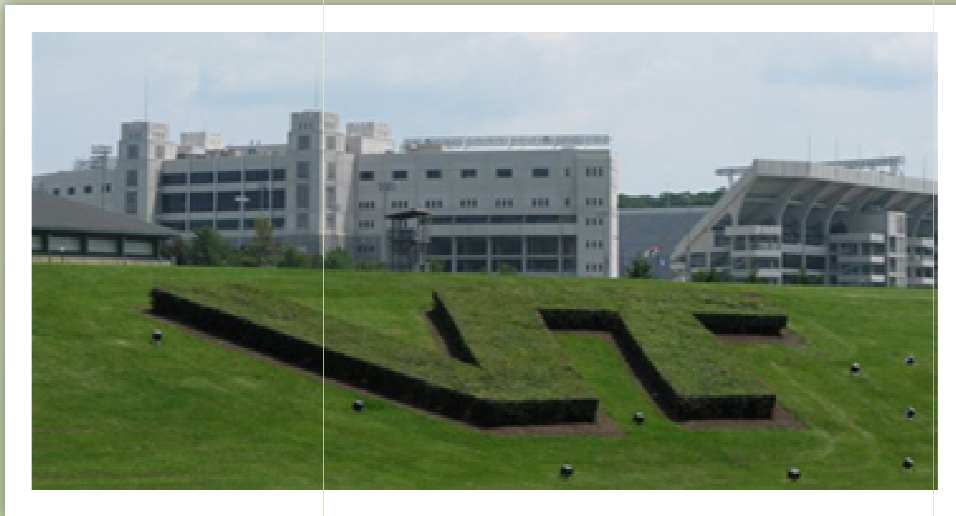# 2010 Annual Report on Campus Sustainability at Virginia Tech

Presented by the Virginia Tech
Office of Sustainability

2010 Annual Report on Campus Sustainability at Virginia Tech

Table of Contents

Acknowledgements

The Office of Sustainability would like to sincerely thank all of the following people that helped in various ways to develop this report. Without your hard work and dedication to making our campus more sustainable, we would not be where we are today.

John Beach, Director of Utilities and Strategic Initiatives, Facilities Services

Erv Blythe, Vice President for Information Technology and Chief Information Officer

Kim Briele, Associate Director of Operations Engineering, Facilities Services

Rachael Budowle, Housing & Dining Services Sustainability Coordinator

Donna Cassell, Director, Career Services

Catherine Chambers, Manager of Printing Services, Facilities Services

Michael Coleman, Associate Vice President for Facilities Services

Chris Compton, Director of Property Operations, Inn at Virginia Tech and Skelton Conference Center

David Dent, Associate Director, Facilities Services, University Planning, Design, & Construction

John Dooley, Vice President for Outreach and International Affairs

Holli Drewry, Assistant Director of Communications & Marketing, Student Affairs

Debby Freed, Alternative Transportation Manager, Facilities Services

Matt Gart, Landscape Architect

Tim Gift, Associate Director for Facilities Management, Student Programs

Patrick Hilt, University Planning, Design & Construction, Facilities Services

Monica Hunter, Associate Director of Campus Programs, UUSA

Scott Hurst, University Architect

Hal Irvin, Associate Vice President for Human Resources

Cathy Jacobs Director, Virginia Tech Work/Life Resources

Tom Kaloupek, Director of Materials Management, Purchasing

Fred Koziol, Operations Division Manager, Virginia Tech Services

Alex Kosnett, Student Intern

Mary Ann Lewis, Director of First Year Experiences

Lea Lupkin, Sustainability Consultant, Roanoke College 2009

Leon McClinton, Director, Residence Life

Jim McCoy, Chief of Staff, Facilities Services

Richard McCoy, Manager Parking Services, Facilities Services

Craig Moore, Site Development Manager, University Planning, Design, & Construction, Facilities Services

Byron Nichols, Associate Director Utility Systems, Facilities Services

Chris Piatt, Student Intern

John Randolph, Professor, Urban Affairs & Planning, School of Public & International Affairs

Gene Reed, Manager, Fleet Services, Facilities Services

Scott Reed, Senior Associate Director of Operations, UUSA

Katie Ridgeway, Comprehensive Waste Management Intern Team Captain

Wyatt Sasser, Director of Custodial Services, Facilities Services

Larry Smith, Associate Director of Mechanical/Electrical Systems, Facilities Services

Sarah Surak, Ph.D Candidate, Recycling Consultant

James Torgersen, Facilities Manager, Department of Athletics

Sincerely,

Denny Cochrane, Sustainability Programs Manager, Facilities Services

Angie De Soto, Campus Sustainability Planner, Facilities Services

Fred Selby, Energy Manager, Facilities Services

Executive Summary

The Virginia Tech Office of Sustainability is pleased to present the *2010 Annual Report on Campus Sustainability at Virginia Tech*. The purpose of this report is to provide a comprehensive status of implementation of the Virginia Tech Climate Action Commitment and Sustainability Plan (VTCAC&SP) and to highlight the accomplishments and breadth of sustainability programs at Virginia Tech. The creation of this report also meets the requirement of the Virginia Tech Climate Action Commitment Resolution, Point 13: "The university 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 reevaluate targets, making adjustments to targets as appropriate based on changing internal and external conditions and evolving technologies."

The numerous highlights from fiscal year 2010 (FY2010) are summarized below in order of their appearance in the report:

- President Steger highlighting Sustainability achievements in both his Virginia Tech Annual Report 2008-2009 Message from the President and the "Virginia Tech Year in Review, January 2010" video
- Creation of the of Director of Energy Initiatives position to lead the university's overall large-scale energy research initiatives
- 6.0% decrease from calendar year 2006 GHG emissions, normalized for both campus GSF and FTSE population
- 9.7% decrease from FY2007 annual energy use, normalized for both campus gross square footage (GSF) and climate conditions
- 10.0% decrease from FY2008 purchased electricity use
- February free cooling results at Central Chilled Water Plant and satellite chiller plants of 2,502,402 tons, or 91% of total demand
- Scheduled shutdown of approximately 172 Air Handler Units (AHU's) in 40 buildings and space temperature setback programs netting an estimated $1.0 million in annual energy savings
- Virginia Tech's successful enrollment in PJM's Summer Capacity Demand Response Interruptible Load Reduction (ILR) program to receive $162,000 for a 3 MW load reduction commitment
- Approved grant for a new solar photovoltaic (PV) installation on the new Perry Street parking garage
- Henderson Hall Renovation and Theatre 101 project being awarded US Green Building Council (USGBC) LEED Gold certification, achieving the goal of LEED Silver or better, and the first buildings to receive LEED certification on campus and in Blacksburg
- 36.5% recycling rate in calendar year 2009, already exceeding a recycle milestone rate of 35% by 2012
- Successful recycling events RecycleMania, Ytoss?, and Green Effect Game
- Successful introduction of composting to the Owens Hall and Dietrick Dining Facilities
- Facilities Services Department Custodial Services implementing a LEED-certified Green Cleaning Program and Housing and Dining Services Housekeeping Department being awarded JanPak Level III Clean Zone Certification
- First Eco-Olympics successfully being held on campus
- University Common Book Committee successfully incorporating environmental awareness into the common book process for the first time
- Fifty departments, representing 4,747 employees or two-thirds of the Blacksburg campus work force, participating in the Virginia Tech Green Campus Challenge survey
- More than 350,000 hours again being pledged and served by students, faculty and staff members, and alumni participating in VT-ENGAGE
- Virginia Tech again being designated one of the Best Workplaces for Commuters Race for Excellence and receiving a gold award for its Alternative Transportation programs in the Best Workplaces for Commuters Race to Excellence
- 48% campus alternative transportation use relative to 2009 baseline level of 45%
- Lumenhaus, Virginia Tech's entry into the 2009 Solar Decathlon and 2010 Solar Decathlon Europe competitions, placing first in the June, 2010 European Solar Decathlon in Madrid, Spain
- Virginia Tech receiving a Campus Sustainability Report Card 2010 overall grade of "B" from the Sustainable Endowments Institute (SEI), the second consecutive year the university's overall grade has improved
- SEI recognizing Virginia Tech as a "Campus Sustainability Leader"
- Virginia Tech placing third among top-scoring state agencies in this year's "Green Commonwealth Challenge"
- Virginia Tech being recognized by AASHE for their sustainability leadership

Virginia Tech's Climate Action Commitment & Sustainability Plan Implementation Progress

Point 1 – Leadership: *"Virginia Tech will be a Leader in Campus Sustainability."*

Background

On April 25, 2008 Virginia Tech President Charles W. Steger charged the newly established Energy and Sustainability Committee with the important responsibility of "developing a Virginia Tech Climate Commitment and Sustainability Plan that is specific to Virginia Tech." In addition, he directed the Committee to have the draft documents reviewed through the University Governance System, and to have the "Virginia Tech Climate Commitment" placed in resolution format presented to the University Council for action by the end of the 2009 Spring Semester.

The Energy and Sustainability Committee immediately created a Subcommittee consisting of 20 individuals from all facets of the university to conduct appropriate research and to prepare the drafts. The Commission on University Support reviewed and recommended the approval of all draft documentation in March 2009. On Earth Day, April 22, (less than one year from President Steger's charge) the University Council recommended approval of "The Virginia Tech Climate Action Commitment Resolution" and accepted the accompanying Sustainability Plan. On June 1, 2009, at their regularly scheduled meeting, the Virginia Tech Board of Visitors unanimously approved the 14-point **"The Virginia Tech Climate Action Commitment Resolution"**[1] and accepted the accompanying **"Sustainability Plan"**[2] (VTCAC&SP). The Sustainability Plan is a living document and provides a way for the university to achieve the points in the VTCAC Resolution. The foundation of the policy is that **Virginia Tech is to become a leader in campus sustainability.**

Ongoing Leadership Support

President Steger continued to show university leadership's ongoing support in FY2010 by highlighting sustainability achievements in both his Virginia Tech Annual Report **2008-2009 *Message from the President***[3] and the "**Virginia Tech Year in Review, January 2010**" video.[4]

> **"The university made huge strides in its effort to become "greener." The Board of Visitors and the University Council approved the Virginia Tech Climate Action Commitment Resolution and accepting the accompanying Sustainability Plan. The plan calls for, among other things, pursuing LEED Silver certification or better for all new buildings and renovations, a 35 percent recycling rate by 2012, specific targets for reductions in greenhouse gas emissions, reductions in electric usage, and improvements in transportation efficiency."**
>
> Dr. Charles W. Steger
> President's Message

2010 - A Campus Sustainability Leader

Virginia Tech is committed to becoming a national and international leader in campus sustainability. During Academic Year 2009-2010 the university received special sustainability leadership recognition.

First, the Sustainable Endowments Institute's College Sustainability Report Card 2010 recognized Virginia Tech as a **"Campus Sustainability Leader"** for receiving an average rating of "A-" or better for the six campus operations categories. The Administration, Student Involvement, and Transportation categories received an "A" rating, and the Climate Change & Energy, Green Building, and Food & Recycling received a "B" rating. Only 80 of the 332 colleges and universities surveyed earned this distinction.[5]

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[1] http://www.facilities.vt.edu/sustainability/climateAction.pdf
[2] http://www.facilities.vt.edu/sustainability/sustPlan.pdf
[3] http://www.president.vt.edu/annual-reports/09-10_annual_report.pdf
[4] http://www.reports.president.vt.edu/2009_year_in_review/
[5] http://www.greenreportcard.org/report-card-2010/awards/campus-sustainability-leaders

Second, Virginia Tech was included in the 2010-2011 edition of Princeton Review's exclusive *"Guide to 286 Green Colleges."*[6] The guide to 286 U.S. colleges and universities highlights schools that have demonstrated an "exemplary commitment to sustainability." Other Virginia institutions listed in this guide include the College of William and Mary, George Mason University, James Madison University, Radford University, University of Richmond, and the University of Virginia.

