takes place during the 3rd week of September, and interns are expected to volunteer and attend VT-sponsored events.

- **Green Tailgating**: This event was started by an Office of Sustainability intern, and aims to increase Virginia Tech's recycling practices during home football games. As an intern, you will join our Green Team during tailgate hours to pass out blue recycling bags to football fans and increase our recycling rate for these events.

- **WellFest:** WellFest takes place during the first week of the Spring semester and provides a chance for students to explore their own wellness with exhibitors from on and off campus. Students can learn about many opportunities to assist on their wellness journey. Sustainability is a key aspect of wellness, and as interns, you can expect to table at this event and think creatively about the relationship between sustainability and wellness.

- **Earth Week**: Earth Day 2019 occurs on Monday, April 22nd. Earth Week activities are led by the student organization the Environmental Coalition at Virginia Tech, with the support of the Office of Sustainability. All interns will help plan the week's events, and each team will host one event during Earth Week.

- **Intern Team outreach events**: Each team will host 1 – 2 outreach events per semester (not including Sustainability Week or Earth Week). These events can align with national campaigns such as World Water Day or RecycleMania, holidays such as Halloween or Valentine's Day, or campus initiatives such as the OZZI

program or Y-Toss. Outreach events aim to foster peer-to-peer learning and target behavior changes that resonate with the campus community.

Career & Professional Development CEIP

The Office of Sustainability has partnered with Career and Professional Development to participate in their Cooperative Education & Internship Program (CEIP). This not only allows for the Sustainability Internship to be displayed on your transcript, it also allows for further development of skills that will benefit you beyond your college career. Each semester, we will hold two professional development workshops in partnership with Career & Professional Development. You will also complete career-oriented assignments through a zero-credit Canvas course.

Meeting Requirements

There are a series of meetings throughout the year that interns are expected to attend, including:

- **Bi-Weekly Cohort Meetings (everyone)**: These meetings occur on Monday evenings and are intended for all 20 interns to come together to discuss team projects and host professional development workshops, guest speakers, etc.
- **Weekly Team Meetings (team specific)**: These meetings are an opportunity for each team to come together to work on projects.
- **Weekly Team Leader Meetings (team leaders only)**: These meetings are intended for team leaders to check in with the Campus Sustainability and team advisors to ensure deadlines are being met and teams are functioning smoothly.
- **Weekly Communications Representative Meetings (comms reps only)**: These meetings are intended for communications representatives to discuss team needs, schedule social media posts, and execute communications campaigns.
- **Partner Organization Meetings**: You will meet with your project partner on an as-needed basis; but setting up weekly or bi-weekly meeting times is recommended.

What Does a Typical Week Look Like?

It is difficult to articulate what a typical week will look like throughout the internship, because sustainability is a varying and complex field that involves all members of

campus. Each team works differently to accomplish their goals. However, here is how you can expect to spend some of your time each week:

- 3 - 4 hours in weekly meetings (all-team, team specific, comms, team leaders)
- 1 - 2 hours communicating with project partners
- 2 - 3 hours completing individual project work
- 1 - 2 hours participating in sustainability-related events on campus

Procedures

Internal Communication

Internal communication refers to written, electronic, or face-to-face interactions between your team members, Office of Sustainability staff, and project partners. You are required to respond to internship-related emails within 24 hours. All internal communication should be professional and appropriate in content.

Task Management Tools

Teams will use three primary methods of task management. The first is an application called **Trello** (trello.com), which allows each team to build lists and keep track of tasks, dates, and deadlines. The second tool students will utilize is **Google Team Drive**. This is a place where all important files will be kept, including meeting notes, success metrics, documents, etc. The team drive is intended to be the go-to place to look, should any team members or other teams need to find a document quickly and efficiently. **Google Calendar** is the third tool, which will be used to record important dates; including weekly meetings, events, and other happenings around campus. These tools will not only help your team stay organized, they will also allow Office of Sustainability staff to stay connected to the work you are doing.

External Communication

External communication is comprised of any messaging that is going to be distributed to any university audience outside the internship program. This includes social media messaging, flyers, news stories, listserv emails, website content, and campus notices. The communications representatives on each team are responsible for all external communications, and it is important that each team clearly and concisely relays their needs to the communications representatives. This is to ensure our messaging to the broader university community is appropriate, interesting, and consistent across all channels.

