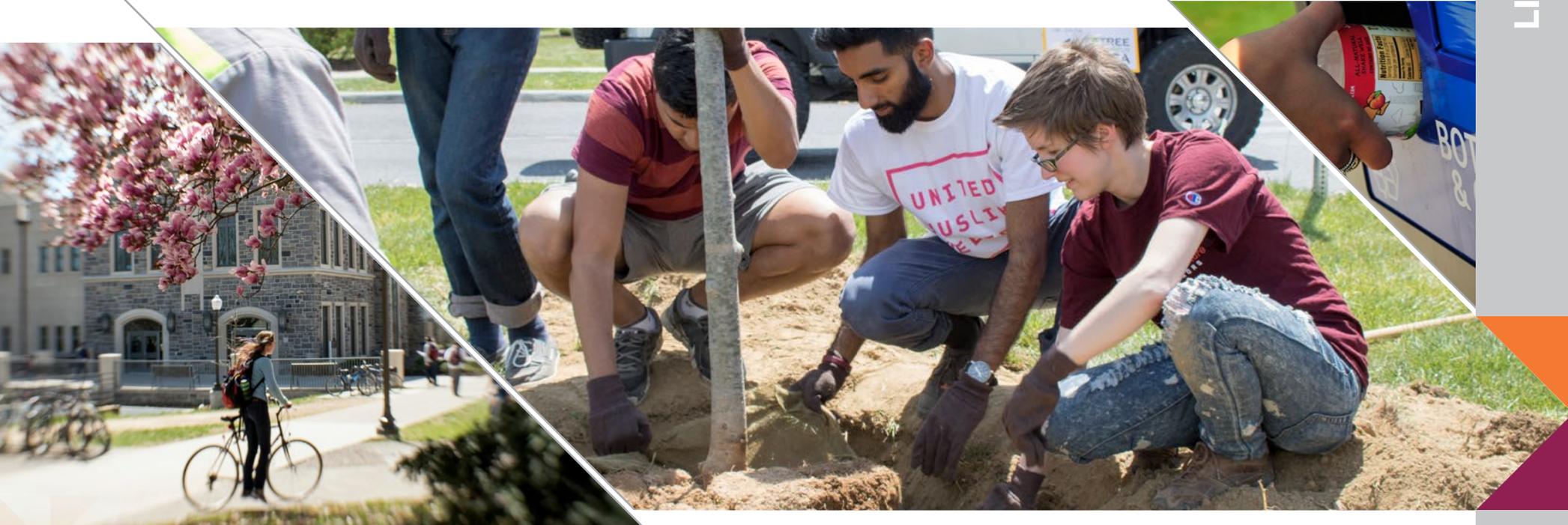


# 2015-16 Office of Sustainability Annual Report

LIVE ◀ LEARN ▶ WORK



VirginiaTech®

Facilities  
Department

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For inquiries regarding non-discrimination policies, contact the Office of Equity and Access at 540-231-2010 or Virginia Tech, North End Center, Suite 2300 (0318), 300 Turner St. NW, Blacksburg, VA 24061.

## OFFICE OF SUSTAINABILITY

Facilities Department  
Division of Administrative Services

Steve Mouras  
Director, Transportation Planning and Sustainability

Denny Cochrane  
Sustainability Program Manager

Karlee Anne Siepierski  
Campus Sustainability Planner

## INTERNS

Laura Featherstone '16	Colette Julson '16
Ann Beverly Prideaux '17	Smita Sharma '16
Alex Flevarakis '17	Bridget Acland '17
Drew Miller '17	Meghan Hekl '16
Ben Pollins '17	Emily Fennell '16
Katie Ranger '16	Chloe Sikora '18
Morgan Altizer '17	Katie Palombo '16
Amy Gelb '17	Dyllan Taylor '16
Serena Emanuel '18	

## ENERGY AND SUSTAINABILITY COMMITTEE

Sherwood Wilson	Staff Senate
M. Dwight Shelton	Katie Reaves
Chris Kiwus	David Mellichamp
Jason Soileau	
Frances Keene	<b>Council of College Deans</b>
Denny Cochrane	Richard Benson

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Steve Mouras

## Graduate Student Assembly

Devita Mccullough-Amal  
Allison Homer

## Environmental Health and Safety Services

Rob Lowe

## Student Government Association

Melvin Amos  
Sam Gittelman  
Guests  
Emily Schosid  
Katy Shepard  
Rial Carver

## Faculty Senate

Sean McGinnis  
John Chermak  
Tim Baird  
Bruce Obenhaus



## Overview

The Office of Sustainability (OofS) was established in accordance with the Virginia Tech Climate Action Commitment (VTCAC) and is responsible for monitoring energy usage, Green House Gas (GHG) emissions, overseeing the implementation of the VTCAC and the Sustainability Plan, coordinating programs for campus sustainability, and managing a campus wide student internship program.

Virginia Tech is a leader in campus sustainability. In 2009, the Virginia Tech Board of Visitors approved the first ever VTCAC. These documents guide the direction of the university by setting goals for the next 50 years to reduce Virginia Tech's environmental footprint.



Virginia Tech is rated by the Association for Advancement of Sustainability in Higher Education (AASHE) and their **Sustainability Tracking Assessment & Rating System (STARS)** yearly. In 2014, Virginia Tech scored a **Gold rating** with **71.02 points** for its efforts to promote campus sustainability.



# Climate Action Commitment

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.



- 1 A **Leader** in Campus **Sustainability**.
- 2 Represent VTCAC&SP in **Strategic Plan**.
- 3 Reduce **GHG emissions** to 80% below 1990 emission level by 2050.
- 4 Improve **energy efficiency**, reduce energy waste, replace high-carbon fuels, etc.
- 5 Maintain a sustainability office.
- 6 **LEED certification**
- 7 Electricity and heat efficiency
- 8 50 percent **recycle** rate by 2020.
- 9 a. Purchase or lease Energy Star equipment and maximize practicable recycled content paper  
b. Consider a product's life cycle cost and impact when making purchasing decisions
- 10 **Engage students, faculty, and staff** to develop and implement innovative strategies for efficient and sustainable use of energy, water, and materials in all university-owned facilities.
- 11 **Transportation** energy efficiency through parking, fleet, and alternative transportation policies and practices.
- 12 Develop and implement innovative sustainability-related **academic programs** in instruction, research, and outreach
- 13 **Monitor energy use** and GHG emissions and change internal and external conditions, prepare an annual 'report card' showing progress towards targets
- 14 **Provide funding** to support sustainability programs.



# Our Partners

To achieve the university's energy and sustainability goals, the Office of Sustainability works collaboratively with the following groups:

## Departments

Alternative Transportation  
College of Natural Resources and Environment  
Sustainability Institute  
Dining Services  
YToss at Virginia Tech

## Student Groups

Campus Kitchen  
Environmental Coalition  
Environmental Student Organization  
Residence Hall Federation  
Roots and Shoots  
Students for Clean Energy  
Student Government Association  
Sustainable Food Corps

## Community Groups

Sustainable Blacksburg  
Town of Blacksburg





# Energy

## Demand Side Management

Demand Side Management promotes energy efficiency by upgrading, retrofitting, and commissioning mechanical, lighting, and electrical systems in the buildings. The Office of Energy Management launched a **Five Year Energy Action Plan** to address the energy efficiency improvements with 50 of the most energy intensive buildings.

## On-Going Projects

- ▶ Combustion testing of boilers and furnaces
- ▶ Electric sub-metering of chiller plants
- ▶ Fume hood energy reduction program
- ▶ Greenhouse lighting technology improvements
- ▶ Thermal imaging of campus buildings
- ▶ Lighting bulb/fixture replacement
- ▶ Steam Trap Survey Program
- ▶ Thermal insulation on steam pipes, fittings, and equipment