Third, Virginia Tech placed third in Virginia's "**Green Commonwealth Challenge**" and was the only higher education institution to finish in the top five.

Energy and Sustainability Committee

The Energy and Sustainability Committee (E&SC), established in 2007, is the University Governance System Committee charged "to review and provide advice to the University Administration on broad policy issues relating to the university's energy supply and use, and resource conservation." It consists of 19 members (6 administrators, 5 faculty, 4 staff, and 4 students)[7]. The E&SC met seven times during the Academic Year 2009-2010.[8]

The three E&SC primary goals for academic year 2009-2010 were:

1. **Revise University Policy 5505 "Campus Energy and Water" to incorporate requirements contained in former Governor Timothy Kaine's Executive Order 82 (2009), "Greening of State Government," effective June 10, 2009.** <u>Status</u>: The policy name was revised to read Policy 5505 "Campus Energy, Water, **and Waste** Reduction." Revision 2 to Policy 5505 was in the process of being finalized for submission to the approving authority (Vice President for Administrative Services) when current Governor Robert McDonnell issued Executive Order 19 (2010) effective July 1, 2010.[9] While E.O 19 (2010) contains many of the requirements in E.O. 82 (2009), the Committee anticipates having to modify Revision 2 to Policy 5505 this fall.

2. **Participate in the Governor's "Green Commonwealth Challenge" which was contained in E.O. 82 (2009).**
   <u>Status</u>: Complete. See "Point 13 – Annual Report Card", Section "Green Commonwealth Challenge (p. 26).

3. **Develop and implement the "Virginia Tech Green Campus Challenge" Survey.**
   <u>Status</u>: Complete. See "Point 8 – Engagement", Section, "Green Campus Challenge" (p. 18).

Point 2 - Strategic Plan: *"The university will represent the VTCAC&SP in the Virginia Tech Strategic Plan."*

Virginia Tech Strategic Plan Mid-Term Review

The Virginia Tech University Strategic Plan is updated every six years to reaffirm the university's commitment to achieving excellence as a comprehensive, land-grant university that makes innovative contributions in learning, discovery, and engagement to the Commonwealth of Virginia, the nation, and the world. While the current 2006-2012 University Strategic Plan update did not specifically address sustainability issues per se, a 2009 mid-term review recommended the creation of a high-level position to strategically and pro-actively lead the university's overall large-scale energy initiatives effort as a top priority.[10] As a result, a new position, **Director of Energy Initiatives** was created.

Point 3 - GHG Emissions Inventory: *"Virginia Tech will establish a target for reduction of campus GHG emissions to 80% below 1990 emission level by 2050, and interim targets from 2006 emissions of 316,000 tons consistent with the Virginia Energy Plan, the Governor's Commission on Climate Change, the Town of Blacksburg, and the federal administration: 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)."*

2006 Inventory

In 2007, students in Urban Affairs & Planning at Virginia Tech conducted a comprehensive energy and GHG inventory for the Town of Blacksburg and Virginia Tech[11] and determined total GHG emissions for calendar year 2006 to be **316,000 tons** of CO_2 equivalent. Although coal, natural gas and purchased electricity each represented approximately one-third of campus energy sources consumed in 2006, purchased electricity contributed the majority of emissions at 60%, with campus coal at 21%, natural gas at 8%, and commuting at 8%. The remaining emissions resulted from solid waste at 1%, water/wastewater at 0.9%, VT fleet at 0.6%, and VT aviation at 0.3%.

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[6] http://www.princetonreview.com/green-guide.aspx
[7] http://www.facilities.vt.edu/sustainability/e_s_roster_10.pdf
[8] http://www.facilities.vt.edu/sustainability/meeting_minutes_09-10.pdf
[9] http://www.governor.virginia.gov/Issues/ExecutiveOrders/pdf/EO_19.pdf
[10] http://www.provost.vt.edu/documents/provost_response_1_08_10.pdf
[11] http://www.facilities.vt.edu/sustainability/GHG_Emissions_Inventory.pdf

GHG Emissions Trend

Figure 1 shows an increasing, but leveling, GHG emissions trend to date, including a slight increase of emissions in the 2009 calendar year over recent years to **344,000 tons**, an 83% increase from the original 1990 baseline and a 1.8% increase over 2008.

2009 Inventory and Analysis

The calendar year 2009 inventory result of 344,000 tons represents an increase of 28,000 tons, or 8.9% in total GHG emissions over the 316,000 tons from the 2006 inventory. One significant driver for the increase was the intentional maximizing of the campus Central Power Plant's coal-burning capability to meet budget commitments; however, this was for the most part offset by emissions reductions resulting from achieved reductions in 2009 campus energy usage. In 2006, coal accounted for 75.0% of total boiler fuel input on a per-Btu basis, while lower GHG-emitting natural gas accounted for 24.6% and fuel oil the remaining 0.4%. In 2009 however, coal Btu percentage of total boiler fuel input increased to **92.8%**, while natural gas decreased to only 6.2%, and fuel oil at the remaining 1.0%. For comparison purposes, on a per-Btu basis, coal-related GHG emissions are 85.4% greater than that of 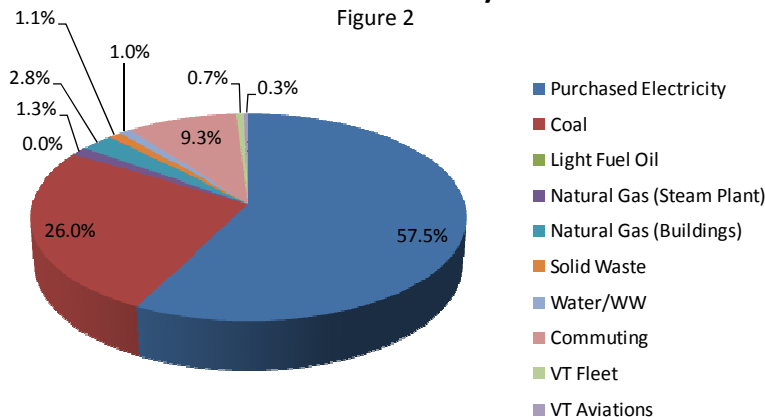natural gas and 31.6% greater than that of fuel oil. Figure 2 shows that in 2009, purchased electricity continued to be by far the predominant GHG emissions category.

Two additional factors contributed to the overall GHG emissions increase for 2009 over 2006 - campus gross square footage (GSF) and student population (FTSE); per Table 1 below, 2009 GHG emissions, when normalized for both campus GSF and FTSE population actually have been **reduced by 6.0%** since 2006. Regardless, the VTCAC&SP commits the university to **absolute GHG reductions**, which must be the continuing focus.

Virginia Tech GHG Emissions
Targets vs. Actuals
(in CO2 Equivalent Tons)
Figure 1

2009 GHG Emissions % By Source
Figure 2

Table 1: 2009 vs. 2006 Emissions Normalized for GSF and FTSE

	2006	2009	% Change + or ( )
Total Emissions (tons CO$_2$ e)	316,000	344,000	+8.9%
Full-Time Student Equivalents (FTSE)	28,622	30,181	+5.4%
Emissions / FTSE	**11.04**	**11.40**	**+3.2%**
Campus GSF (M-GSF)	7,650,213	8,403,343	+9.8%
Emissions / 1,000 GSF	**41.31**	**40.94**	**(0.9%)**
Emissions / FTSE / 1,000,000 GSF	**1.44**	**1.36**	**(6.0%)**

Point 4 - GHG Emissions Reduction: *"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."*

Energy Usage

Overall Usage Trends

Virginia Tech is a comprehensive, innovative research university with the largest full-time student population in Virginia. Its Blacksburg campus includes more than 138 buildings occupying more than 8.4 million gross square feet (GSF). During FY2010, the Virginia Tech campus consumed over **1.893 trillion Btu's** of coal, natural gas (Central Power Plant only), fuel oil and purchased electricity, representing a 1.23% increase over FY2009 and a 13.69% increase over FY2006. Figure 4 shows this steadily increasing overall consumption over the most recent five-year period. However, similar to the GHG emissions analysis, other factors must be considered.

Since FY2006, the Virginia Tech campus footprint has grown from 7,503,425 gross square feet (GSF) to 8,403,343 in FY2010, a 12% increase. Recent E&G building additions such as the **Institute For Critical Technologies & Applied Sciences** (ICTAS) I (99,411 GSF), **Life Sciences I** (71,799 GSF) and **Bishop-Favrao Hall** (31,651 GSF) are state-of-the-art research facilities and therefore inherently energy-intensive. New fully-air conditioned auxiliaries additions including **New Hall West** residence (92,800 GSF) **Hahn-Hurst Basketball Practice Facility** (52,944 GSF) and **Football Locker Room** (42,145 GSF) have also added significant electrical load to the campus. **ICTAS II** (42,190 GSF) is currently under construction with project completion scheduled for December 2010.

The winter of 2009-2010 was one of the coldest and most severe in recent Blacksburg history. The eastern United States encountered winter storms almost weekly during the months of December, January and February. Through FY2010, Blacksburg experienced **5,260 Heating Degree Days** (HDD's, a quantitative index used to reflect climate severity, calculated by subtracting mean daily temperature from a 65°F balance temperature and summing only positive values over an entire year), a 3.16% increase over FY2009 and a 11.99% increase over FY2006.

Normalizing campus energy use for both building GSF and annual HDD's, figure 5 instead shows a steadily decreasing energy consumption trend over the previous three years since energy conservation efforts began in earnest and a **9.67% reduction** in FY2010 over FY2007.
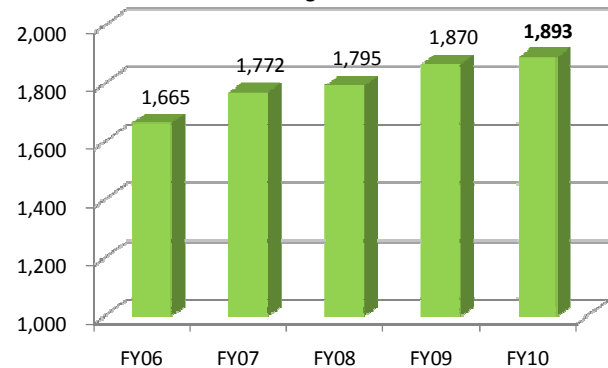
Energy Fuel Source Trends

Virginia is a net exporter of coal, and coal mining continues to be a significant economic driver of the Southwest Virginia economy. Virginia Tech's Central Power Plant, which provides district steam for heating and process needs to the majority of campus buildings, reflects that fact with its 200,000 pounds per hour of coal-fired steam generating capacity.

For FY2010, natural gas and fuel oil continued to cost significantly more on a per-Btu basis than coal. With the university facing multi-million dollar reductions in its FY2010 operating budget, Facilities Services opted beginning in FY2009 to maximize coal-firing steam generation for the immediate future, coupled with continued energy conservation and efficiency improvement efforts. Figure 6 shows the resultant increase in per-Btu coal consumption over the most recent three year period relative to natural gas and fuel oil. Figure 7 provides a detailed energy fuel source percentage per-Btu breakdown for FY2010. While the campus currently relies heavily on coal as a cost-effective fuel source, it does so in an environmentally-responsible manner and in full compliance with all existing state and federal regulations.