VT Event Planning Office & Table Cards

Each team will likely need to book meeting or event space, advertising slots, or public space at some point throughout the internship. This requires partnering with the Event Planning office to ensure all bookings are done correctly and within the allotted time frame. The communications representative from each team will be solely responsible for communicating with the Event Planning office, and will be the only one with permission to create bookings and reservations. The communications representatives will also be responsible for booking table cards. Table cards can be booked via an online portal. Before booking table cards, the event or news story must be published in GobblerConnect, and you must have your table card proof ready for approval at the time of booking. Each communications representative will be equipped with guidelines, and the Campus Sustainability Planner is happy to assist in any bookings or reservations that require a staff signature.

Team Portfolios from Previous Cohort

Each year, the outgoing cohort of interns will give the incoming cohort team project portfolios, which contain past projects, guidelines, important contacts, success stories, and lessons learned. Should you need any further information about past projects, the previous cohort is willing to discuss or provide any helpful advice. Often times, members from past cohorts are still on campus and happy to sit down with new teams to brainstorm and share information.

Dining Services Sustainability

At Virginia Tech Dining Services, we're serious about sustainability.

As part of our Guiding Principles, we have pledged to promote a sustainable dining and food system, both at Virginia Tech and within the greater community.

2018 Dining Services Awards & Recognition

Dining Services boasts a tradition of award-winning programming, venues, and service. Dining Services is committed to being the leader of college and university food service and a leader in sustainability (Climate Action Point #1 reference). We have received numerous awards for our efforts!

- No. 1, The Best College Dining Program in Each State, FoodService Director
- Reusable To-Go Program - Honorable Mention for the 2018 Governor's Environmental Excellence Awards
- Best of Show - 2018 Best Concept Award, Food Management
- College Food Truck of the Year, Mobile Cuisine
- No. 2, Best Campus Food, Niche
- No. 9, Best Colleges for Food in America, The Daily Meal
- No. 2, 50 Best Colleges with the Best Food 2017-18, Best Value Schools
- No. 3, 2018 College Power Players, Food Management
- No. 3, The Ten Colleges with the Best Dining Halls, College Magazine
- No. 6, Best Campus Food, "Best of 382 Colleges: 2018 Edition," The Princeton Review
- Top 15 Best Universities for Healthy Eaters, Healthline
- Top 25 Best College Dining Halls - The College Consensus Best Campus Dining Halls, College Consensus
- The 30 Colleges with The Best Campus Food You've Ever Seen, Delish
- A Report Card for Vegan Offerings, for going above & beyond to provide all students with exceptional vegan food, Peta2

VIRGINIA TECH SUSTAINABILITY

Sustainable Dining

Local and Sustainable Products:

Virginia Tech is increasingly using products that promote a sustainable dining program and food systems. Local products are considered to be 250 miles from Blacksburg or within the Commonwealth.

Homefield Farm:

This six-acre farm is a partnership between Dining Services and the College of Agriculture and Life Sciences. It grows **fruits, vegetables and herbs** for Virginia Tech Dining Services, and serves as a site of experiential student learning, interdisciplinary research, and community outreach.

Reusable to-go program:

Our free reusable to-go program reduces waste to landfill and allows you a sustainable way to eat on the go! Eat, return, & repeat.

Waste reduction:

Dining Services works with Campus Kitchens at Virginia Tech to recover unused food to give to those in need within the NRV. Since 2015, the program has recovered over 125,626 pounds of food!

QUICK FACTS

250,000+ meals served in reusable to-go containers since 2014!

Produce, beef, lamb, pork, eggs, milk, herbs, fruits & vegetables are campus-sourced products!

196,545 pounds of produce produced at Homefield Farm

VIRGINIA TECH SUSTAINABILITY

Climate Action Commitment

The Virginia Tech Climate Action commitment was approved in 2009 and touches on all aspects of the university, including teaching, research, and campus operations and is intended to guide the university toward a greener, more sustainable future.

Virginia Tech Dining Services is committed to contributing to the university's Climate Action Commitment through its sustainability operations.

4,700 pounds

of packaging waste kept out of the landfill through the implementation of our reusable to-go container program.
Climate Action Commitment-Point #8: Virginia Tech will minimize waste and achieve a 50% recycle rate by 2020.

90% WATER

is removed from our compost waste at Turner Place in Lavery Hall through the use of our waste reduction technology.
Climate Action Commitment Point #14: Innovative strategies are used to create efficient and sustainable operations at university-owned facilities."

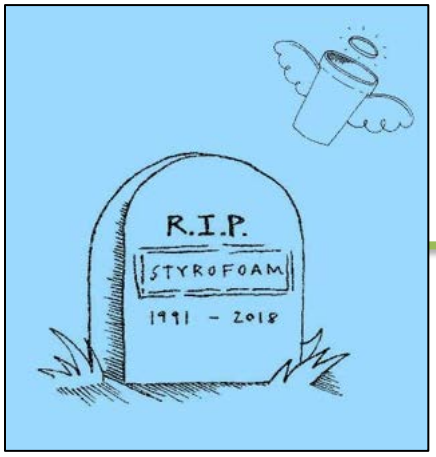
TURNER PLACE

5,000 tons

of organic waste sent from our dining facilities to be composted since 2009.
Climate Action Commitment-Point #8: Virginia Tech will minimize waste and achieve a 50% recycle rate by 2020.