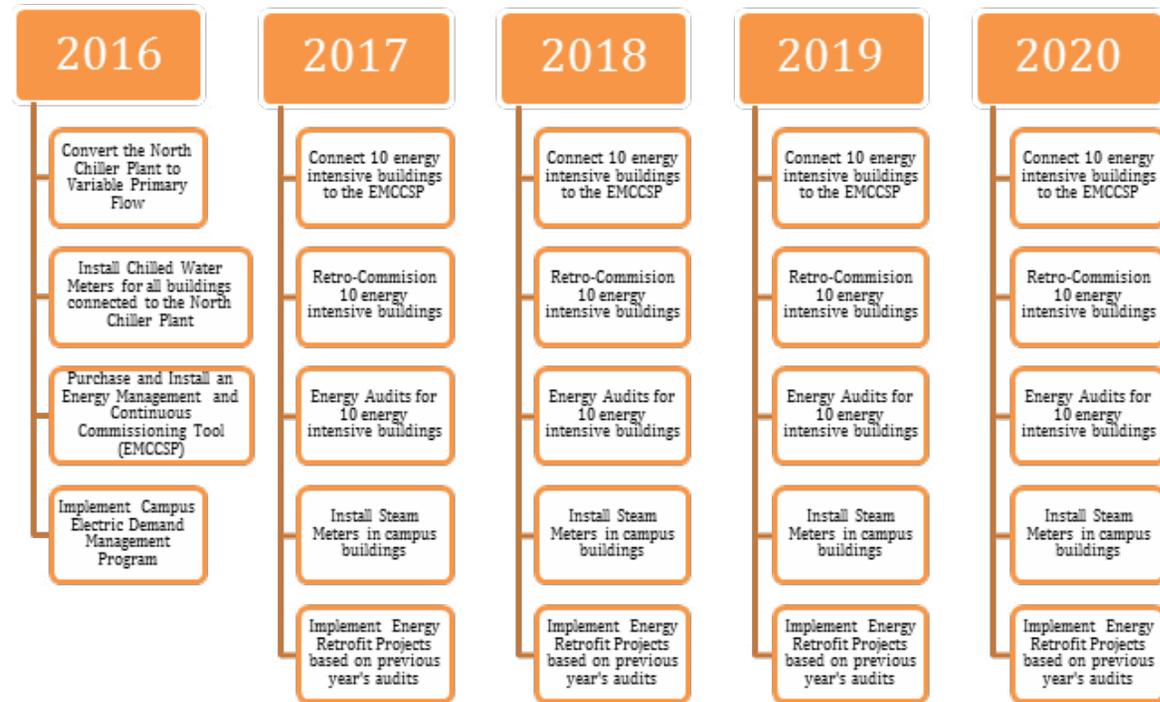
# Energy Efficient Design

To establish university standards which go beyond the applicable VA Energy Code, the Facilities Department has added a section to Virginia Tech's "**Design and Construction Standards**" that speaks to "Guidelines for Energy Efficient Design."

The guide applies to all new construction and new addition and renovation projects and will over time make **significant advancements to energy reductions and savings.**



# Five Year Energy Action Plan



The Office of Energy Management recently conducted a benchmarking analysis of campus buildings which identified 50 energy intensive buildings. Representing only 35 percent of the university structures, these buildings account for over 70 percent of the main campus utility cost.

Following this study, a comprehensive **Five Year Energy Action Plan** was developed in collaboration with the Office of Budget and Financial Planning. The plan guides the facilities operations to achieve significant reduction in energy cost. The program will concentrate on 10 "energy hog" buildings per phase with a goal of completing all in five years. An **energy cost savings of approximately \$4.5 million** is estimated.



# Waste Disposal, Composting, and Recycling



## Zero Waste Events

- ▶ Staff Appreciation Day May, 2015: composted food waste 2,500lbs, recycling material 130lbs
- ▶ Welcome Back Kickoff Aug, 2015
- ▶ Hokie Picnic at Lane Stadium Aug 21, 2015
- ▶ 3.2 Run for Remembrance April 16, 2016
- ▶ Staff Appreciation Day May, 2016

## Composting Feasibility Study

When the company that provided composting services for Virginia Tech went out of business in May 2015, the university reevaluated the program and determined that the most cost effective solution was for Virginia Tech to **continue using a third party organic waste management provider**. Key stakeholders on campus, including representatives from Facilities, Environmental Health and Safety, and Dining Services, participated in the reevaluation process.



Ytoss 2016

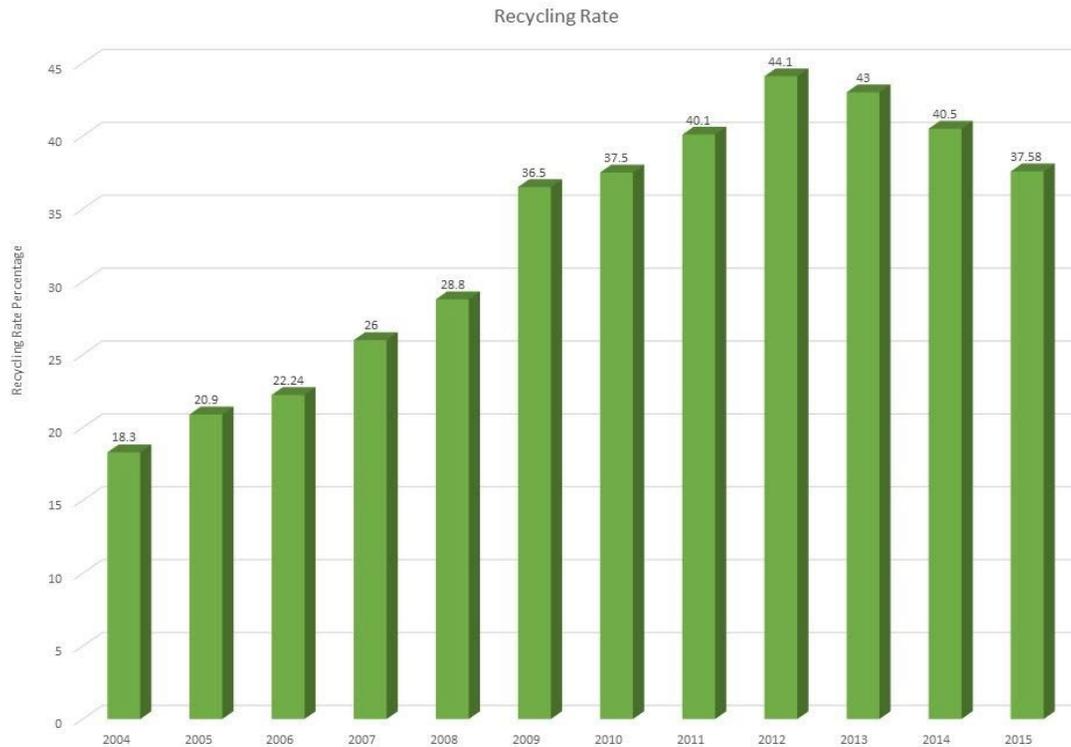


9.4 tons of used student furniture, appliances, etc. kept out of landfill.



Every year students volunteer to keep the program running!





**Single Stream Recycling**  
Recycle these items together:

- Newspapers, Magazines, and Mail
- Cardboard & Pizza Boxes
- Cereal & Tissue Boxes
- Glass Bottles & Jars
- Aluminum & Metal Cans
- Plastic Containers #1-7 (lids on)

**Keep Out:**

- Electronics, Cords & Wires
- Styrofoam
- Plastic Bags and Wrap
- Food Waste
- Batteries

Questions? See [www.facilities.vt.edu/sustainability/recycle](http://www.facilities.vt.edu/sustainability/recycle)

## Transition to Single Stream Recycling

**Single Stream Recycling** began the summer of **2015** for the Blacksburg campus. Standard Single Stream Signage (left) is being used on all single stream advertising on campus.

In addition to bottles, paper products can now be dropped into the Big Belly Solar Trash Compactors for recycling. Additionally, new Large Outdoor Recycling Containers (right) have been placed outside residence halls and new Indoor Single Stream Recycling Lids were replaced with the existing "Slim Jims" containers.



# Sustainable Dining

The Farms and Fields Project in Owens Food Court offers a seasonal menu highlighting local, sustainable, and organic foods.



## Dining Services Farm at Kentland

Beginning as a quarter acre herb plot in 2009, the Dining Services Farm at Kentland now produces about six acres each year. This joint program between Dining Services and the Department of Horticulture produces fruits, vegetables, and herbs that are used in Virginia Tech's dining halls. In 2015, the university harvested **48,000 pounds of produce.**



## Reusable To-Go Container Program Expands to Two Additional Dining Centers

*Sometimes, ordering food to-go happens.*

Here are your options:

*Reusable To-Go*



\$3.50 Cash or  
\$3.50 Flex w/discount  
one time buy-in  
unlimited uses with token

*Compostable To-Go*



\$0.20 Cash or  
\$0.10 Flex w/discount  
large 9x9 to-go  
container only

### At the start of the fall 2015 semester:

- ▶ 9,500 Reusable To-Go containers were distributed to on-campus residents. The Virginia Tech Student Government Association and Office of Housing and Residence Life shared the \$19,000 cost.
- ▶ 47,000 meals were served in Reusable To-Go containers during the fall 2015 semester.
- ▶ 340,000 fewer compostable to-go containers were used in the fall 2015 semester compared to spring 2015 semester.



# Alternative Transportation

## Bus, Bike, Walk, and Carshare

Alternative Transportation promotes and encourages the use of alternative modes of transportation (e.g., bicycling, walking, vanpooling, carpooling, riding transit) to get to, from, and around campus.



The **Hokie Bike Hub** serves as a bicycle maintenance and commuter education center. Cyclists have access to tools and resources for self-service bike repair. Cyclists can also attend bike-themed workshops and learn how to maintain and repair bikes. The 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.