Campus Energy Use*
Coal, Oil, Natural Gas, Purchased Electricity
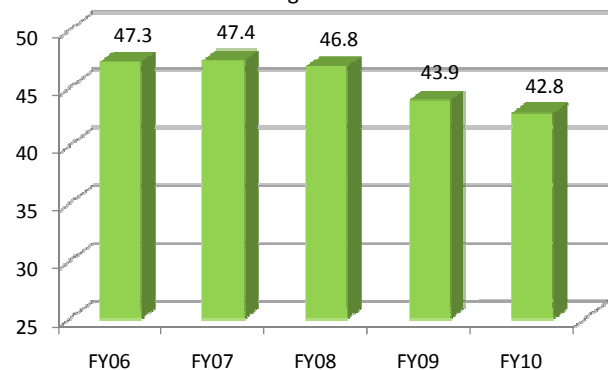(In Billions Btu's)
Figure 3

Campus Energy Use* - Normalized
Normalized to Building GSF and Heating Degree Days
(In Btu's per GSF per HDD)
Figure 4

∗ Numbers do not include unmetered natural gas to individual building package boilers; FY2010 coal, oil, and natural gas numbers based on projected 12-month usage

By comparison, American Electric Power's (AEP) electrical generation capacity by fuel source in 2009 was coal at 66%, natural gas/oil at 22%, nuclear at 6%, and hydro/pumped storage/renewable at 6%.[12]

Purchased Electricity Reduction

Figures 6 and 8 also show a continuing decrease in annual purchased electricity use resulting from conservation efforts combined with a slight increase in self-generation at the Central Power Plant. Both results support VTCAC&SP goals to "Reduce purchased electricity by 10% from 2008 by 2012" and "Increase steam plant electric generating capacity." FY2010's purchased electricity use of 169,110 MWh's represents a **10.0% decrease** over FY08's 187,807 MWh's.

Virginia Tech Policy 5505

Virginia Tech Policy 5505, *Campus Energy and Water,* continues to provide the foundation for the university's goal to "achieve the highest standards in energy/water usage with consideration of the impact on environmental quality and economic performance."[13] Policy 5505 contains procedures for Efficiency and Conservation, Facility Design, Building Operation and Maintenance, Transportation, Billing, Point of Contact, Energy and Sustainability Committee, University Departments and Regulatory Agency Contracts, and Implementation and Compliance.
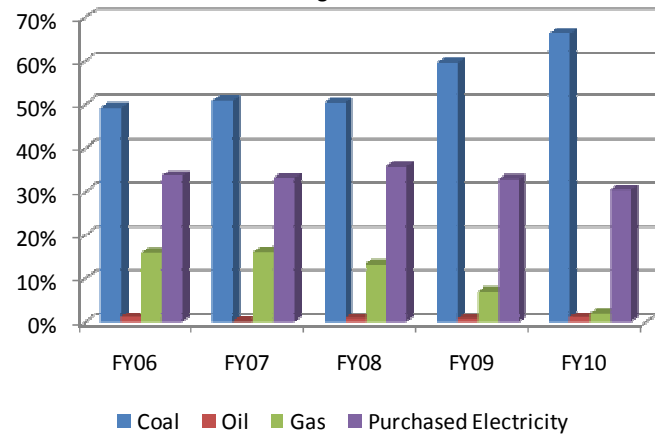
Chilled Water Supply Optimization

In July 2009 the **Chilled Water Infrastructure Master Plan Study** was completed. The study recommended consolidation of Virginia Tech's existing combination of district and decentralized/stand-alone chilled water networks into a total of five regional center chilled water production plants, joined to an interconnected distribution network. The five regional plants would consist of: (1) the existing Central Chilled Water Plant, renamed the North Chiller Plant (NCP); (2) an expanded Dietrick Chilled Water Plant (DCP); (3) a new Perry Street Chilled Water Plant servicing the Northwest (NWCP); (4) a new Northeast Academic Core Chilled Water Plant (NECP); and (5) a new Southwest / Life Sciences District Chilled Water Plant (SWCP). The project proposed $46 million in present value savings 30-year life cycle over the current stand-alone chiller expansion approach. Currently, design of new Southwest Chiller Plant is underway, with a Construction Manager at-Risk having been selected and a request for construction funding having been submitted to the state; construction is anticipated to begin once construction funding is appropriated by the state. In addition, chilled water sourcing for planned new construction projects such as the Academic & Student Affairs Building and Performing Arts Center will be considered in view of this master plan.

Campus Energy Use*
By Percent Energy Source
Figure 5

Campus Energy Use*
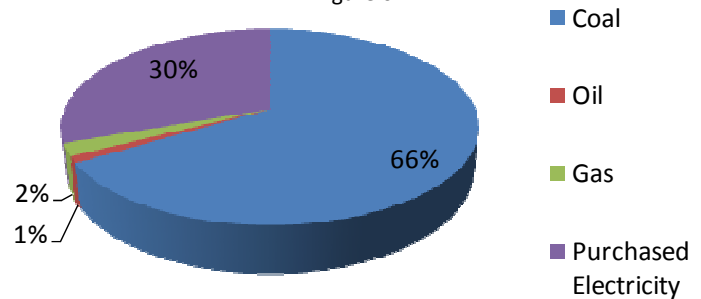By Percent Energy Source - FY2010
Figure 6

Campus Electricity Use
Purchased vs. Self-Generation (in MWh's)
Figure 7

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[12] http://www.nxtbook.com/nxtbooks/aep/accountability2010/#/34
[13] http://www.policies.vt.edu/5505.pdf

∗ Numbers do not include unmetered natural gas to individual building package boilers; FY2010 coal, oil, and natural gas numbers based on projected 12-month usage

During the 2009-2010 winter, Virginia Tech utilities personnel took advantage of the cold temperatures to maximize **free cooling** opportunities at the Central Chilled Water Plant and satellite chiller plants. Free cooling uses the colder cooling tower condensing water to create the refrigeration cycle with no energy having to be expended in the chiller's compressor. Free cooling-related record keeping began on January 15, 2010. Results for the 2nd half of January were 543,067 tons from free cooling, or 54% of total chilled water tonnage demand. Results for February were **2,502,402 tons** of free cooling, or **91%** of total demand. Free cooling season ended in early March and will resume this winter.

Air Handler Unit Shutdowns

Beginning in May 2009 procedures were implemented to shut down campus air handling units (AHU's) during unoccupied periods, primarily third shift on weekdays and extended hours on weekends. Since the program's inception in May, 2009, AHUs have been gradually added to the shutdown list. Approximately 172 AHU's in 40 buildings have been included. Preliminary calculations show an estimated savings of **$181,500** for the 2009 cooling season due to reductions in electricity and chilled water usage.

For the first time, beginning in the fall of 2009, the University aggressively pursued AHU shutdowns during holiday and break periods. Preliminary calculations show an estimated combined electrical and steam savings for Thanksgiving Break and Winter Break periods as **$372,470**.

In addition to resuming cooling season scheduled HVAC shutdowns in May, the number of summer scheduled buildings was increased from 25 in 2009 to approximately 50 in 2010; also, the number of scheduled-off hours was increased from 72 hours per week to approximately 80 hours per week. Most recently, building owners from 11 buildings identified areas mostly unoccupied during the summer in their buildings, allowing 38 AHU's to be shut down during peak demand periods and reducing summer billed demand by an average of 766 kW. Total AHU-related estimated annual savings are **$700,000**.

Space Temperature Setbacks

Space temperature setpoints adjustments back to 68 degrees for the heating season and 74 degrees for the cooling season implemented campus-wide in December, 2008 continued throughout FY2010, for an estimated **$300,000** annual savings.

Electrical Demand Response

Electric demand response refers to large energy users reducing or shifting their electric demand during periods of unusually high aggregate electric demand and/or wholesale electricity prices. The U.S EPA recognizes electrical demand response as one of several "cost-effective strategies for reducing peak electric demand, achieving air quality benefits, and contributing to electric supply reliability."[14] PJM Interconnection (PJM), the regional transmission organization (RTO) that manages the high-voltage electric grid and wholesale electricity market serving Virginia, 12 other states and the District of Colombia, currently offers two types of demand response programs to Virginia customers.

Virginia Department of Mines, Minerals and Energy (DMME) has selected EnergyConnect, Inc., a third-party Curtailment Service Provider to administer PJM's demand response programs in the Commonwealth. During FY2010 EnergyConnect enrolled Virginia Tech in both PJM's **Summer Capacity Demand Response Interruptible Load Reduction (ILR)** and **Economic Demand Response** programs. For the ILR program, Virginia Tech committed to a 3MW demand reduction in the event of a significant grid event in exchange for a **$162,000 benefit** to be paid during FY2011. As a requirement for the enrollment process, Virginia Tech successfully demonstrated a one hour-long 3MW load reduction test on June 24. EnergyConnect also enrolled Virginia Tech in PJM's Economic Demand Response program effective July 1, 2010, which will compensate the university when it electively reduces energy consumption during select hours when wholesale electricity rates are high. To facilitate Virginia Tech's participation, Siemens and EnergyConnect have partnered to develop a web-based interface utilizing the existing Siemens Building Automation System (BAS) that will provide EnergyConnect with real-time demand data originating from Virginia Tech Electrical Services (VTES). Although a detailed demand reduction plan has yet to developed, July's wholesale electricity rates exceeding $0.20/kWh on several occasions demonstrate the financial potential that exists with this program.

Alternative and Renewable Energy Sources

While renewable energy sources are not currently used, approval for the funding of a new solar **photovoltaic (PV) installation** on the new parking garage was announced on Earth Day, April 22. The PV system will tentatively generate approximately **148,000 kWh/year**, cost an estimated $1.3 million, and will provide approximately 14.1% of the total energy needs of the structure. The system will physically cover approximately 12,440 ft2 or 14% of the top deck.

Preliminary discussions have taken place this year between the Virginia Tech Office of Sustainability, utilities staff, and faculty from the College of Engineering's Department of Mining & Minerals Engineering to explore the application potential of dewatered coal fines from abandoned waste coal slurry ponds as a fuel source for Virginia Tech coal boilers, either alone, or in combination with biomass (switchgrass).

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[14] http://www.epa.gov/statelocalclimate/documents/pdf/hedd_clean_energy_options.pdf

Point 5 - Office of Sustainability: *"Virginia Tech will establish an Office of Sustainability 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."*

Office of Sustainability

The Office of Sustainability was established in 2009 under the Facilities Services Department and serves as an information clearing-house, coordinating continuous discussion between the various administrative units, administrators, facility infrastructure and operational groups, and students. Currently, the Office of Sustainability currently consists of six full-time employees: Sustainability Program Manager; Energy Manager; Campus Sustainability Planner; Graduate Assistant; and two Green Team Coordinators. In addition, numerous staff and faculty employees and both paid and unpaid student interns campus-wide support sustainability initiatives as liaisons, coordinators of specific sustainability programs, or leaders of departmental curriculum efforts.

The Office of Sustainability established a student sustainability internship program in 2009 and the program continues to grow each semester. During FY10 interns focused on implementation of the VTCAC&SP and coordination of student sustainability education and worked on projects involving Comprehensive Waste Management, Annual Report Data Collection and Graphic Design, Attitudes and Awareness Assessment, and Electronic Media Strategies.

Office of Sustainability Website

The Office of Sustainability website[15] was created to be the central clearinghouse for Virginia Tech sustainability-related news and information. It is updated regularly and provides current status on ongoing sustainability initiatives, activities and events. The website provides a venue for viewers to communicate with Office of Sustainability staff on initiatives, ask questions about programs, and submit new project ideas. Interns spent time this spring identifying Office of Sustainability website best practices and made recommendations for improvements that will be incorporated into a major website update planned for the following academic year.