VIRGINIA TECH SUSTAINABILITY

Dining Sustainability Milestones



Winter 2018

We banned styrofoam within Dining Services. This included getting rid of styrofoam at our campus Chik-fil-A & Dunkin Donuts. Only compostable and reusable containers are used on campus now.

Spring 2018

Hydroponics have arrived! Vegetables and herbs are grown at Owen's Dining Hall in the hydroponic system! These hang on either side of the Farms & Fields restaurant in the dining hall and provide delicious produce for students!

Fall 2018

We held our first ever Homefield Farm Pop-up Farm Stand. Students were able to purchase fresh, local campus-grown veggies from our very own Homefield Farm!

VIRGINIA TECH

Vice President for Finance and Chief Financial Officer
800 Drillfield Drive
Burruss Hall, Suite 210
Blacksburg, Virginia 24061
P: (540) 231-8775 F: (540) 231-4265

May 3, 2019

MEMORANDUM

TO: Energy and Sustainability Committee
Denny Cochrane, Sustainability Program Manager, Office of Energy and Sustainability

FROM: M. Dwight Shelton, Jr.

SUBJECT: Proposals for Student Organization Sustainability Initiatives (Green RFP)

I am pleased to learn that progress is continuing in advancing the Campus Sustainability Plan via the Green RFP program. This program is aimed to solicit and respond to proposals from recognized student organizations. Student engagement is an important factor in achieving goals in the sustainability plan and will continue to be crucial as the University implements specific actions in the plan.

The university has reviewed the funding request from the 2018-19 Student Organization Sustainability Initiatives (Green RFP) and approves the proposals recommended by the Energy and Sustainability Committee as illustrated in Attachment 1.

The Office of Budget and Financial Planning will establish the needed funds to underwrite these projects. The Office of Energy and Sustainability will serve as the liaison between student organizations and the University, and will be responsible for coordinating the implementation. Some initiatives were funded by Auxiliaries, others received support from E&G funds.

I want to thank you, the Office of Energy and Sustainability, the Energy and Sustainability Committee, and the participating student organizations for your commitment and support to this innovative program.

If assistance in the funding process is needed, please contact Brian Garber (bgarber@vt.edu or 231-3281).

cc:

Kate Barbour	Tim Hodge	Angela Page
Gannon Davis	Travis Hundley	Patty Perillo
Jeff Earley	Stacy King	Ken Smith
Brian Garber	Chris Kiwus	Dwyn Taylor
Jim Hillman	Liza Morris	Sherwood Wilson