# Green Building: LEED Certifications

(Leadership in Energy and Environmental Design)



Goodwin Hall  
LEED Gold 2015



Human and Agricultural  
Biosciences Building  
LEED Gold 2015



Indoor Athletic  
Training Facility LEED Silver 2015

## More LEED Registered and Certified Buildings at Virginia Tech

Henderson Hall Renovation and Theatre 101 Addition	Gold	2/1/10
Football Locker Room Addition	Silver	10/1/11
ICTAS II (Institute for Critical Technology and Applied Science)	Gold	11/1/11
Visitors and Undergraduate Admissions Center	Certified	8/1/12
Academic and Student Affairs Building (Lavery Hall)	Silver	4/1/13
Vet Med Instructional Addition	Silver	6/1/13
Ambler Johnston Hall	Gold	11/1/13
Chiller Plant, Phase I (Southwest Chiller Plant)	Silver	11/1/13
Center for the Arts (Moss Arts Center)	Gold	5/1/14
Renovate Davidson Hall	Certified	3/11/16

Virginia Tech also has a number of future LEED Certified buildings under design

# Sustainability Week



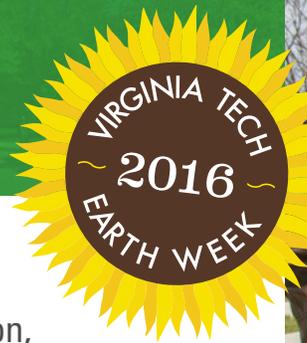
Sustainability Week is a **partnership between Virginia Tech, the Town of Blacksburg, and Sustainable Blacksburg** that highlights sustainability efforts in the town and on campus. More than a dozen events were scheduled the week of Sept. 14-18, 2015 to showcase the sustainable efforts happening on campus and in the community.

## Some of the highlights include:

- ▶ “Caught Green Handed”—Volunteers traveled throughout the community catching people in the act of making more sustainable everyday choices such as biking to work, using a reusable coffee mug, or recycling.
- ▶ Active Commute Celebration—This event is hosted by the Office of Alternative Transportation and highlights information about Blacksburg Transit, the Virginia Tech Office of Sustainability, the Blacksburg Office of Sustainability, and many others.
- ▶ Tree Planting—Virginia Tech students, employees, and community members planted six native Oak trees along West Campus Drive.



# 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 Clean Energy
- ▶ Virginia Tech Environmental Student Organization
- ▶ Sustainable Food Corps
- ▶ Sustainable Dining at Virginia Tech
- ▶ Virginia Tech Office of Alternative Transportation
- ▶ YMCA at Virginia Tech
- ▶ Veg Club of Virginia Tech
- ▶ Blacksburg Farmers Market

Each day of Earth Week is themed around an important sustainability topic, like 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.



# Green Request for Proposals (RFP) Program

## At a Glance

The Green Request for Proposals Program provides **university funds to student-generated sustainability projects**. This program solicits proposals from recognized student organizations that promote sustainability on campus. Proposals that are funded by the university support the Virginia Tech Climate Action Commitment and produce realizable savings.

Since 2010, 43 student proposals have been approved and **awarded more than \$435,000**. **The following projects were funded in 2014-15:**

- ▶ Water bottle refilling stations in residence halls and academic buildings
- ▶ LED street lamp upgrades
- ▶ OZZI machines for reusable to-go containers
- ▶ A Solar Charging Table in Pritchard Quad



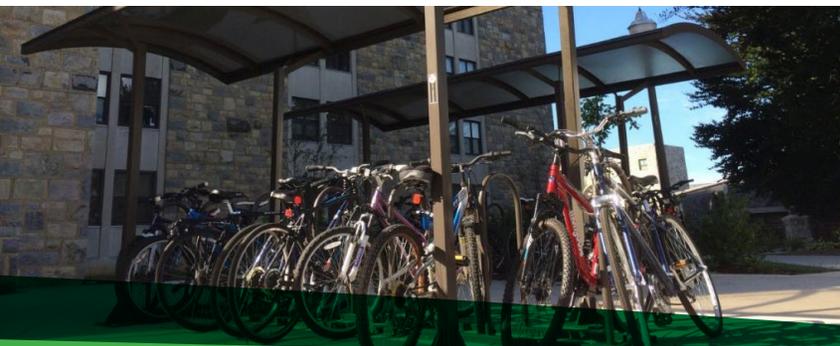
## The following projects were funded and will be installed during the 2016-17 academic year:

- ▶ Additional LED street lamp upgrades-**\$23,800**
- ▶ Additional OZZI reusable to-go machines and Hokie Passport readers-**\$31,000**
- ▶ Indoor waste stations for academic buildings-**\$15,000**
- ▶ Shut-the-Sash fume hood stickers-**\$1,000**
- ▶ Bicycle parking hubs-**\$52,970**
- ▶ Rainwater catchment system for Urban Horticulture Center-**\$1,715**
- ▶ Water bottle refilling station in Smyth Hall-**\$3,500**
- ▶ Native trees for Sustainability Week (fall 2016)-**\$5,000**
- ▶ Bicycle fix-it stations-**\$2,800**
- ▶ Ytoss signage-**\$775**



### Solar Charging Table

On April 13, 2016 (during Earth Week), Virginia Tech's first Solar Charging Table was unveiled. This table was proposed by Students for Clean Energy president Patrick Gallagher during the 2014-2015 RFP requests.



# Energy and Sustainability Committee

## Committee Purpose

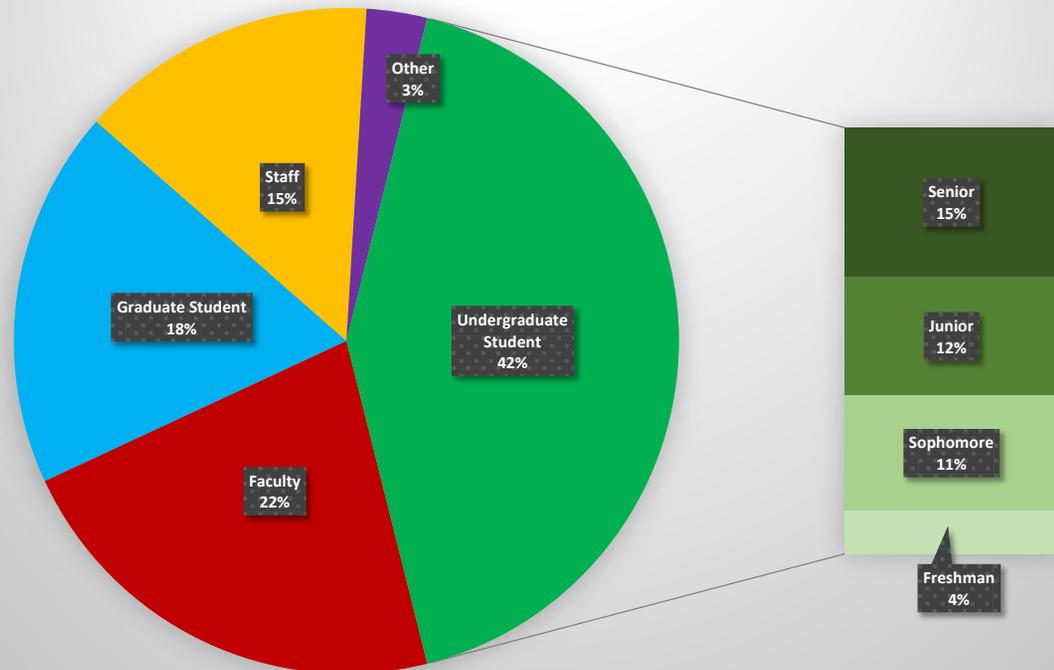
To review and advise the university administration regarding broad policy issues relating to energy usage, efficiency and conservation in particular, and with overall sustainability matters in general.