Point 6 – LEED Certification: *"Virginia Tech will pursue LEED Silver certification or better and exceed ASHRAE 90.1 2004 energy performance by 35% (ASHRAE 90.1 2007 by 30%) for all new buildings and major renovations. Capital budgets should account for future energy price, cost of building operation, return on investment, and environmental benefits of achieving this level of performance."*

Henderson Hall Renovation and Theatre 101 Addition Project

The Henderson Hall Renovation and Theatre 101 Addition projects were awarded the US Green Building Council (USGBC) LEED (Leadership in Energy and Environmental Design) **Gold certification** on February 5, 2010 for their sustainable energy use, lighting, water and material use as well as incorporating a variety of other sustainable strategies.

LEED Gold-Certified Henderson Hall Renovation

President Steger Delivering an Earth Day 2010 Message in Front of the New LEED Gold-Certified Theater 101 Addition

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[15] http://www.facilities.vt.edu/sustainability/

The buildings are the first to receive LEED certification on campus and in Blacksburg. President Steger unveiled a US Green Building Council LEED Gold Rating Plaque for each building during an Earth Day 2010 Celebration Ceremony on April 22.

Virginia Green Program

The "Virginia Green" program[16] works to reduce the environmental impacts of Virginia's Tourism Industry. It is run as a partnership between the Virginia Department of Environmental Quality, the Virginia Tourism Corporation and the Virginia Hospitality and Tourism Association. The Inn at Virginia Tech is certified as "Virginia Green Lodging" facility and the Skelton Conference Center is certified as a "Virginia Green Conference Center."

Future LEED Projects

The university currently has 11 additional projects totaling over 1 million GSF currently registered with the USGBC, with six currently under construction and five in the design phase:

Buildings Under Construction (581,855 GSF):
ICTAS II (42,000 GSF)
Ambler Johnston Residence Hall Renovation (272,000 GSF)
Academic and Student Affairs Building (91,200 GSF)[17]
Visitors and Undergraduate Admissions Center (18,155 GSF)
Football Locker Room Addition (38,500 GSF)
Center for the Arts (120,000 GSF)[18]

Buildings In Design Phase (422,000 GSF):
Signature Engineering Building (160,000 GSF)
Virginia Bioinformatics Institute Addition (50,000 GSF)
Human and Agricultural Biosciences Building (92,000 GSF)
Davidson Hall Chemistry Renovation (50,000 GSF)
Myers Lawson School of Construction Phases II and III (70,000 GSF)

Point 7 - Energy Efficiency: *"Virginia Tech will improve electricity and heating efficiency of campus facilities and their operations, including the heating and cooling infrastructure and operation, lighting efficiency, controls and operation, and equipment efficiency and controls."*

Lighting Retrofits and Occupancy Sensors

Further large-scale progress on lighting upgrades was minimal during FY2010 due to budgetary constraints and was limited primarily to new construction and building renovation projects. Projects to retrofit or replace fixtures in Engel and Roberson Halls were completed in spring 2010, while other projects remain on hold due to unavailability of funds. The Sterrett Facilities Center lighting conversions are being completed as spaces are renovated. Similarly new installations of occupancy sensors are on hold pending funding availability.

ESCO Performance Contracting

In January, Pepco Energy Services (Pepco), selected to be the Phase 1 Energy Services Company (ESCO) for Virginia Tech submitted their Technical Audit to the university. The Technical Audit verified and expanded upon the savings of the "Back of the Envelope Proposal" submitted in March, 2009 for six initial campus buildings (Central Power Plant, Cassell Coliseum, Dietrick Hall, Pritchard Hall, McBryde Hall, and Hahn Hall-South). The Technical Audit also provides a basis for an energy performance contract with a detailed and specific scope of work with measurable and verifiable energy and water savings.

Pepco proposed $11.7 million of Energy Conservation Measures (ECM), with $0.88 million in annual energy savings totaling over $19 million over the 15-year contract term, a 21.1% guaranteed reduction in energy and a 8.3% reduction in water consumption. Environmentally, the proposed ECM's in total would reduce annual GHG emissions by approximately 4,514 tons. Facilities staff has reviewed the list and will recommend eliminating some of the lowest-return ECM's for a revised $8.7 million Phase 1 ESCO project with projected annual savings of $0.83 million for a 10.5-year simple payback; a presentation for final review is currently under development.

McBryde Hall

Pritchard Hall

Cassell Coliseum

Dietrick Hall

Hahn (South) Hall

Central Power Plant

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[16] http://www.deq.state.va.us/p2/virginiagreen/
[17] http://www.pdc.facilities.vt.edu/mediawiki/index.php/File:Acad_Stu_Afrs_Aug_09_Page_1.jpg
[18] http://www.vtnews.vt.edu/articles/2010/06/2010-477.html

Point 8 - Waste Minimization: *"The university will adopt at least 4 reduction measures in the Waste Minimization component of the national RecycleMania competition. Virginia Tech Recycling will adopt a goal of 35% recycle rate by 2012 and 50% by 2025.*
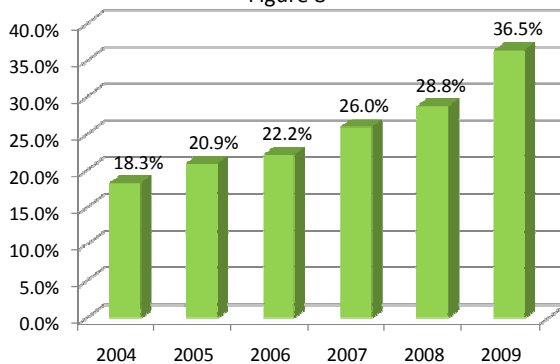
Recycling

Waste and Recycling Trends

Having achieved a 2009 recycling rate of **36.5%,** Virginia Tech has already exceeded its recycle milestone rate of 35% by 2012 and is on pace to meet or exceed its 50% recycle rate goal by 2025. Figures 8 and 9 show continuing favorable rate trends in overall recycling increase, municipal solid waste (MSW) reduction, and printable recyclable materials (PRM) increase.

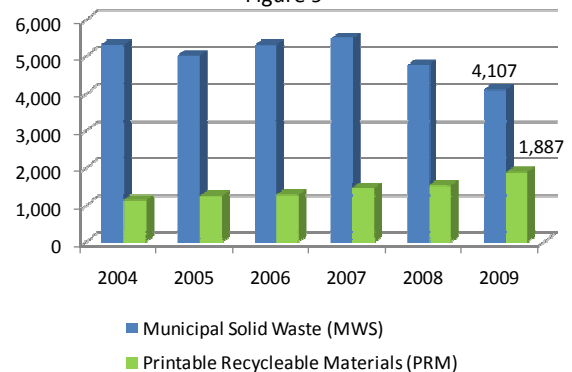**Final Recycling Rates**
Calendar Years 2004-2009
Figure 8

MSW and PRM Rates
Calendar Years 2004-2009 (in Annual Tons)
Figure 9

In addition, more than 10,300 tons of new construction and demolition waste for capital and renovation projects was diverted at a rate of **75.8%**.

RecycleMania Competition

For the fourth consecutive year, Virginia Tech successfully participated alongside of more than 600 colleges and universities nationwide in the 2010 RecycleMania tournament. University highlights included a **6.6% increase** in cumulative recycling rate, a **7.3% increase** in pounds of recycled material, and a **4.7% decrease** in pounds of trash generated. Additionally, Food Service composting pounds tripled and waste generation significantly lowered as the result of Dining Services' recycling efforts. In general the university ranked in the middle of the pack when compared to institutions within the ACC and the Commonwealth of Virginia in all categories. Results are available on the RecycleMania website.[19]

Ytoss?

The YMCA at Virginia Tech, Virginia Tech's Office of Sustainability, the Department of Residence Life, the Town of Blacksburg and other campus and community-based organizations again partnered for this year's *Ytoss?* event[20]. The program is a recycling event that collects gently-used items students often "toss" during move-out, including TVs, electronics, microwaves, refrigerators, furniture, rugs, clothing, hutches, and fans. Non-refrigerated foods, paper products, and laundry detergent are collected and donated to a local food bank. This year**, 9.86 tons** of materials were diverted from the landfill and the program received the University Student Leadership Award for "**Outstanding Achievement by an Organization**" in April 2010. *Ytoss?* not only reduces move-out related dumping fees it provides a substantial fundraising opportunity for the YMCA at Virginia Tech's leadership development programs.

Waste Management Planning

Virginia Tech is one of the five jurisdictional members of the Montgomery Regional Solid Waste Authority (MRSWA). During Academic Year 2009-2010 the university participated in the comprehensive process of updating the "MRSWA Solid Waste Management Plan."[21] The plan was approved by the Board of Directors on March 18, 2010.

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[19] http://www.recyclemaniacs.org/Index.htm
[20] http://www.facilities.vt.edu/sustainability/ytoss_2010_summary.pdf
[21] http://www.mrswa.com/assets/MRSWA_SWMP.pdf

In the past, Virginia Tech trash and recycling were managed by several independent departments. In January, a Waste Management Taskforce was formed to begin development of a **Comprehensive Waste Management Plan.** The plan will document current waste management practices and consolidate currently decentralized policies for managing trash, recyclables, and special materials such as construction debris, compostable material, and special events waste. The plan will outline short-term, medium-term and long-term university waste reduction goals and will be updated on an annual basis or as needed.

This past year, a diverse, undergraduate student intern team collected waste and recycling data in 50 buildings across campus. Following the team's analysis of current bin locations, location efficiency, signage needs, and overall contamination issues, recommended best approaches to managing waste and recycling for each building were submitted in a detailed report (copies of this report are available through the Office of Sustainability.) The intern team's recommendations will be incorporated in the Comprehensive Waste Management Plan.

Recycling at Hokie Home Football Games

At Virginia Tech's 2009 football season home opener with Marshall, the SGA Sustainability Committee and the Environmental Coalition partnered to conduct a **waste audit** in the tailgating parking lots and determined that approximately 50% of the items placed in trash containers during the game were recyclable. Tailgaters cited reasons for lack of recycling such as (1) not enough recycling receptacles available, (2) receptacles not in central enough locations, and (3) not knowing recycling was available. Student leaders are spearheading an effort to develop an in-stadium and tailgating recycling and fan engagement program for 2010 home football games.

The SGA and Athletic Department designated the Virginia Tech-Nebraska game on September 19, 2009, as the first **Green Effect Game**. The SGA, along with nearly 150 student volunteers visited all designated parking lots encouraging tailgaters and fans to recycle and to distribute recycling bags. As the result, there was an estimated **70% increase** in recycled material collected at the Green Effect Game over the 1.05 tons of recycled material collected during the previous Saturday's Virginia Tech-Marshall game. The 2010 Green Effect Game will be the Virginia Tech – East Carolina game on September 18 and will be the kickoff event for Sustainability Week 2010.

Food and Dining

The Farms and Fields Project and Local Foods

The Farms and Fields Project first opened in Owens Food Court in January of 2008 to provide sustainable, organic and local options. In addition, local products are being integrated into other Dining Centers. A Dining Services-run garden has been expanded to one acre of vegetable production and produce generated will be used in Farms and Fields and other dining facilities on campus. To further integrate local foods into the offerings in dining facilities, Homestead Creamery, a family-owned business in southwest Virginia, meats and ice creams are available in multiple locations.

Dining Services incorporated its own sustainability campaign into New Student Orientation meals. A display was placed in D2 for orientation breakfast and dinner, reaching all incoming students and their families during their first meal. The display highlighted composting efforts at the dining facility, the Dining Services Garden harvest present at the meal (local and sustainably managed produce), and the ability to reserve a reusable bottle for use in the fall through the "Plant the Seed

A life-sized water bottle display greets visitors from the Pritchard-side entrance, letting them know that "every drop counts" to Virginia Tech Dining.

for Sustainability Campaign." Additional signage and tablecards were posted throughout the facility.