2018-19 Green RFP Fund Initiatives

Proposal	Description	Student Organization	Funding Source	Aux Funding	E&G Funding	Total Funding
3	Replace 264 hallway fluorescent lights with LED lights in Payne Hall.	Environmental Innovation at VT	Residential	$ 10,700	$ -	$ 10,700
4	Replace 84 Outdoor Lights having high-pressure sodium (HPS) lamp post fixtures with LED fixtures in the vicinity of Newman Library and the University Bookstore.	Environmental Coalition	Facilities (self funded)	$ -	$ 14,300	$ 14,300
5	Replace 30 Cobra fixtures (HPS) and 25 Hokie Lights (HPS) with LED lights within Cassell Coliseum parking lot and on sidewalks along Washington St. and Beamer Way.	UAP 3354: Intro to Environmental Policy & Planning	Facilities (self funded)	$ -	$ 16,700	$ 16,700
6	Provide labs on campus with kits that may include fume hood stickers, equipment magnets, faucet aerators, freezer filters, outlet timers, and educational materials. Intent is to have one kit per Green Lab. The goal is to help encourage energy saving practices.	Office of Sustainability - Student Intern Waste Team	E&G	$ -	$ 3,700	$ 3,700
7	Replace 582 overhead fluorescent sink lights with LED lights in five residence halls (Vawter, Barringer, Johnson, Newman, Miles).	Environmental Innovation at VT	Residential	$ 103,600	$ -	$ 103,600
8	Stroubles Creek Riparian Restoration (purchase and plant approximately 800 native seedlings). This is year 2 of a 3 year project that began in FY18 with Green RFP Funding.	Stroubles Creek Coalition, VT StREAM Lab, Env. Coalition, & American Water Resource Assoc.	Coca-Cola	$ 5,500	$ -	$ 5,500
9	Mixed Paper Recycling Toters for use in the 18 Architectural Studios of Cowgill & Burchard Halls.	UAP 3354: Intro to Environmental Policy & Planning	Coca-Cola	$ 2,000	$ -	$ 2,000
11	Provide reusable-to-go containers (similar to OZZI system containers) in various sizes for use in four primary dining facilities that serve food in the Reusable To-Go Containers.	UAP 3354 & REAL 3024 - "Applied Real Estate Development"	Coca-Cola	$ 16,100		$ 16,100
12	Rainwater Catchment System in Hahn Horticulture Garden: Install a 500 gallon cistern to catch rainwater to water the vegetable garden and plant beds. Cistern would collect 10,800 gallons of rainwater annually.	UAP 3354: Intro to Environmental Policy & Planning	Coca-Cola	$ 2,200	$ -	$ 2,200
13	Purchase & Install Two Single Water Bottle Refill Stations in Kelly Hall.	Biomedical Engineering Society	E&G	$ -	$ 5,000	$ 5,000
14	New recirculation infrastructure for ten Residence Halls to utilize a pump and pipe system for readily available hot water instead of an underground recirculation system. The purchase will consist of pumps and associated items to recirculate water within the system which will provide quicker on demand hot water.	Office of Sustainability - Student Intern Water Team	Residential (MR funds)	$ 150,000	$ -	$ 150,000
15	Two Electronic Waste Recycling Bins in Goodwin Hall & Newman Library for items such as phones and computers.	UAP 3354: Intro to Environmental Policy & Planning	E&G	$ -	$ 400	$ 400
16	Install a bat box in the Duck Pond area to foster local bat species growth on campus. Bats help keep nuisance insect populations low and serve as pollinators.	UAP 3354: Intro to Environmental Policy & Planning	E&G	$ -	$ 200	$ 200
17	Battery Powered Leaf Blower for use at the Hahn Horticulture Garden to replace a gas powered unit. The battery powered blower will reduce fuel consumption and engine emissions.	Hahn Horticulture Garden - Student Maintenance Staff	E&G	$ -	$ 200	$ 200
18	One Solar Power Charging Table to be located in the vicinity of Bishop Favrao Hall.	Dept. of Building Construction - BioBuild Studio Course	Coca-Cola	$ 9,700	$ -	$ 9,700
19	Construct an outdoor dog run at VetMed. This will mitigate soil erosion and storm water run-off. Total project cost is $87k, with $10k of Green RFP support. Remaining cost will be funded with private support and in-kind donations.	Virginia -Maryland College of Veterinary Medicine Classes of 2019 & 2020	E&G	$ -	$ 10,000	$ 10,000
			Total	$ 299,800	$ 50,500	$ 350,300

Cochrane, Denny

From: Hodge, Tim
Sent: Thursday, July 25, 2019 5:46 PM
To: Cochrane, Denny
Cc: Hundley, Travis; Heath, Bruce
Subject: Green RPF Approval - Math Emporium

Denny Cochrane & Energy and Sustainability Committee,

In FY19, several Green RFP projects, recommended by the Energy and Sustainability Committee, were approved with two projects at the Math Emporium needing further review. Since then, the university has completed that work, so we are pleased to now approve those two energy savings projects as listed below:

Proposal	Description	Student Organization	Funding Source	Aux Funding	E&G Funding
1	Replace all 311 overhead metal halide light fixtures in the Math Emporium with LED fixtures. Note. this is a leased space but VT pays O&M directly.	Office of Energy Management – Student Interns	E&G	$ -	$ 194,300
2	Replace HVAC controls in the Math Emporium with programmable thermostats to enhance energy efficiency. Proposal also includes rebalancing the supply air to the Air Handling Units (AHUs).	Office of Energy Management – Student Interns	E&G	$ -	$ 8,000

The Office of Budget and Financial Planning will establish the needed financing to underwrite these projects. These projects will be repaid by the energy savings. The Office of Energy and Sustainability will serve as the liaison between student organizations and the University, and will be responsible for coordinating the implementation.

I want to thank you, the Office of Energy and Sustainability, the Energy and Sustainability Committee, and the participating student organizations for your commitment and support to this innovative program. Please share this with the Energy and Sustainability Committee.

If assistance in the funding process is needed, please contact Brian Garber (bgarber@vt.edu or 231-3281).

Tim Hodge
Associate Vice President for Budget and Financial Planning
Office of Budget and Financial Planning (0114)
Burruss Hall, Suite 326, Virginia Tech
800 Drillfield Drive
Blacksburg, Virginia 24061
540-231-0419