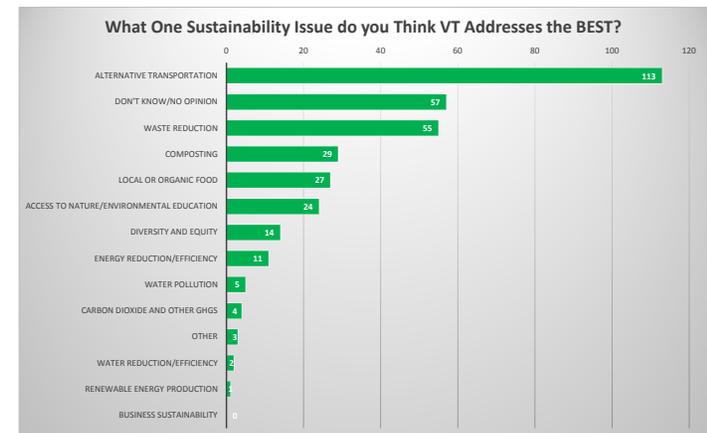
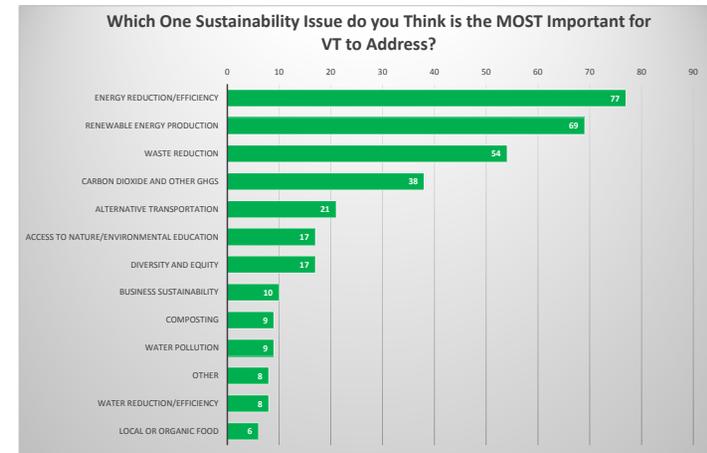
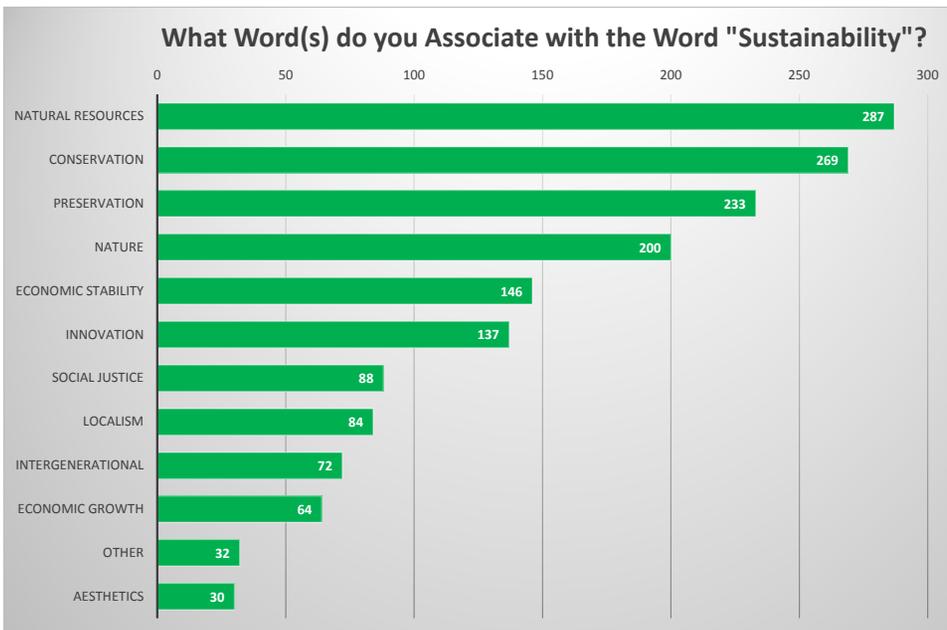
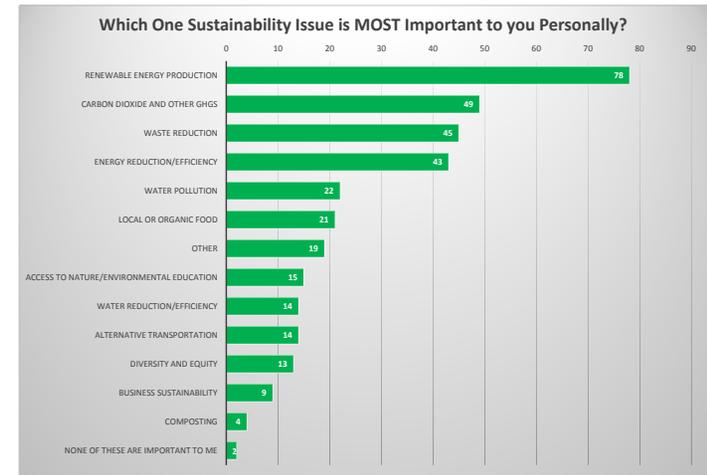
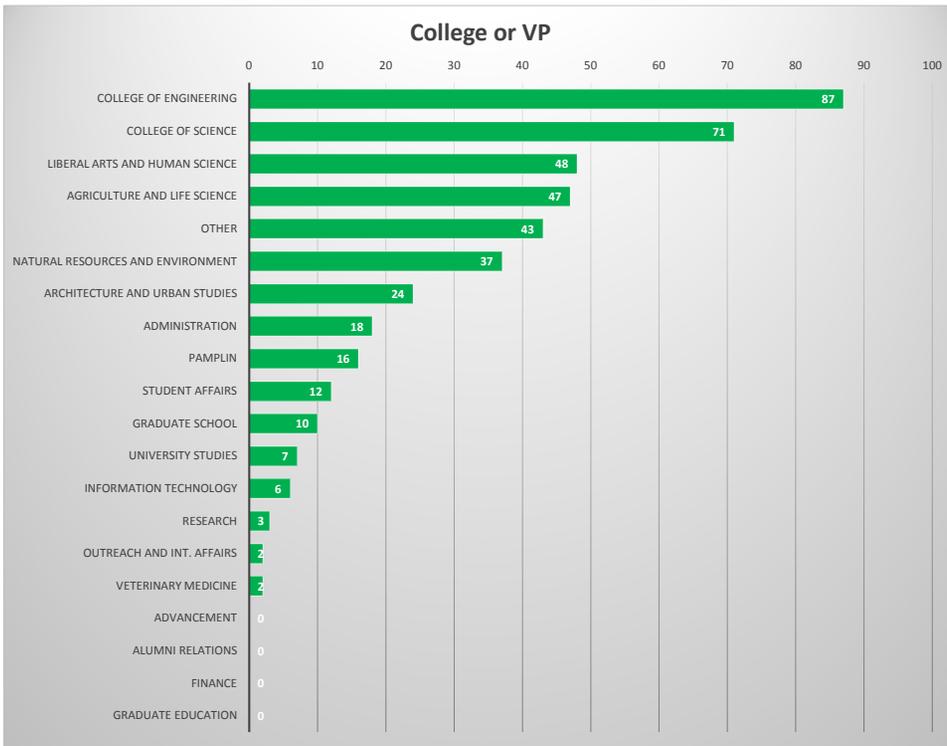
The Energy and Sustainability Committee is part of the university governance structure. The committee reports to the Commission on University Support which reports to University Council.

## Sustainability Survey and Focus Groups

In 2015, members of the Energy and Sustainability Committee discussed ways to create more opportunities for the committee to interact with the rest of the Virginia Tech community on sustainability issues. The committee distributed a survey about sustainability at Virginia Tech to determine what issues are most important to Hokies. The results of this survey can be seen below. These results give a good indication of the **issues deemed most important**, as well as the desired priorities going forward.

Participants





# Green Office Certification

The Green Office Certification program recognizes offices/departments who save energy and reduce waste.

Since the program launched, 15 offices have completed the certification.



The **Office of Sustainability Internship Program** blends real-world projects at the Blacksburg campus with practical skills-based professional development courses to prepare students for a career in the sustainability field. Students learn what it is like to work in a dynamic environment by **encouraging creativity, ownership, and collaboration.**

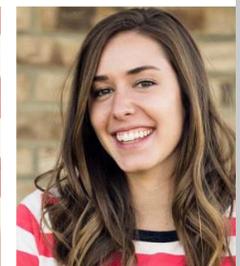
There are two main goals of this program:

1. Cultivate the skills needed by young sustainability professionals.
2. Forward Virginia Tech's sustainability goals through creative engagement.

The projects the students take on, paired with professional development classes and other trainings, allow students to sharpen and expand their environmental professional skill sets.



## Internship Program



# Fall Semester Intern Events



## MEET OZZI

VT'S REUSABLE TO GO CONTAINER

**STEP 1:**  
ASK FOR YOUR FOOD IN A REUSABLE TO GO CONTAINER WHEN YOU ORDER AND PAY YOUR ONE TIME FEE OF \$3.50

**STEP 2:**  
EAT YOUR FOOD ON THE GO!

**STEP 3:**  
DUMP YOUR LEFTOVERS AND TAKE YOUR EMPTY CONTAINER TO AN OZZI MACHINE.

**STEP 4:**  
GRAB YOUR OZZI TOKEN AFTER YOU DEPOSIT YOUR CONTAINER.

**STEP 5:**  
NEXT TIME YOU EAT TO GO, HAND THE CASHIER YOUR OZZI TOKEN.

YOU CAN FIND THE BIG OZZI MACHINES IN OWENS, WEST END, AND TURNER

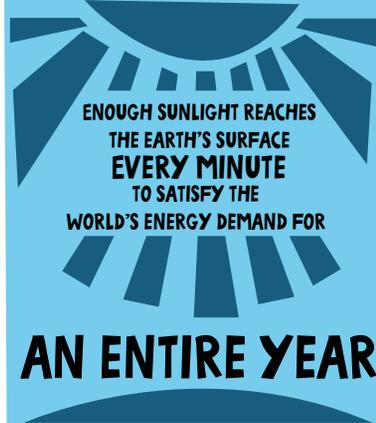
Display 10/12-10/18

# DID YOU KNOW?



A LAUNDRY MACHINE TAKES 20 GALLONS OF WATER TO RUN PER LOAD. THAT IS EQUIVALENT TO DRINKING 320 CUPS OF COFFEE **EACH DAY**

IF EVERY FAUCET IN AMERICA DRIPPED ONCE EACH SECOND,





## Green Graduates



### Frequently Asked Questions

**Do other schools have a graduation pledge?** Yes. Virginia Tech is part of the Graduation Pledge Alliance. There are more than 100 active pledge schools and 125,000 college graduates have taken the pledge.