Composting

Dining Services completed a highly successful composting pilot program at their Southgate Food Processing Facility and expanded composting to the Owens Hall Dining Facility at the beginning of the 2009 Fall Semester. Composting was introduced to the Dietrick Dining Hall this summer with the goal of having composting at all on-campus dining facilities in the near future. Poplar Manor Enterprises (PME) in Riner, Virginia, the first composting facility in the region, composted **131 tons** of Virginia Tech's dining hall waste in calendar year 2009. Pre-consumer food scraps for 100% of meals prepared on campus are now composted.

Waste Recycling, Reduction, Diversion and Donation

Dining Services has initiated a variety of initiatives in dining halls to reduce food waste, including encouraging the use of reusable dishware and conducting a food waste audit. Dining Services initiated tray-less dining in "all you care to eat" facilities - Shultz and D2 - in 2008 following a successful test week in April during which trays were removed from the D2 dining center. The pilot study resulted in approximately a **30% reduction in food waste**, or the equivalent of **1,546 pounds of food**.[22] Additionally, Dining Services is developing a comprehensive waste tracking system for employees to assess and adjust overproduction, prep, and other waste to more effectively reduce, donate, and divert food waste. This program will be piloted in summer and fall 2010. Dining Services is working on providing recycling for mixed paper and commingled containers to customers in all dining centers and equipping kitchens with recycling receptacles for staff use. Dining Services has selected a specific reusable bottle design that meets all food service standards for use in a la carte dining facilities for free water and discounted fountain drinks. The bottle was piloted during Earth Week 2010 and was made available for reservation during New Student Orientation.

A food donation initiative began during the 2009 spring semester and was expanded during the 2009 fall semester. Edible un-eaten food is currently being diverted from trashcans in the dining halls to the local non-profit organization Feeding America. All grab-n-go and individually packaged items not sold within the time period for quality standards yet still safe for consumption are donated daily. Dining Services additionally piloted "hot food diversion" this year in the D2 facility. Plans are to expand this type of diversion throughout dining centers on campus.

Campus Landscape and Grounds

Tree Canopy

The Arbor Day Foundation selected Virginia Tech for "Tree Campus USA" Status in 2008 and subsequently approved its yearly application for recertification. As of April 22, 2010, 252 trees had been planted this fiscal year (153 of them planted by students) with a goal to increase the canopy by at least 100 trees per year. The Department of Horticulture's Urban Horticulture Center provided 74 native trees that were planted by student volunteers during the Earth Week 2010 tree planting event and 54 trees planted by students during the 2009 Sustainability Week Planting. Individual classes planted the remainder of the student trees.

Stormwater Management

Low impact development (LID) design is being incorporated into all new building and parking projects. Past projects utilizing LID techniques include the bioretention filters at New Residence Hall, Henderson Hall and Theater 101. Future projects incorporating LID into stormwater management (SWM), include West End, Visitors and Undergraduate Admissions Center, and Academic & Student Affairs Building. A team of interns is helping to develop individual project Hydrologic and Hydraulic models, which will then be incorporated into a comprehensive model. A goal of 60% of the campus modeled by October 2010 has been set.

Students show that teamwork is key when planting trees to increase the campus carbon sink.

Point 9 – Procurement: *"Virginia Tech will require purchase of Energy Star rated equipment, maximum practicable recycled-content paper, and other low life-cycle cost products, with exceptions for special uses."*

Purchasing Policies and Practices

Sustainability product purchase guidelines to support Environmentally Preferable Purchasing (EPP) are currently under development. Upon the approval of the latest revisions of Policy 5505, Virginia Tech will require that all purchases of equipment for which Energy Star ratings are established must meet Energy Star ratings unless specific use of the product requires otherwise. This policy will also require that all purchases of copy paper contain a minimum of 30% post consumer waste (PCW) content.

Green Cleaning

In January 2010, Custodial Services, within the Facilities Services Department, implemented a **Green Cleaning Program**. The LEED-certified cleaning program was approved for the Henderson project and will be standard for future projects. Chemical dispensing systems have been installed in close to 50% of the E&G buildings on campus with Custodial Services planning to install more each quarter. Equipment now being used and purchased is more sustainable. Three Nobles floor scrubbers that do not use cleaning

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[22] http://www.vtnews.vt.edu/articles/2008/06/2008-421.html

chemicals but instead convert ordinary tap water into a powerful cleaning agent instead of have been purchased. In addition, floor cleaning practices now use micro fiber mops and cloths to increase efficiency and reduce waste and upright vacuums are highly energy efficient.

In May 2010, for their Green Cleaning initiatives, the Housing and Dining Services Housekeeping Department was awarded the **JanPak Level III Clean Zone Certification**, the first such certification awarded in a university setting[23]. This program is made available through JanPak Janitorial Solutions and is a unique certification program designed to create a healthier environment through the implementation of sustainable cleaning products, systems and programs.

Point 10 – Campus Engagement: *"Virginia Tech will engage students, faculty and staff through education and involvement to reduce consumption of energy, water, and materials in academic and research buildings, dining and residence halls, and other facilities."*

Engaging Students

Student Involvement and Organizations

Numerous student organizations currently either focus on campus sustainability or have a working group within their organization that works on sustainability issues. Examples include Beyond Coal at Virginia Tech, Soil and Water Conservation Society, Environmental Coalition, Student Government Association, Mountain Justice Blacksburg, SUSTAIN (themed housing), Office of Sustainability Green Team, Virginia Tech Sustainable Food Corps, Poverty Awareness Coalition for Equality, YMCA Student Programs / YToss?, Residential Hall Federation, and Young Democrats.

New and Transfer Student Orientation

The Office of Sustainability participated in 2009 orientation events for both new and transfer students. The office manned a booth at the orientation's Hokie Resource Fair, prepared and distributed four separate handouts about various sustainability topics, and led an information session for all orientation leaders.

The Office of Sustainability also participated with a booth at **Gobblerfest 2009**, the annual welcome festival for students, staff, faculty and community members. The Office of Sustainability was one of over 370 student organizations, businesses, non-profits, and Virginia Tech departments to participate and the event was attended by more than 18,000 students and community members.

Eco-Olympics

The first **Eco-Olympics** was held this spring from March 29 through April 30. Eco-Olympics focuses on reducing energy consumption and engaging students to develop sustainable behaviors. Residence Halls receive points by having the lowest per-capita energy consumption and by participating in various events throughout the month-long competition. On-campus housing buildings are separated into five categories to help normalize the data: large, medium, small, air-conditioned, and Oak Lane. The Eco-Olympics website[24] is updated every week during the competition to show point totals, kWh consumed, and GHG emission reductions for students to track their hall's weekly progress. A winner is declared in each of the five categories and a Grand Champion is selected based on overall effort at the end of the month. The event kicked off with Earth Hour 2010, where Virginia Tech joined communities across the world to turn off all non-essential lighting for one hour as a show of support for climate change action.

Congratulations to the 2010 Eco-Olympics Winners:
- Grand Champion: West Ambler Johnson (Large category)
- Medium: O'Shaughnessy
- Small: Hillcrest
- AC: New Hall West
- Oak Lane: Tri Delta

Dr. Leon McClinton, Director of Residence Life, (second from left) with the award winners and event organizers. Congratulations to West Ambler Johnston Residence Hall for being our "Grand Champion."

[23] http://www.janpak.com/story.aspx?sid=27&pid=1&id=9
[24] http://www.housing.vt.edu/saveenergy/

Earth Week 2010

The Environmental Coalition student organization organized *Earth Week 2010* this spring with workshops, live music, guest speakers, displays and roundtable discussions.

The Common Book Project

The University Common Book Committee[25] successfully incorporated environmental awareness into the common book process for the first time by selecting Daniel Goleman's *Ecological Intelligence* for academic year 2009-2010. In conjunction with the university selection, the Blacksburg Town Council also selected Goleman's book as the first ever "Town Common Book." Dr. Goleman gave the keynote address for Sustainability Week 2009, and had the opportunity to meet with students and participate in the Sustainability Week 2009 Kickoff Ceremony. Dr. Mary Ann Lewis, Director, First Year Experience, recently announced that Barbara Kingsolver's *Animal, Vegetable, Miracle* has been selected as the University Common Book for academic year 2010-2011[26] and that Kingsolver is scheduled to speak on campus this fall.

Engaging Faculty and Staff

Green Campus Challenge

The Virginia Tech Green Campus Challenge[27] (GCC) was an online survey launched in March 2010 by the Energy and Sustainability Committee as an education, assessment, and encouragement campaign to campus departments with ten employees or more. The survey was modeled after the Green Commonwealth Challenge issued to all Virginia state agencies and institutions in 2009. **Fifty departments participated in the challenge representing 4,747 employees, or two-thirds of the Blacksburg campus work force**. Special congratulations go to Facilities Services, Materials Science and Engineering, Military Affairs/Corps of Cadets, and University Scholarships and Financial Aid for being the four departments achieving the highest point totals. As a show of his support for the GCC, President Steger will be inviting a representative from each of those departments to join him in the President's Suite for a home football game this fall. Full survey results can be viewed online.[28] As a result of the Green Campus Challenge, most departments now have green policies:

- **74%** to shut down computers at night, **88%** to turn off lights at COB; **94%** to encourage recycling
- **86%** to print/copy on both sides of 30% recycled paper; **90%** to use electronic media rather than print
- **76%** encourage carpooling to meetings, all use teleconferencing (saving 21,000 VMT/mo), **34%** have flex-work policy, **60%** have telecommuting policy (saving combined 2,050 commuter days/mo)
- **80%** identified a Green Campus Representative to keep the green campus dialogue alive

Green Jobs Training Programs

In January 2010 a **$3.8 million** project for Green Jobs training was funded by the Department of Labor as part of the American Recovery and Reinvestment Act (ARRA). Virginia Tech is one of 7 regional partners pioneering this effort to revive Virginia's economy and train and employ citizens throughout the Commonwealth in green jobs. The **CREATES** (Construction, Retrofitting, and Energy-Efficiency Assessment, Training and Employment Systems) Program provides free training through an "Energy Training Partnership" grant, in green construction, retrofit and energy efficiency industries to unemployed, dislocated and incumbent workers.

Engaging Community

Community Service

"Ut Prosim, *That I May Serve*" has been the university's motto and mission of service since 1896, and community service continues to be vitally important to the Virginia Tech community. The mission of VT-ENGAGE,[29] the central community service entity for the university, is to "encourage everyone everywhere to do volunteer work as a way to give back to the community." Virginia Tech students, faculty, and staff are encouraged to perform as much community service per year as possible, both on campus and their respective communities. Additionally, VT-ENGAGE and Virginia Tech have proudly partnered with the Montgomery, Radford, and Floyd United Way to serve the volunteer needs of local communities. **In the 2009-2010 academic year, 350,000 hours of community service were pledged**[30].

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[25] http://www.commonbook.vt.edu/
[26] http://www.vtnews.vt.edu/articles/2010/06/2010-535.html
[27] http://www.vtnews.vt.edu/articles/2010/06/2010-470.html
[28] http://www.facilities.vt.edu/sustainability/vt_green_campus.pdf, http://www.facilities.vt.edu/sustainability/gcc_results.pdf
[29] http://www.engage.vt.edu/
[30] http://www.vtmagazine.vt.edu/spring09/feature1.html

One Big Day. One Big Thanks

Every spring thousands of students, faculty and staff come together on a Saturday to complete hundreds of community service projects throughout Blacksburg, Christiansburg and the New River Valley. With 5,700 participants in 2009 and more than 7,000 participants and over 900 jobs in 2010, the **Big Event**[31] is Virginia Tech's largest service event. Started in 2002, it is a student-run community service effort through the Student Government Association that has grown into one of the largest events of its kind in the nation.

Sustainability Week

Virginia Tech and the Town of Blacksburg continue to work together on many sustainability endeavors. A "green partnership" was formed between these two parties and a local citizens group, Sustainable Blacksburg,[32] to begin sponsoring a week of events focused on sustainability. **Sustainability Week**[33] began in October 2007 and has become a highly successful, annual event. Throughout the week, Virginia Tech is able to work with local community groups such as the Blacksburg Farmers Market and local schools through events that entertain, educate, and highlight sustainability programs and practices. Sustainability Week ends with the annual Community Sustainability Fair featuring local vendors, children's activities, demonstrations, and much more.

Virginia Tech President Dr. Charles Steger delivering a message at the Sustainability Week 2009 Kickoff Ceremony held at The Inn at Virginia Tech and Skelton Conference Center's

Catawba Sustainability Center

The Catawba Sustainability Center continues to be a community partnership initiative of the Office of Outreach and International Affairs at Virginia Tech Roanoke. The center, a 377-acre farm in Roanoke County and former dairy for the adjacent Catawba Hospital is a living classroom and facility to support development of more sustainable rural communities and "green" job opportunities and provides education and outreach opportunities, a landcare enterprise incubator that includes training, and community engagement activities.[34] Virginia Tech faculty and students, representatives of the Virginia Department of Conservation & Recreation, and community members are working together to develop a 50-year conceptual plan for the site[35]. Initial activities included an informal dinner in April, and a follow-up stakeholder planning workshop for the site held in May.

Engaging Peers

The Association for the Advancement of Sustainability in Higher Education (AASHE)

In 2008, Virginia Tech became a member of AASHE[36] and has renewed its membership every year since. AASHE's mission is to empower higher education to lead in sustainability transformation by providing 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. AASHE is a member-driven, independent 501(c)(3). As part of its active engagement in AASHE, Virginia Tech became a Charter Participant in the AASHE STARS (Sustainability Tracking, Assessment, and Rating System) Program and has sent a representative to its conferences each year. AASHE membership benefits are listed under the Office of Sustainability website.[37]

Inter-Campus Collaboration on Sustainability

The Office of Sustainability partners with other campuses on sustainability issues in several ways. *First*, office members participate in the "**Green schools listserv**"[38], a discussion list focused on sustainable campus operations and devoted to the exchange of ideas, support, and technical information. *Second*, Virginia Tech is a part of the **Virginia Sustainability in Higher Education Consortium**[39] where office members can interact with, and learn from other sustainability offices across the Commonwealth. By creating a network of Virginia-specific higher education sustainability professionals, colleges and universities in Virginia can leverage the experiences of others, share resources, build networks of subject matter experts from both within and outside their respective institutions, and form partnerships in research and education. Other Consortium members include George Mason University, James Madison University, Radford University, Virginia Commonwealth University, and the University of Virginia. *Third*, webinars and conference calls are scheduled regularly to discuss different challenges of sustainability in higher education.

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[31] http://www.vtbigevent.org/index.php

[32] http://www.sustainableblacksburg.org/

[33] http://www.recycle.vt.edu/sustain/

[34] http://www.landcarecentral.org/References/EngagementMatters-CSC-LandcareIncubator.pdf

[35] http://www.vtrc.vt.edu/May2010Newslette(Rev).pdf

[36] http://www.aashe.org/about

[37] http://www.facilities.vt.edu/sustainability/aashe.asp

[38] http://www.aashe.org/lists/lists.php

[39] http://groups.google.com/group/VASHE_Consortium?hl=en

Engagement Communication

Media-Based Communication

In addition to the Office of Sustainability website, sustainability-related news and information is communicated to student, staff and faculty, and the community through numerous electronic and printed venues. Both the **Collegiate Times**, the officially-recognized, student-run newspaper serving Virginia Tech since 1903 and **The Roanoke Times** with its local *New River Valley Current* section have featured sustainability-related articles in both their printed newspaper and online editions. Recent articles highlighted Virginia Tech's improving its Sustainability Endowments Institute 2010 report card grade from a "B-" to a "B",[40] Virginia Tech's vanpool and Alternative Transportation programs[41] and Virginia Tech finishing third in former Governor Tim Kaine's "Green Commonwealth Challenge."[42]

A section of the **Virginia Tech Magazine Fall 2009 Edition** was dedicated to highlighting the Hokies's efforts to green campus[43] and highlighted the Board of Visitor's approval of the VTCAC Resolution. Additionally, one page of the home football game program was dedicated to letting Hokie football fans know that recycling at games is important and alerted them to the "Green Effect" football game.

Cover photo of Hahn Horticulture Garden by Kim Peterson

2009 Home Football Program Ad

Virginia Tech sustainability activities and accomplishments were also featured in the following:
- ✝ Virginia Tech Annual Report 2008-2009 containing the article "Green Gaining Ground at University"
- ✝ President Steger featured sustainability in his "Virginia Tech in Review January 2010" highlight video.
- ✝ Sustainability-related articles in Virginia Tech News Daily E-mail sent to faculty and staff employees daily
- ✝ *Metro Magazine* featured Virginia Tech's Alternative Transportation program[44]
- ✝ A recent Arbor Day Foundation article recognized Virginia Tech as one of twenty-nine colleges and universities to receive re-accreditation in 2009 for "Tree Campus USA" status[45]

Point 11 – Transportation: *"Virginia Tech will improve transportation energy efficiency on campus through parking, fleet, and alternative transportation policies. Alternative transportation use will increase from the current level of 45%, to a goal of 52% in 2015, and 60% in 2020."*

Nationally-Recognized Leader

Virginia Tech has again been designated one of the **Best Workplaces for Commuters**[46] and continues to be nationally recognized for its outstanding Alternative Transportation Programs. Virginia Tech was one of three higher education institutions in the nation to receive a gold award for its Alternative Transportation programs in the **Best Workplaces for Commuters Race to Excellence** in December 2009.[47] For the **Green Commonwealth Challenge**, Virginia Tech was recognized for its many employees using alternative commuting to get to campus. It is estimated that the University's **Carpool and Bike, Bus, and Walk** (BB&W) programs are reducing GHG emissions by approximately 2,531

[40] http://www.collegiatetimes.com/stories/14702/university-improves-sustainability-grade
[41] http://www.roanoke.com/news/nrv/wb/254007
[42] http://www.roanoke.com/news/nrv/wb/231401
[43] http://www.vtmagazine.vt.edu/fall09/index.html
[44] http://www.metro-magazine.com/News/Story/2009/11/Virginia-Tech-honored-for-sustainability-practices.aspx
[45] http://www.arborday.org/media/pressreleases/pressrelease.cfm?id=205
[46] http://www.bestworkplaces.org/
[47] http://www.vtnews.vt.edu/articles/2010/01/2010-18.html

metric tons per year and saving its employees approximately $839,777 per year in gasoline costs.

Virginia Tech Parking and Fleet Services

In response to the VTCAC&SP, Virginia Tech Parking Services has reduced their fleet of fossil fuel-powered pickup trucks by four. They currently have one T-3 electric personal transport which costs between 4 and 5 cents per day to operate and plan to purchase 2 Kubota utility vehicles this summer.

Fleet Services, as the result of their "Green Fleet" initiative,[48] has replaced 9 of its 11 Ford Crown Victorias with 32 MPG-rated Chevrolet Cobalts, with the goal to eventually replace all eleven. Additionally, five Honda Insights, hybrid vehicles with an estimated 40-43 MPG, have been added to the fleet. Beginning this year, a 10% biodiesel mix will be used from April through September and a 5% biodiesel mix will be used from October through March. To date, over 15,655 gallons of biodiesel have been used in campus fleet vehicles.

Alternative Transportation Program

At the end of FY2010, campus alternative transportation use was at **48%**, relative to the 2009 baseline level of 45% and 2015 goal of 52% and 2020 goal of 60%. Virginia Tech gauges the level of participation as a ratio of number of permits sold to number of resident students, commuter/graduate students, and employees. Breaking down the total by category, resident students were at a 63% usage rate, commuter/graduate students at a 48% usage rate, and employees at a 30% usage rate.

Local and Regional Public Transit

Locally, the Virginia Tech community utilizes the **Blacksburg Transit** (BT) bus system, which averages 2.95 million passengers per year. Blacksburg Transit received federal and state funding in fiscal year 2010 to purchase seven 40-foot and two 60-foot hybrid diesel-electric buses which will be in operation starting fall 2010.[49] BT has also invested in Intelligent Transportation System technologies, which allow collected information to be shared with customers to improve their overall experience while riding BT.

To commute to and from Roanoke, community members have access to the **Smart Way bus**[50], which offers free Wi-Fi to enable passengers to work while commuting in a more sustainable manner. Smart Way buses transport more than 64,000 passengers each year. Virginia Tech faculty, staff, and students also have access to discounted monthly passes.[51] During academic year 2009-2010, Smart Way Bus introduced a larger, 57-seat motor coach manufactured by Motor Coach Industries (MCI) to replace their current fleet of 32-seat buses.[52]

Commuter Alternatives Program (CAP)

The Commuter Alternatives Program (CAP)[53] oversees university permit-based Carpool Programs and the Bike, Bus & Walk (BB&W) program. Carpool programs exist for both students and Faculty/Staff.[54] Virginia Tech is a Workplace member of RIDE Solutions[55], a regional ridesharing program, which makes these programs possible. Beginning in the fall 2010 session, a new $15 registration fee will help offset rising administrative and maintenance costs and will also be used to improve campus infrastructure such as bike racks and crosswalk enhancements.

Vanpool Program

A vanpool program[56] is also available for full-time, permanent employees for commuting purposes. There are three operational vanpools commuting from Pulaski County, Roanoke, and West Virginia. In addition, a VT Rideboard will be available this fall to help Virginia Tech students find rides for trips, breaks, and anywhere else. The Home Ride[57] of Virginia program is still available.

[48] http://www.facilities.vt.edu/tcs/fleet/greenfleet.asp
[49] http://www.collegiatetimes.com/stories/15611/hybrid-buses-look-to-save-bt-money
[50] http://www.smartwaybus.com/
[51] http://www.facilities.vt.edu/tcs/passes.asp
[52] http://www.vtnews.vt.edu/articles/2009/12/2009-946.html
[53] http://www.facilities.vt.edu/tcs/alternative/cap.asp
[54] http://www.facilities.vt.edu/tcs/alternative/cap.asp#carpool
[55] http://www.ridesolutions.org/index.asp
[56] http://www.facilities.vt.edu/tcs/alternative/van.asp
[57] http://www.homeride.com/

U Car Share

U Car Share[58], a subsidiary of the U-Haul company program on campus provides a sustainable alternative to car ownership. U Car Share provides 24 hours a day, 7 days a week availability of a car to students, staff and faculty. Members pay only for what they use in one low hourly rate with U Car Share covering all fuel, insurance, and maintenance costs. Virginia Tech's Transportation and Campus Services and U Car Share recently announced a new departmental billing option that will allow university departmental employees to rent vehicles for official university business and have the cost billed back to their departments via Hokie Mart.[59] U Car Share has provided six EPA SmartWay certified vehicles including two hybrids.

Bicycles

Virginia Tech Policy 5005 "Bicycle and Personal Transportation Devices"[60] was passed in June 2009 and establishes responsibilities and procedures to ensure pedestrian safety, proper vehicular operation, and enforcement of bicycles, skateboards, in-line skates, roller skates, mopeds, motor scooters and electronic personal assistance mobility devices on campus, as well as parking regulations.