**How do I participate?** To participate send a quick blurb of how you pledge to support a sustainable world and a photo of yourself (think “Humans of New York” project or just your standard selfie) to the Facebook page.

**Do I need to be graduating to get the cord?** Yes, we will only give cords to students who are set to graduate in the upcoming graduation ceremony.

**Do you hand out cords for December graduation?** Yes.

**Do you have to be an undergraduate student to participate (rather than a Masters, PhD, etc.)?** Not at all. Graduate students are also invited to participate.

**What’s the cost?** The cord is free of charge, and only requires that you send your pledge and photo to commit to living a sustainable post-graduation life.





“Earth is our home, it’s been here long before humans walked the planet and it will be here when we’re gone. We don’t own this place, we’re only borrowing it from future generations of species. Which is why we have a responsibility to leave it in a better condition than we received it. We can each help, even the smallest changes in your lifestyle can make a difference. Use reusable bags to reduce plastic waste, plant a small garden, take shorter showers, and recycle plastic and glass bottles. It’s all in the little things!”



“I pledge to support a sustainable world because I recognize that the ground I walk on is finite and it is my responsibility to do all that I can to ensure its survival through my day to day activities, raising awareness about how important it is to support a sustainable world, and treating the Earth with unwavering respect. I pledge to support a sustainable world because I want to fight for environmental justice and a safer, cleaner, and greener world.”

“Hola! My name is Luis Manrique Bowen, I’m a senior graduating from the college of engineering and majoring in civil engineering. I want to be the first person in my family to incorporate sustainability in my everyday life. I think by taking the first step towards this goal it will enlighten those around me to do the same and think about our planet’s current conditions. By committing myself to live a sustainable life style, I hope to empower others to follow my footsteps. This is our only home and we must preserve it for those yet to come.”

To view more,  
visit our  
Facebook page:

Green Graduates  
of Virginia Tech.



Since Virginia Tech was first certified in 2008 under the Tree Campus USA program, over 600 trees have been planted across campus. Plantings primarily take place during Sustainability Week in the fall semester and during Earth Week in the spring semester. Virginia Tech was one of the founding member schools of Tree Campus USA but as of 2015 over 250 universities were certified through this program.



# STARS: Sustainability Tracking, Assessment and Rating System



## Gold Rating since October 15, 2014

### A Letter From President Sands to the Association for the Advancement of Sustainability in Higher Education (AASHE)

Virginia Tech is proud to be a charter participant in AASHE's STARS. **We are committed to maintaining our leadership role in campus sustainability.** It is my pleasure to endorse and affirm that Virginia Tech's STARS submission accurately reflects the sustainability initiatives and progress to date on our campus.

We actively use STARS as the primary tool for benchmarking our progress towards a more sustainable campus. Our commitment to sustainability was initiated by students in 2007. In 2009, our Board of Visitors unanimously approved the Virginia Tech Climate Action Commitment Resolution, which was accompanied by a Sustainability Plan specific to the university. This resulted in the creation of the Office of Energy and Sustainability, establishment of targets for the reduction of greenhouse gas emissions, an emphasis on energy efficiency, increased recycling and alternative transportation rates, an institutional commitment to pursue LEED Silver certification or better for all new construction and major renovation projects, and continued student engagement in campus sustainability. We are pleased to report that we have made tremendous progress toward our goals and are continually implementing additional initiatives to achieve a more sustainable future.

The STARS program continues to evolve and offer greater opportunities for colleges and universities. We will submit an application again under version 1.2 to advance our rating from Silver to Gold. Thank you for this opportunity to continue our participation in STARS and to learn from our peers as we **work together to advance sustainability in higher education.**



## Beginning Farmer Programs

To help train new farmers and strengthen the local food system, the CSC in partnership with Virginia Cooperative Extension, continued the Small Farm Incubator program by providing 6 farmers with land and resources at the Center during the 2015 growing season. In addition, the CSC facilitated the **Midsummer Sustainable Gardening Workshop** and implemented an agriculture education program with a local high school.

## Catawba Sustainability Center

The Catawba Sustainability Center (CSC) is a 377-acre research and education site in Roanoke County, Virginia, that aims to inspire thought and discover solutions in environmental, social, and economic sustainability through research, education, and demonstration. The CSC works to advance environmental stewardship, community engagement, and economic growth by providing a living, learning environment for the teaching and demonstration of sustainable practices in land management, agriculture, and economics.





## Conservation Land Management and Agroforestry

The Catawba Sustainability Center is committed to implementing and teaching conservation land management practices and integrating agroforestry into the development of the farm wherever possible.

CSC is a partner in a National Fish and Wildlife Foundation grant award to develop a multi acre, mixed-use agroforestry farm plot over the next two years to demonstrate **how agroforestry can be used on Virginia Farms to meet conservation goals** and generate revenue through conservation and nutrient credit trading.

The **Catawba Sustainability Center hosts over 1,000 visitors annually**. In 2015, the Catawba Sustainability Center produced the 3rd Roanoke Valley Locavore Food Directory, a print and web publication showcasing locally produced food and beverage.



# Multi-Modal Transit Facility (MMTF) and Sustainability Showcase

The **Multi-Modal Transit Facility (MMTF)** is a partnership between the university and the Town of Blacksburg. It will function as a transit hub and will serve multiple modes of transportation. The facility will provide amenities for users, facilitate public interface, disseminate information, and promote alternative transportation.

This project will be the first building at Virginia Tech to pursue LEED Platinum certification. Some of the sustainability showcase items that will be included in the MMTF include:

- ▶ **Rainwater** from the building will be collected in storage tanks and be reused for gray water purposes in the building.
- ▶ A **wind turbine** will be installed as a demonstration of wind energy.
- ▶ Extensive **photo-voltaic panels** will be installed in select bus slip canopies to provide renewable energy.
- ▶ A **green roof** will be installed to provide natural insulation, CO<sub>2</sub> reduction, and reduce rain water runoff.