Transportation and Campus Services at Virginia Tech has been awarded funding through TEA-21 Enhancement grants for a bicycle pathways project called the "Hokie Bikeways."[61]

Telecommuting and Flexible Work Options

Flexible Work Options (FWO)[62] provide alternatives to the traditional "8-to-5" workday, the standard workweek, or the traditional workplace. FWO can help employees balance work and personal responsibilities, while meeting business needs and objectives. Since telecommuting or flexing one day per week can decrease emissions by up to 20% per employee participating in the program, this can have a substantial positive impact on commuting emissions as well. Applicable University policies are Policy 4325, Alternate Worksite and Telework, updated December 2008 and Policy 4300, Hours of Work, Section 2.4, updated October 2008. Accompanying guidelines and agreement forms have been developed and are now available on the Work Resources website[63] for more convenient online submission.

Currently, there are 26 teleworkers and 21 employees working alternative schedules, with nine utilizing both options at the same time. Participation is expected to increase as publicity and outreach to employees increase.

Point 12 - Academic Programs: *"The university will create and support a virtual Virginia Tech School of Sustainability or similar mechanism to coordinate, develop, and communicate related instructional, research, and outreach academic programs."*

Curriculum

Special Advisor on Academic Sustainability Programs

In May 2009, in response to the VTCAC&SP plan recommendation to establish a Senior Fellow for Sustainability Programs or comparable position to develop and coordinate academic instruction, research, and outreach sustainability programs, Provost Mark McNamee appointed Professor John Randolph (Urban Affairs and Planning, School of Public and International Affairs, College of Architecture and Urban Studies) as his **Special Advisor on Academic Sustainability Programs**. Dr. Randolph has since established an ad hoc committee from across the eight academic colleges to develop sustainability-focused curricula, and has formed five work groups related to VTCAC&SP plan implementation: (1) New sustainability-related degree in CNR; (2) College survey of sustainability-related academic programs; (3) Cross-college and interdisciplinary sustainability programs; (4) sustainability literacy; and (5) Website for the Virtual School of Sustainability.

College of Natural Resources and Environment

Virginia Tech's Board of Visitors approved at its June 2010meeting re-naming the College of Natural Resources as the College of Natural Resources *and Environment* to more accurately reflect Virginia Tech's broad-based programs and increasing emphasis on sustainability initiatives[64]. The College's programs are ranked among the top three in North America by its peer institutions. The

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[58] https://www.ucarshare.com/secure/Home.aspx
[59] http://www.vtnews.vt.edu/campus_notices/campusnotice.php?item=3052
[60] http://www.policies.vt.edu/5005.pdf
[61] http://www.facilities.vt.edu/tcs/alternative/
[62] http://www.worklife.vt.edu/alt_work_opt/index.html
[63] http://www.worklife.vt.edu/alt_work_opt/index.html
[64] http://www.vtnews.vt.edu/articles/2010/06/2010-489.html

College also recently announced an expansion of its graduate-level programs in the National Capital Region to focus on leadership for sustainability, including a new first of its kind **Executive Master of Natural Resources degree**[65].

Earth Sustainability Program

Virginia Tech's Earth Sustainability (ES) course series was recently named as one of two 2009 University Exemplary Department Award winners.[66] Presented annually since 1994, the University Exemplary Department Award recognizes the work of departments or programs that enhance the teaching and learning environment for students and faculty. This year, the awards were presented to departments and programs that effectively linked research and scholarship with teaching, with particular emphasis on innovative undergraduate programs. The series is part of the newly emerging "Living in the 21st Century" program, designed to integrate the goals of the university's Curriculum for Liberal Education in an interdisciplinary theme-based learning experience. Students work together as a group and in learning communities of 25-30 students, each facilitated by a faculty member.

Green Engineering Minor

Green Engineering, first offered in Spring 2009, focuses on design of materials, processes, systems, and devices while minimizing overall environmental impact, including energy utilization and waste production, throughout the entire life cycle of a product or process, from initial extraction of raw materials used in manufacture to ultimate disposal of materials that cannot be reused or recycled at the end of the useful life of a product. Approximately 200 students are pursuing the minor currently, and an estimated 50 students received the minor in Spring 2010.

Research

Director of Energy Initiatives

Following a 2009 mid-term review of the current 2006-2012 University Strategic Plan, the Provost's Response and Action Plan[67] recognized an area of special need involving the overall energy agenda for the university; "the increased emphasis by federal, state and special agencies (such as the Tobacco Commission) on large-scale energy initiatives requires us to be as strategic and pro-active as possible in promoting a clear, effective energy research strategy. The creation of a high-level position to lead the overall effort, in partnership with the institutes and the colleges, is a top priority."

As a result, the position of **Director of Energy Initiatives** was created with specific job responsibilities to serve as a central resource for energy-related initiatives within the university, promote areas of energy-related research expertise to outside constituencies, be aware of research opportunities focusing on energy and related fields and develop mechanisms to bring these opportunities to the Virginia Tech research faculty, and work with ICTAS and other stakeholders and researchers in the university to promote and coordinate multidisciplinary and interdisciplinary energy-related research efforts and policy initiatives. While this position will report directly to the Director of the Institute for Critical Technology and Applied Science, the incumbent will assume a strong liaison role with the Vice President for Research.

Virginia Tech Wins 2010 European Solar Decathlon Competition

In June, 2010 Lumenhaus, Virginia Tech's entry into the 2009 Solar Decathlon and 2010 Solar Decathlon Europe competitions, **placed first in the European Solar Decathlon** in Madrid, Spain.[68] Lumenhaus bested entries from 16 university teams from seven countries on three continents. A team of faculty, undergraduate, and graduate students from four Virginia Tech colleges — the College of Architecture and Urban Studies, the College of Engineering, the Pamplin College of Business, and the College of Liberal Arts and Human Sciences, designed and built the 100% solar house. The zero-energy home, inspired by architect Mies Van Der Rohe's Farnsworth House, has north and south walls that are all glass to maximize exposure to natural daylight and incorporates movable screens, recyclable materials and extremely efficient lighting.

The Virginia Tech Lumenhaus at the 2010 Solar Decathlon Europe

[65] http://www.vtnews.vt.edu/articles/2010/06/2010-457.html
[66] http://www.vtnews.vt.edu/articles/2009/12/2009-910.html
[67] http://www.provost.vt.edu/documents/provost_response_1_08_10.pdf
[68] http://www.vtnews.vt.edu/articles/2010/06/062910-caus-lumenhauswins.html

Prior to the European competition, Lumenhaus was exhibited in Times Square in New York City in January and was featured on ABC's Good Morning America.

Green500 Supercomputer List

Since its 2007 debut, the Green500 Supercomputer List, founded by Virginia Tech's Associate Professor Wu Feng of the Departments of Computer Science and Electrical & Computer Engineering, College of Engineering[69] has ranked the energy efficiency of the world's 500 fastest performing supercomputers. The most recent sixth edition of the Green500 List shows continuing improvement in energy efficiency among the world's fastest supercomputers.
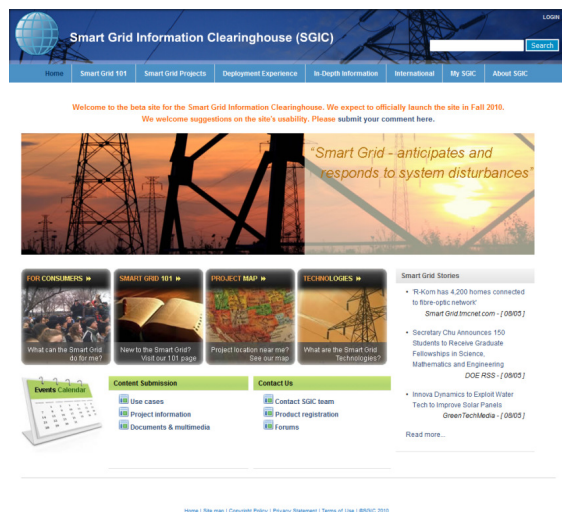
EcoCAR Challenge

The Hybrid Electric Vehicle Team of Virginia Tech[70] (HEVT) continues to provide students with the opportunity to research, develop, and build usable hybrid, plug-in hybrid, full-electric and alternative fuel vehicles. HEVT is currently participating in the 2008 – 2011 international "EcoCAR: The NeXt Challenge Advanced Vehicle Technology Competition Series" sponsored by General Motors and the U.S. Department of Energy, o redesign the power train of a stock, conventional vehicle in order to reduce petroleum energy use and greenhouse gas emissions, while still maintaining safety and consumer acceptability. HEVT recently took second place in the international EcoCAR Challenge, a three-year design competition that seeks to inspire science and engineering students to build more energy-efficient "green" automobiles. HEVT's EcoCar can be seen in action on a youtube.com MotorWeek video.[71]
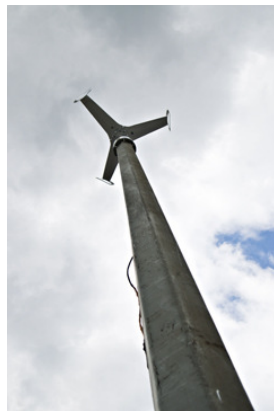
Smart Grid Information Clearinghouse

In 2009, Virginia Tech was awarded a $1.25 million five-year contract by the U.S. Department of Energy (DOE) to develop, manage, and maintain a public Smart Grid Information Clearinghouse (SGIC) Web portal that encourages use of electricity in an environmentally responsible way.[72] The SGIC portal will be designed to serve as a repository for public smart grid information and to direct its users to other pertinent sources or databases for additional data, case studies, etc. It will facilitate direct sharing and dissemination of smart grid information among various stakeholders on knowledge gained, lessons learned, and best practices.

Virginia Tech announced recently it has posted a beta version of the Smart Grid Information Clearinghouse (SGIC) Web portal to invite comments and suggestions on usability from both consumers and the smart grid community[73], with the full version of the site expected to be released this fall.

Blacksburg Wind and Solar Project

Blacksburg Wind & Solar Power[74] received a $15,000 Community Action Grant from Virginia Tech's Office of the Vice President for Research on April 1, 2009 and installed a 640 watt residential/small-business scale wind turbine and 1,050 watt solar array at the YMCA Center at 1000 North Main Street, less than 0.5 miles from the Virginia Tech campus, to investigate the feasibility of wind energy in an urban environment and to serve as an educational tool about alternative energy sources.[75]

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[69] http://www.vtnews.vt.edu/articles/2009/11/2009-797.html
[70] http://www.me.vt.edu/hevt/
[71] http://www.youtube.com/user/Motorweek#p/search/0/9Pa6ckOw4fc
[72] http://www.vtnews.vt.edu/articles/2009/10/2009-801.html
[73] http://www.vtnews.vt.edu/articles/2010/07/070710-ncr-smartgrid.html
[74] http://www.blacksburgwindpower.com/index.php
[75] http://www.roanoke.com/news/nrv/wb/243943

Student Research Projects

Many student research projects address sustainability directly. Some examples of these are described below.

Graduate students in Economic Development helped green businesses emerge in nearby Floyd County. The class of eight students conducted a market analysis of Floyd County's assets and then worked to determine what business opportunities might be the best fit. Considering startup costs, needed labor skills, employment possibilities, and community input, the class recommended the following four green businesses: (1) a wood pellet manufacturing facility; (2) a micro dairy; (3) a flooring and countertops manufacturing facility; and (4) a "sustainable living" training-and-education center.

To renew interest in the possibilities of passenger rail travel, four senior industrial design lab teams developed high-speed train concepts. The designs were required to comply with the Americans with Disabilities Act, use a locomotive design based on an operational engine, accommodate 250 to 350 passengers, and be used as a signature vehicle for the proposed Southeast High Speed Rail Corridor from Richmond, Virginia to Charlotte, North Carolina, and Atlanta, Georgia. The students were invited to present their high-speed passenger train designs to the American Public Transportation Association's annual meeting in Chicago in June 2009.