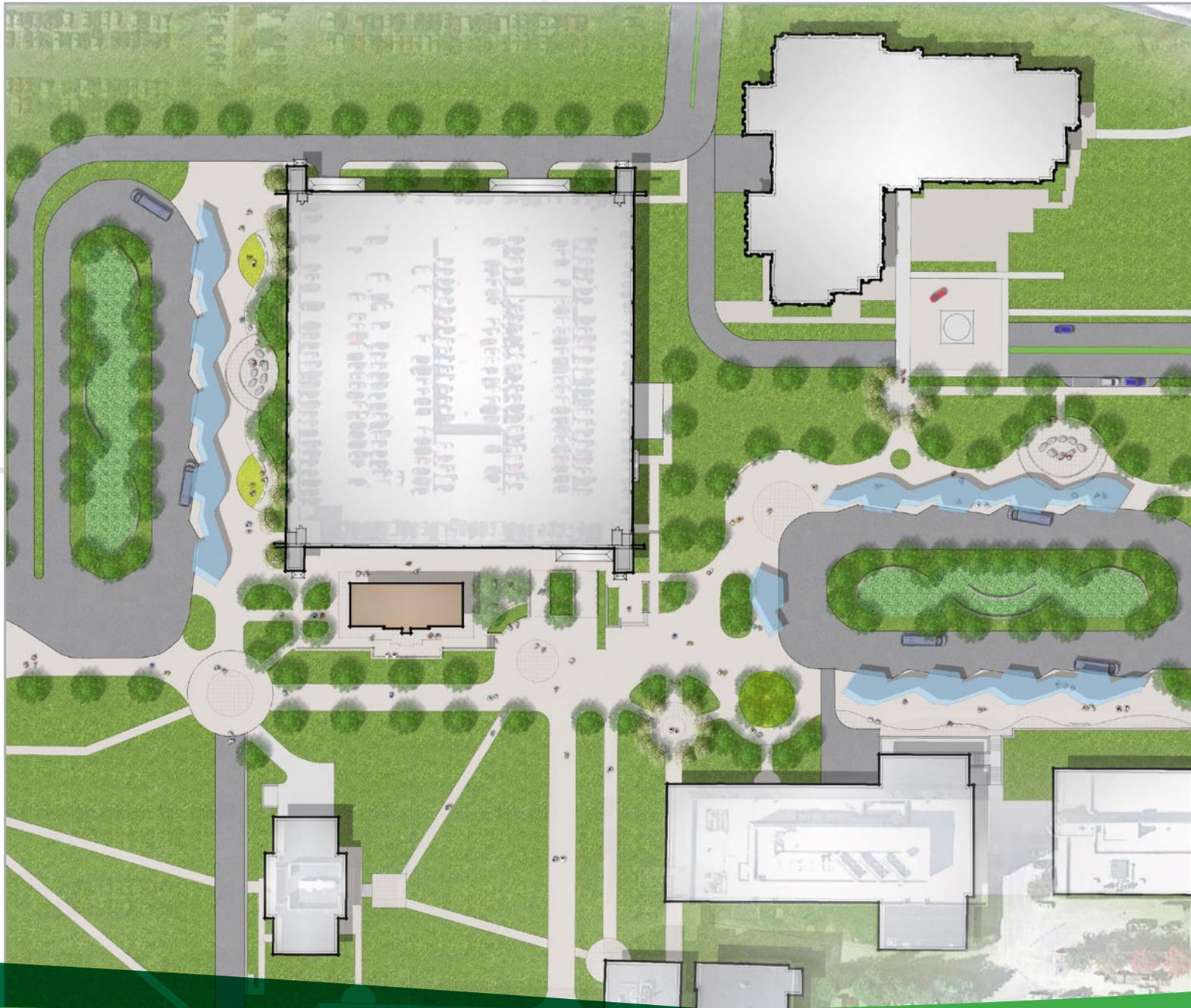
## Aerial view looking north



**Ground view looking south with Perry Street Parking Garage on left**

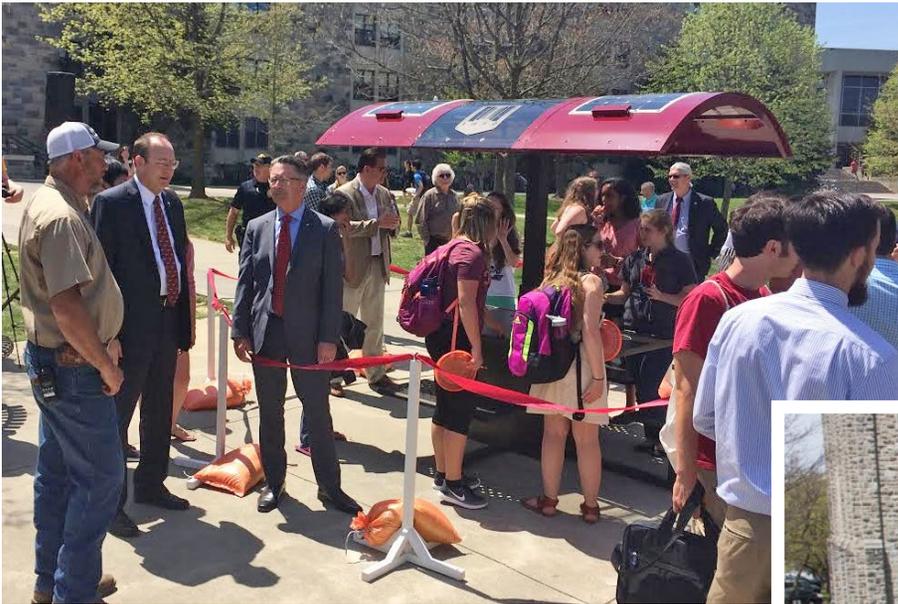


# MMTF site plan



## In Conclusion

The past year has been a “Sustainability Success” because of our achievements engaging our campus community and implementing a comprehensive Five Year Energy Action Plan. You can see these achievement in the faces of our faculty, staff, and students as they come together to make our campus even greener and in the results of our annual Greenhouse Gas (GHG) assessment showing a 7.6% decrease in our emissions in FY 16. Virginia Tech continues to lead in Sustainability.



# Appendices





Commonwealth of Virginia
Locality Recycling Rate Report
For Calendar Year 2015

Contact Information

Reporting Solid Waste Planning Unit: Virginia Tech

Person Completing This Form: Dennis C. Cochrane

Title: Sustainability Program Manager, Office of Sustainability

Address: Sterrett Center, Suite 48 (0160), 230 Sterrett Drive, Blacksburg, VA 24061

Phone #: (540) 231-5184 Fax #: (540) 231-4745 Email Address: denniscc@vt.edu

Summary: The Montgomery Regional Solid Waste Authority (MRSWA) located in Christiansburg, VA oversees the implementation of the Solid Waste Management Plan for our region of Southwest Virginia. MRSWA operates a transfer facility that receives recycling materials and municipal solid waste from its four jurisdictional members which includes the Towns of Blacksburg and Christiansburg, Montgomery County and Virginia Tech. MRSWA collects data from its members and prepares a consolidated recycling rate report using this DEQ form. Virginia Tech uses the same form and calculates its recycling rate using the DEQ formula shown on page 2. The figures provided in this report pertain to the Virginia Tech main campus in Blacksburg. MRSWA transitioned to a "Single Stream Recycling System" on July 1, 2015. Recycling and municipal solid waste is brought to MRSWA, weighed, and transported to our recycling hub Recycling & Disposal Services (RDS) in Roanoke, VA. Our "Commingled (Single Stream)" line item shows a significant increase this year (see page 3, part I). The sudden and unexpected closure of Popular Manor Enterprises in Riner, VA in mid-April directly resulted in an estimated 260 ton decrease in composted food waste and a decrease in our recycling rate. A feasibility study has identified an acceptable composting company for our use in 2016.

Due to the complexity and difficulty in obtaining data, this report reflects the best efforts of the solid waste planning unit to represent its recycling efforts for CY 2015. Data in this report was collected from our recycling and solid waste facilities, and from other recycling sources, including non-governmental entities. 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. These records will be made available for auditing purposes, if requested.

Dennis C. Cochrane

Sustainability Program Manager

APRIL 8, 2016

Authorized Signature

Title

Date

# Locality Recycling Rate Report

For Calendar Year 2015

**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 %**

$$\frac{\boxed{1,892} \text{ TONS}}{\boxed{1,892} \text{ TONS} + \boxed{3,916} \text{ TONS}} \times 100 = \boxed{32.58} \%$$

**Step 2: CREDITS calculation**

a. Total Recycling Residue	0 tons
b. Total Solid Waste Reused	49 tons
c. Total Non-MSW Recycled	4,981 tons
<b>CREDITS</b>	<b>5,030 tons</b>

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

$$\frac{\boxed{1,892} \text{ TONS} + \boxed{5,030} \text{ TONS}}{\boxed{1,892} \text{ TONS} + \boxed{5,030} \text{ TONS} + \boxed{3,916} \text{ TONS}} \times 100 = \boxed{63.87} \%$$

Step 4:  Source Reduction Credit does not apply; or

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

$$\boxed{63.87} \% + 2\% = \boxed{65.84} \%$$

**Step 5: Final Recycling Rate\* for Solid Waste Planning Unit =** 37.58 %

**\* 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**  
**PART B: DATA**

**For Calendar Year 2015**

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

<u>PRM TYPE</u>	<u>RECYCLED AMOUNT (TONS)</u>
Paper	594 (round to whole tons)
Metal	229
Plastic	16
Glass	0
Commingled (also known as Single Stream)	275
Yard Waste (composted or mulched)	250
Waste wood (chipped or mulched)	150
White Goods	4
Tires	6
Used Oil	4
Used Oil Filters	1
Used Antifreeze	0
Batteries	6
Electronics (E-Waste)	10
Food Waste Organic-Composting	298
Waste Cooking Oil	37
Fluorescent Lights/Bulbs & Ballasts	8
<b>TOTAL PRMs</b>	<b>1,892 (PRMs)</b>

**(Enter Total on Page 2, Step 1)**

**Listing of sources for Principal Recyclable Materials and Municipal Solid Waste data**

1. Virginia Tech activities that provided recycling and municipal solid waste (MSW) data:
  - a. Department of Facilities: Facilities Operations
  - b. Department of Facilities: University Design & Construction
  - c. Department of Facilities: Office of Sustainability
  - d. Dining Services
  - e. Environmental Health and Safety Office
  - f. Fleet Services
  - g. Department of Human Resources
  - h. \_\_\_\_\_
  - i. \_\_\_\_\_
  - j. \_\_\_\_\_
2. Other facilities (not included in #1 above) that provided PRM & MSW data:
  - a. Montgomery Regional Solid Waste Authority (MRSWA)
  - b. YMCA at Virginia Tech
  - c. Dairy Facilities at Kentland Farm
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_
  - f. \_\_\_\_\_
  - g. \_\_\_\_\_
  - h. \_\_\_\_\_
  - i. \_\_\_\_\_