One of the passenger rail concept designs developed by students

A team of undergraduate students from Virginia Tech's Department of Biological Systems Engineering in the College of Agriculture and Life Sciences and the College of Engineering was one of 14 teams to win an Environmental Protection Agency (EPA) P3 Award at the 6th Annual National Sustainable Design Expo[76]. Virginia Tech's award-winning design developed a combined riparian zone with a stream denitrifying biofilm, for nitrate reduction in aquatic ecosystems. The team was awarded $75,000, which will be used to further refine the design and to implement a pilot-scale model at Stroubles Creek in Blacksburg.

Point 13 – Annual Report Card: *"The university 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."*

Internal Assessment and Accountability

This report, *"2010 Annual Report on Campus Sustainability at Virginia Tech",* authored by the Office of Sustainability is the first of future reports to provide a comprehensive status of implementation of the VTCAC&SP and to highlight the accomplishments and breadth of sustainability programs at Virginia Tech. The creation of this report also is intended to meet the requirement of an "annual 'report card'" in Point 13 above.

In addition, the Office of Sustainability has created a spreadsheet report to track the implementation of the proposed actions and measures listed in the VTCAC&SP for the Immediate Phase (2009-2012).[77] The spreadsheet is organized into the following six categories in order: Administrative Structure and Governance, Facilities Infrastructure, Facilities Operations, Transportation, Behavior and Campus Life, and Academic Programs. Following each action/measure is a brief description, the current status and contact information. The report will be updated on a quarterly basis and will be utilized in the VTCAC Annual Report.

College Sustainability Report Card

The Sustainable Endowments Institute (SEI) released its Campus Sustainability Report Card 2010 on October 7, 2009, and Virginia Tech received an overall grade of "**B**",[78] the second consecutive year the university's overall grade has improved. The university received an "A" in the Administration, Student Involvement, Transportation, and Investment Priorities categories, and received a "B" in the Climate Change & Energy Category, Food and Recycling, and Green Building categories. Furthermore, SEI recognized Virginia Tech as a "Campus Sustainability Leader" for receiving an average grade of "A-" or better in the six campus operations categories (Administration, Climate Change & Energy, Food & Recycling, Green Building, Student Involvement, and Transportation). Only eighty of the 332 surveyed institutions earned this distinction.[79] Virginia Tech's one-page summary report card may be viewed online.[80]

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[76] http://www.epa.gov/p3/project_websites/2010/2010awardwinners.html
[77] http://www.facilities.vt.edu/sustainability/vtcac.pdf
[78] http://www.facilities.vt.edu/sustainability/
[79] http://www.greenreportcard.org/report-card-2010/awards/campus-sustainability-leaders
[80] http://www.greenreportcard.org/report-card-2010/schools/virginia-polytechnic-institute-and-state-univ

Green Commonwealth Challenge

Virginia Tech placed **third** among top-scoring state agencies in former Gov. Tim Kaine's "Green Commonwealth Challenge" and was the only college and university represented in the top five.[81] The challenge was part of Kaine's "Renew Virginia" energy conservation and sustainability initiative stemming from Executive Order 82 and called on state agencies to increase recycling and energy conservation and decrease carbon emissions from driving. Employees from the top three agencies were awarded a day off.

Shooting for the STARS.

The AASHE Sustainability Tracking Assessment and Rating System (STARS) is a transparent, self-reporting framework for colleges and universities to gauge relative progress toward sustainability.[82] Institutions earn points in three main categories: Education & Research; Operations; and Planning, Administration & Engagement. Each of these categories includes subcategories such as Purchasing, Curriculum, Energy, and Human Resources. Virginia Tech earned recognition from AASHE for their leadership in sustainability by registering as a STARS charter participant this spring and will be submitting for a rating this winter.

Point 14 – Funding: "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 will provide funding to support sustainability programs through a variety of sources, which might include savings from reduced electricity and energy fuels, E&G funds, loans, a Green Development Fund from private sources, and a student Green Fee."

Green Development Fund

The VTCAC&SP recommended the establishment of a Green Development Fund for campus sustainability and other endowment funds for academic sustainability programs. The idea is to provide donors with an opportunity to support sustainability programs and investment in campus sustainability. The Office of Sustainability has had preliminary discussions with University Development representatives and the initiative appears promising. The Office of Sustainability will prepare and advance a draft proposal to be forwarded through the Associate Vice President for Facilities Services and the Vice President for Administrative Services for consideration.

Pilot Program for the Green RFP

The Office of Budget and Financial Planning, in partnership with the Office of Sustainability, has created a pilot program to solicit and respond to proposals from recognized student organizations that will help to advance the VTCAC&SP. The purpose of this pilot program is to determine if this can be an effective strategy to understand and respond to student priorities in the area of sustainability. The intent of this process is to direct a variety of existing university financial resources to sustainability initiatives each year in order to accomplish the intended impact of a so called "Student Green Fee" but without requiring an additional increase in the fees charged to students. This approach acknowledges the complexity of the institutions regulated funding structure, the cross-cutting nature of sustainability, and the institutional wide interest in sustainability.

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[81] http://www.vtnews.vt.edu/articles/2010/01/2010-14.html
[82] http://stars.aashe.org/

Conclusion and Future Steps

In conclusion, the Office of Sustainability would like to acknowledge the time and efforts expended by many over the past year. Implementation of the VTCAC&SP is a team effort, and the Office wishes to thank those individuals who contributed to initial implementation steps as well as the preparation of this document. The past year indeed has seen much accomplished in all facets of initial sustainability implementation at Virginia Tech. However, much work lies ahead.

Specific focus areas of implementation of the VTCAC&SP for the coming year and listed by Virginia Tech Climate Action Commitment Resolution key point:

Point 1 – Leadership
- Strive to improve Virginia Tech's overall rating on the Sustainable Endowments Institute's College Sustainability Report Card 2011. The Campus Survey, the Dining Survey, the Endowment Survey, and eight Student Surveys were completed and submitted to SEI by July 21, 2010. Results are expected to be released in September 2010.
- The Energy and Sustainability Committee will seek to obtain approval of Revision 2 to University Policy 5505 "Campus Energy, Water, and Waste Reduction" that incorporates the requirements contained in Virginia Governor Robert McDonnell's Executive Order 19 (2010).
- The Office of Sustainability, in coordination with appropriate university activities, will coordinate the preparation and submission of our AASHE "STARS" program documentation.
- Continue to promote Virginia Tech's sustainability achievements in local, state, and national publications.

Point 2 - Strategic Plan
- The Office of the Vice President for Research will select the new Director of Energy Initiatives.

Point 3 - GHG Emissions Inventory
- Conduct a comprehensive GHG emissions inventory at the conclusion of calendar year 2010.

Point 4 - GHG Emissions Reduction
- While maximization of coal-fired steam capability will continue to be required in the interim for budgetary reasons, continue to offset and reduce overall GHG emissions through increased coal-boiler efficiency and steam demand reductions.
- Continue reducing purchased electricity (the highest per-Btu GHG-emitting energy source) through aggressive space temperature setbacks, continued expansion of AHU shutdown program, and maximization of onsite electrical self-generation.
- Continue implementation of the 2009 Chilled Water Master Plan Study and associated action items by providing district chilled water to the new Academic and Student Affairs and Performing Arts Center buildings if feasible and by completing the design of new Southwest Chiller Plant.
- Continue to develop a working partnership with Virginia Tech College of Engineering's Department of Mining & Minerals Engineering faculty to explore environmentally-friendlier fuel alternatives for Virginia Tech boilers such as dewatered coal fines from abandoned waste coal slurry ponds and biomass, as well as more sustainable solutions for boiler ash disposal.
- Actively participate in PJM's Economic Demand Response programs; develop demand response strategies involving occupancy-based HVAC equipment shutdowns, chilled water temperature reset, and lighting and plug load reductions.

Point 5 - Office of Sustainability
- Continue to implement all tasks in Point #5 of the VTCAC Resolution.
- Expand the VTCAC&SP "Status Report" spreadsheet to include actions and measures listed for the "midterm phase (2013-2025)."
- Enhance the Office of Sustainability Website.
- Coordinate and submit the AASHE "STARS" program documentation.
- Coordinate the implementation of the "Student Organization Sustainability Initiative (Green Request for Proposal) Pilot Program with the Office of Budget and Financial Planning.
- Complete the Virginia Tech Comprehensive Waste Management Plan.
- Expand Student Intern sustainability opportunities.

Point 6 - LEED Certification
✦ The university has 11 capital projects registered with the U.S Green Building Council (USGBC) with six under construction and five in the design phase. The Football Locker Room Addition and ICTAS-II are scheduled for completion this fall and provide excellent opportunities for ceremonies and celebration.

Point 7 - Energy Efficiency
✦ Continue to implement energy-efficient lighting fixture, lamp, and control technologies in buildings as funds become available.
✦ Continue to pursue advancement of the ESCO Project process; seek to obtain funding for Phase I Project ECM's and begin scope development for a Phase II project.

Point 8 - Waste Minimization
✦ Complete the Comprehensive Waste Management Plan.
✦ Increase our overall Recycling Rate for Calendar Year 2010.
✦ Expand our overall composting program and introduce composting at additional on-campus dining facilities.
✦ Continue participation in Recyclemania 2011 with the goal to increase traditional recycling materials and composting figures, while simultaneously decreasing municipal solid waste.
✦ Adopt additional reduction measures in the Waste Management component of the nation Recyclemania nation competition.
✦ Continue to improve our *Y-Toss?* Program and increase volunteer participation.

Point 9 – Procurement
✦ Seek approval of Revision 2 to University Policy 5505 "Campus Energy, Water, and Waste Reduction" which includes provisions for purchasing Energy Star rated equipment, the use of recycled paper content, and other efficiency and conservation requirements.

Point 10 - Campus Engagement
✦ The Office of Sustainability will continue to support university student programs to include New Student Orientation, Gobblerfest 2010, student sustainability organizations and events, Sustainability Week 2010, Eco-Olympics, Recyclemania 2011, and Earth Week 2011.
✦ Seek to expand implementation of sustainability initiatives within the Virginia Tech Department of Athletics.
✦ Continue to promote and participate in sustainability communications using internal and external sources.

Point 11 – Transportation
✦ Virginia Tech's Fleet Services and Parking Services will continue to implement improvements with its vehicle fleet and personal transport.
✦ The University's award winning Alternative Transportation Program is nationally recognized and consistently strives to improve its excellence. The program will continue to increase the current alternative transportation usage toward the goal of 52% by 2015.

Point 12 - Academic Programs
✦ Continue to support the Special Advisor to the Provost on Academic Sustainability Programs in a variety of sustainability initiatives.
✦ Promote the use of university facilities as a learning laboratory for teaching and research.
✦ Explore collaborative sustainability opportunities with university teaching, research, and administrative faculty & staff, and students.
✦ Establish a Virtual School of Sustainability website as a portal to Virginia Tech academic programs related to sustainability, with links to college and department programs and content related to and profiles of campus sustainability programs.

Point 13 - Annual Report Card
✦ Enhance and expand the Annual Report Card format and content.
✦ Develop a single-page comprehensive scorecard containing metrics for key sustainability initiatives, threshold/target/stretch goals for each metric, and current progress against goals for each metric; update on a quarterly basis at minimum.

Point 14 – Funding
✦ Advance discussion on the establishment of a Green Development Fund.
✦ Implement the Student Organization Sustainability Initiatives (Green RFP) Pilot Program.

The Office of Sustainability
August 11, 2010