# Locality Recycling Rate Report

For Calendar Year 2015

## 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)

<u>MATERIAL DESCRIPTION</u>	<u>FACILITY/OPERATION</u>	(round to whole tons) <u>TONS OF MATERIAL</u>
_____ from _____	_____	_____
_____ from _____	_____	_____
_____ from _____	_____	_____
<b>TOTAL RECYCLING RESIDUE</b>		<u>0</u>

(Enter Total on Page 2, Step 2 a)

## B. Solid Waste Re-Used

<u>MATERIAL DESCRIPTION</u>	<u>REUSE METHOD</u>	(round to whole tons) <u>TONS OF MATERIAL</u>
<u>Furniture/Appliances</u>	<u>Ytoss 2015 (YMCA at VT &amp; VT Recycling)</u>	<u>9</u>
<u>Milking Machinery</u>	<u>Sold to vendor for use by Local Farmers</u>	<u>49</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
<b>TOTAL SOLID WASTE REUSED</b>		<u>49</u>

(Enter Total on Page 2, Step 2 b)

## C. Non-Municipal Solid Waste (MSW) Recycled

<u>MATERIAL DESCRIPTION</u>	<u>RECYCLING METHOD</u>	(round to whole tons) <u>TONS OF MATERIAL</u>
<u>Construction Material</u>	<u>Concrete/Masonry (3 projects)</u>	<u>4,187</u>
<u>Asphalt Material</u>	<u>Asphalt Removal (3 projects)</u>	<u>190</u>
<u>EPDM Material</u>	<u>Membrane and Roofing (Sterrett Center)</u>	<u>14</u>
<u>Metal Material</u>	<u>Metal (Southgate Dairy Farm &amp; Brodie Hall)</u>	<u>590</u>
<b>TOTAL NON-MSW RECYCLED</b>		<u>4,981</u>

(Enter Total on Page 2, Step 2 c)

# Locality Recycling Rate Report

For Calendar Year 2015

**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:** The Department of Human Resources has implemented a paperless electronic leave reporting system for use by its more than 7,500 full-time employees.

**SRP description:** Dining Services replaced Styrofoam To-Go Containers with a Compostable alternative, and it continues to expand its very popular Reusable To-Go Container Program which now has a total of 3 OZZI Collection Stations.

**SRP description:** To reduce the use of plastic water bottles, the university has installed over 50 Water Bottle Filling Stations through the student Green RFP Program.

(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.

<u>MSW TYPE</u>	<u>TOTAL AMOUNT of MSW DISPOSED (TONS)</u>
Household	_____ (round to whole tons)
Commercial	_____
Institutional	_____ 3,916
Other (DO NOT INCLUDE INDUSTRIAL WASTES)	_____
<b>TOTAL MSW DISPOSED</b>	<b>_____ 3,916</b>

(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 2015

## Credits Worksheet

### I. Reuse of any Solid Waste

√	Material description	Tons	
___	PRM	_____	(round to whole tons)
___	PRM	_____	
___	PRM	_____	
___	Industrial	_____	
___	Construction	_____	
___	Demolition	_____	
___	Debris	_____	
<u>X</u>	Ytoss Program	<u>Res Hall used furniture/appliances</u>	9
<u>X</u>	Farm Machinery	<u>Milking Machines to Local Farmers</u>	40
___	Other	_____	
	<b>TOTAL TONS</b>	<u><b>49</b></u>	(enter data on Page 4, Solid Waste Re-Used)

### II. Recycling of any Non-Municipal Solid Waste

√	Material description	Tons	
<u>X</u>	Construction	<u>Concrete/Masonry (Southgate Inter)</u>	2,850
<u>X</u>	Construction	<u>Concrete/Masonry (Brodie Hall)</u>	1,042
<u>X</u>	Construction	<u>Concrete/Masonry (New Classroom)</u>	295
<u>X</u>	Construction	<u>Asphalt Removal (Southgate Inter)</u>	100
<u>X</u>	Roadwork	<u>Asphalt Removal (Duck Pond Drive)</u>	40
<u>X</u>	Roadwork	<u>Asphalt Removal (Southgate Drive)</u>	50
<u>X</u>	Roofing	<u>EPDM Materials (Sterrett Center)</u>	14
<u>X</u>	Metal	<u>Metal (Dairy Farm Bldgs 473 &amp; 488)</u>	590
	<b>TOTAL TONS</b>	<u><b>4,981</b></u>	(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 \_\_\_\_\_  
 Average tonnage per vehicle \_\_\_\_\_ X 1 Ton each

**Total Tons** \_\_\_\_\_ (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.

## 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**

<b>Material</b>	<b>Volume</b>	<b>Weight in Pounds</b>
<b>Metal</b>		
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
<b>Paper</b>		
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
<b>Plastic</b>		
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
<b>Glass</b>		
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
<b>Arboreal</b>		
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
<b>Other</b>		
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
<b>This Table For General Guidance Only.</b>		

# Virginia Tech Sustainability Annual Metrics Report 2015-2016

The following report provides a summary status on implementation of the Virginia Tech Climate Action Commitment and Sustainability Plan (VTCAC&SP) for 2015-2016. The VTCAC&SP was developed in 2009 and updated in 2013.

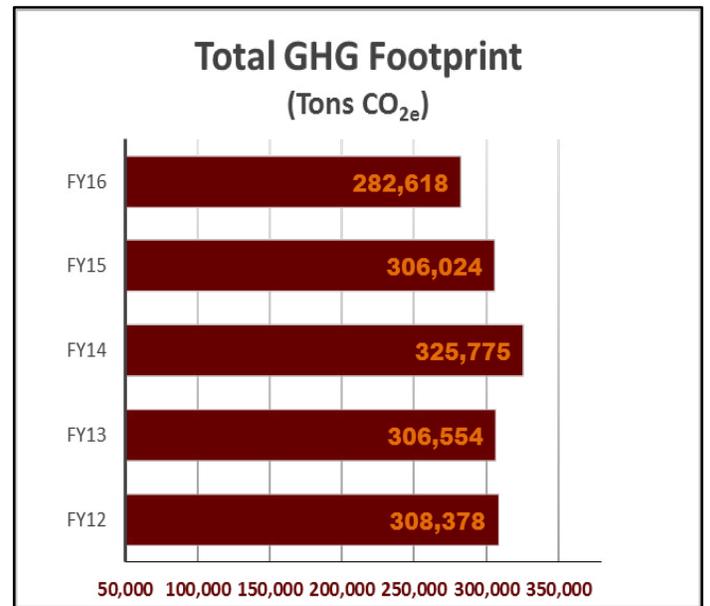
## KEY SUSTAINABILITY METRICS

1. **Greenhouse Gas (GHG) Emissions:** “Virginia Tech will establish a target for reduction of **campus GHG emissions** to 80% below 1990 emission level (**38,000 tons**) by 2050...” (VTCAC&SP)

### Comments

7.6% decrease in FY2016 driven by:

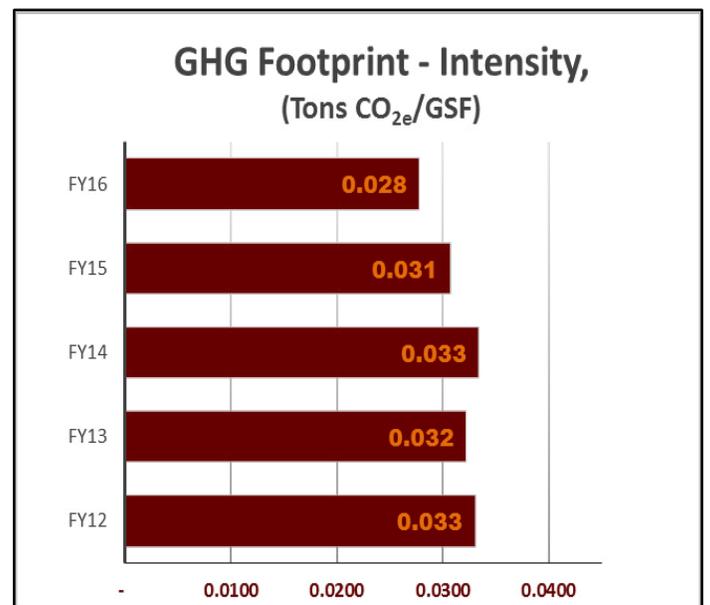
- **34% reduction** in consumption of coal in FY2016 over FY2015. The difference is compensated by increased natural gas consumption and a milder winter.
- Reduction in APCO’s coal usage resulted in less **emissions** per kilowatt-hour of purchased **electricity**.



### Comments

- The university added approximately **182,000 square feet (SF) in construction during FY2016** (New Classroom Building and Pearson Hall)
- GHG emission percentages by fuel source:
 

○ Purchased Electricity	51%
○ Coal	25%
○ Commute	6%
○ Natural Gas (Steam Plant)	11%
○ Natural Gas (Buildings)	2%
○ All Others	5%

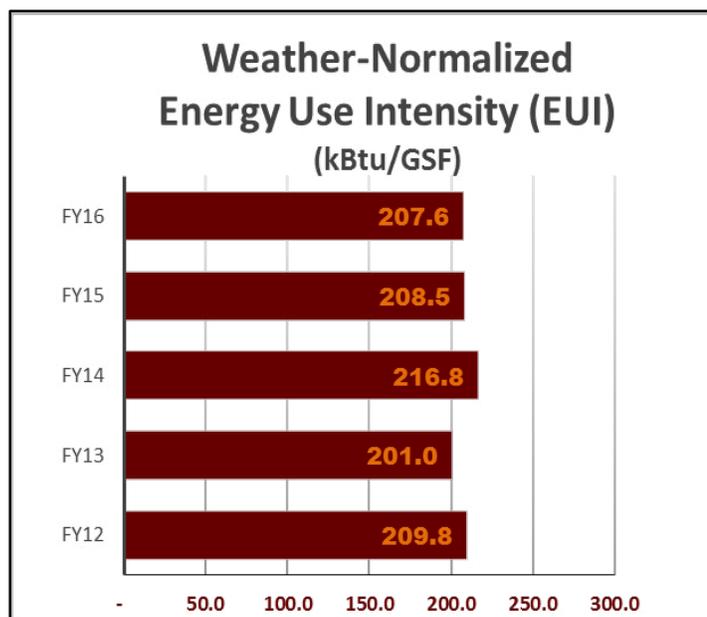


# Virginia Tech Sustainability Annual Metrics Report 2015-2016

2. **Energy Use Intensity (kBtu's/GSF):** "Virginia Tech will improve electricity and heating efficiency of campus facilities and their operations by improving the heating and cooling infrastructure and operation, lighting efficiency, equipment efficiency, and metering and controls of its existing buildings." (VTCAC&SP)

## Comments

- **0.4% decrease over FY2015** primarily driven by a 2.8% reduction in combined fuel consumption in FY2016 over FY2015.
- The university developed a Five Year Energy Action Plan to enhance on-going efforts to operate more efficiently. Virginia Tech has funded Phase 1 of the plan in the amount of \$2.5 million.

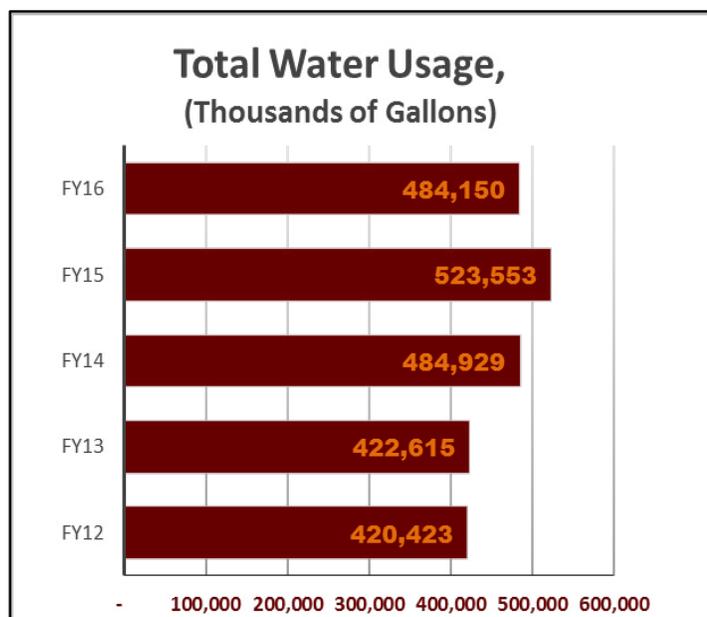


3. **Water Consumption:** "Virginia Tech will engage students, faculty, and staff through education and involvement to develop and implement innovative strategies for efficient and sustainable use of energy, **water**, and materials in all university-owned facilities." (VTCAC&SP)

## Comments

**7.5% decrease over FY2015** driven by:

- The installation of new Water Authority master meters which have provided a better assessment of water usage.
- A water conservation program will be developed in the Campus Master Plan's review of utilities.

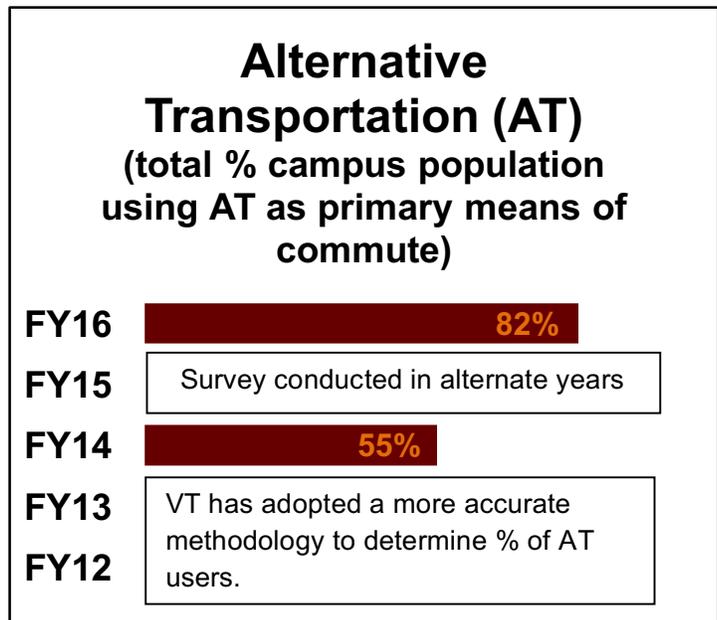


# Virginia Tech Sustainability Annual Metrics Report 2015-2016

4. **Alternative Transportation Use:** “Virginia Tech will improve transportation energy efficiency on campus through parking, fleet, and **alternative transportation** policies and practices.” (VTCAC&SP)

## Comments

- Virginia Tech received its seventh straight gold award from the Best Workplaces for Commuters Race for Excellence, after having been named “Best Of” in the university category in 2014.
- The university has earned recognition as a Bronze level Bicycle Friendly University from the League of American Bicyclists.
- The office of Alternative Transportation conducted the second iteration of the biennial Commuter Survey in the spring of 2016. The survey results showed that 81.6% of campus affiliates (faculty, staff, and students) use at least one alternative mode as a primary transportation source.

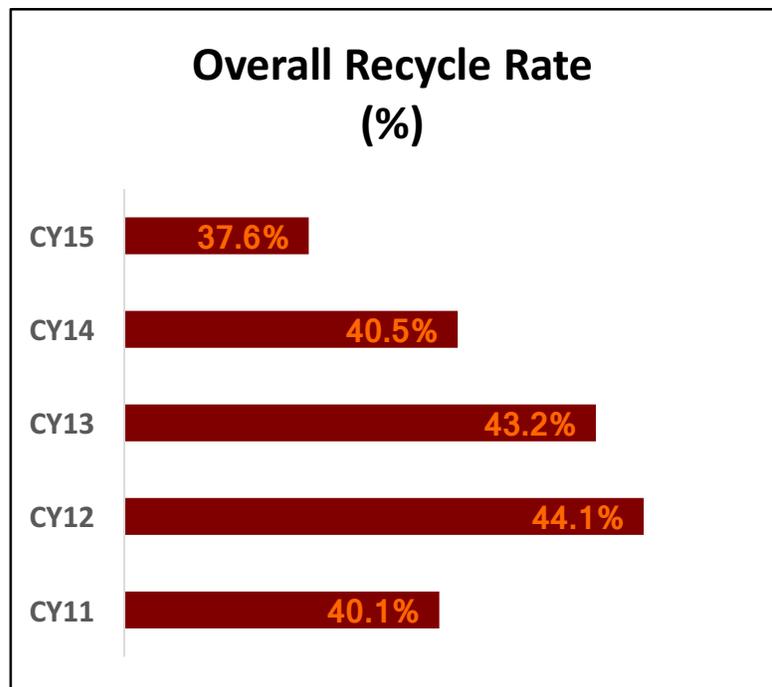


# Virginia Tech Sustainability Annual Metrics Report 2015-2016

5. **Recycling:** “...Virginia Tech will minimize waste and achieve a 50% recycle rate by 2020” (VTCAC&SP)

## Comments:

- 37.6% Overall Recycle Rate for 2015 directly attributable to the unanticipated closure of the composting vendor in April 2015. No other viable composting options were available for the remainder of the year, so 260 tons of food waste went to the landfill. Had the vendor remained operational Virginia Tech would have achieved a 42% overall recycling rate.
- Comprehensive Composting Feasibility Study completed in Spring 2016 recommended Virginia Tech negotiate with new vendor (Royal Oak Farm) near Lynchburg for future composting (as opposed to Virginia Tech starting its own composting operation).
- University transitioned to a Single Stream Recycling System effective July 2015 which will enhance Virginia Tech’s ability to reach the recycle rate goal.



# 2015-16 Office of Sustainability Annual Report



Facilities  
Department

**Office of Sustainability**  
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