# Toward Climate Neutrality



A 100kw wind turbine stands atop campus' highest point



Office of Sustainability Appalachian State University September 2010

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NOTE	

## NOTE:

This document contains, language of a technical nature relating to the measurement of greenhouse gas emissions on a college campus. A basic understanding of these concepts is assumed.

Cover photo coutesy of ASU Communications (Marie Freeman).





# **Toward Climate Neutrality**

# September 2010

Appalachian State University

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# I. Executive Summary

## **Scope of Report**

This report is written as part of Appalachian State University's (ASU) participation in the American College & University Presidents' Climate Commitment (ACUPCC). Sustainability is a core value of the University, thus climate neutrality is also seen as a worthy goal, one that we willingly accept and commit to work toward diligently.

Many of the steps and initiatives required and associated with climate neutrality are already underway on our campus. This document is not meant to serve as the precise stepwise plan that will ultimately lead to climate neutrality. Developed by ASU's Office of Sustainably (OOS), it serves as a guide as we continue our progress towards this monumental goal. To develop the stepwise plan will require a broader and more tactical focus on the specific task of climate neutrality. As a reality, climate neutrality for ASU is many years into the future, and there are many significant uncertainties that have yet to reveal themselves. As we update this document, at least every two years, it will take on a more tactical nature.

Given the aforementioned uncertainties, such as climate-oriented policies, future fuel mix, technological advances, and offset markets, ASU has adopted a climate neutrality target date of 2050. This date corresponds to the target date adopted in the 2009 University of North Carolina (UNC) system-wide sustainability policy.

We have broken up this 40-year planning horizon into three temporal periods as detailed below:

Period	Description	Foci
2010-2015	The Now	Awareness, Operational Effectiveness, Organizational
2015-2025	The Foreseeable Tomorrow	Infrastructure Upgrades, Fuel Mix, Cultural/Behavioral
2025-2050	The Sustainable Future	Transformation, Offsets, Paradigm Shift

Further, it is anticipated, that "The Now" period will be one in which financial resources will continue to be constrained, thus leading to a conservative approach to capital investment and purchased offset activities.



Photo courtesy of Sundance Power Systems

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## **Summary of Findings / Recommendations**



As stated above, we have set a 2050 target date to achieve climate neutrality, or net-zero GHG emissions. The graph below depicts in greater detail what this path will look like over time.

From a reduction percentage standpoint, the following table shows the decreases of each scope and the total relative to our base GHG reporting year of 2009.

9	6 Reductions R	elative to Base	Year 2009	Weighted Total
	Scope 1	Scope 2	Scope 3	All scopes, Includes Offsets
2015	24%	20%	10%	19%
2025	45%	60%	33%	51%
2050	99%	100%	52%	100%

It is important to note that 77% of our GHG footprint comes from our two largest categories, Purchased Electricity and On-Campus Stationary (Steam/Hot Water). This is clearly where we need the most focus as we plan for climate neutrality. It is these same areas, where the decisions are among the most complex, and have long lasting impacts from an infrastructure, cost and strategic partnership perspective. It is expected that major policy decisions and initiatives will accompany shifts in these areas. These types of decisions will require additional study and broader participation from the University community and beyond.

To achieve climate neutrality will require a great focus. Our administrators will need to be committed to this goal through strategic allocation of university resources. Our staff members must be dedicated to creating and managing an effective and imaginative infrastructure with net-zero GHG emissions as a key goal. Our faculty must apply their expertise and research inward as part of this overall joint focus. Our students must be prepared to both lead by example and to be respectful users of our campus infrastructure

and our planet. We must all view this as an education opportunity where we are simultaneously teaching and learning from each other. The complete set of answers to this puzzle-like solution are not known and can only be found through an interconnected and collaborative effort which is based on a respect for planet earth, our commitment to climate neutrality, and each other.

## Participants

The OOS has led in the coordination and creation of this planning document. However, many elements of our University have played significant roles in its preparation. These groups include University administrators, faculty members, students, Physical Plant, University Housing and Food Services, to name a few.

Also engaged in this process has been our University Sustainability Council which was founded in 2008. This council was recharged and reformulated in the Fall of 2010, at which time a subcommittee was created specifically to aid in the management and tracking of our continuing climate action planning efforts.

Listed below are some of the many persons who have played a part in this effort:

Dr. Kenneth Peacock	Chancellor
Greg Lovins	Vice Chancellor Business Affairs
Ged Moody	University Sustainability Director
Dr. John Pine	Director Research Institute for Energy, Environment and Economics
Mike O'Connor*	Director Physical Plant
Jeffrey Tiller	Chair Department of Technology
Dr. Mike Mayfield	Vice Provost
Dr. Tom Kane	Director University Housing
Chuck Smith	Chair Sustainable Development Department
Dr. Howie Neufeld*	Department of Biology
Lee Ball	Department of Technology
Cr. Brett Tubman*	Department of Chemistry
Dr. Shea Tuberty	Department of Biology
Dr, Jeffrey Ramsdell	Department of Technology, Director Energy Center
Jerry Marshall	Energy Manager
Jennifer Maxwell	Resource Conservation Manager
Bob Ellerbe	Motor Pool
Chris Turner	AppalCART
Crystal Simmons	Sustainability Specialist
Meg Marck-Kennedy	International Education
Mary Cavanaugh	Occupational Health & Safety Office
Brooke Kornegay	Sustainable Development Appalachian
Jim Bryan	Landscape Services
Seth Norris	University Police Emergency Planning
Jon Ruth*	Student MBA
Miriam Makhyoun	Student MBA/Appropriate Technology

\*Climate Action Planning Subcommittee Member

# II. Introduction

# Strategic Drivers ASU's of Climate Neutrality Goal

The reasons to focus on Climate Neutrality as a key sustainability goal for the University are many and diverse. When surveying our community on this topic, the following ideals repeatedly surface:

- <u>Global Climate Change</u> : While still a controversial topic, there is strong body of scientific evidence that supports that planet earth is warming as a result of human activities.
- <u>Human and Ecological Health</u> : Along with climate change come the critical issues of health, for us as humans, the animal and plant kingdoms and our wonderfully diverse and beautiful ecosystems.
- <u>Educational Leadership</u> : As an institution of higher learning, we must act as leader and educators in our practices, curriculum and research activities.
- <u>Social and Economic Justice</u> : Climate and its subsequent resource issues have intricate ties to social and economic justice effecting populations on local and global levels.
- <u>Operational Effectiveness</u> : We have a responsibility to operate our campus as effectively as possible, preserving environmental, economic and social resources.

From a strategic standpoint, ASU's Sustainability Strategy Statement is in direct support of our goal of climate neutrality. The next several paragraphs feature the text of this recently develop document.

## Sustainability Mission Statement

Appalachian State University leads in creating a world where environmental, societal, and economic qualities exist in balance to meet the needs of today and of future generations. Our community of students, faculty and staff continually advance our understanding, capabilities and practices in this vital journey. As an institution of higher learning, we lead by example, inspiring new generations prepared to share this knowledge, ingenuity and passion.

## **Our Sustainability Vision**

- Integrate sustainability principles into all aspects of University academic programs, research, planning and operations, focusing both on the current and future implications.
- Design, build and operate a campus environment that minimizes its ecological footprint while also serving as an instrument to educate our community.
- Implement and continuously improve efficiency and renewable strategies, demonstrating the University's commitment to climate change mitigation.
- Create new paradigms for our transportation infrastructure and its use through expanded community knowledge of our travel and commuting impacts.
- Enhance resource utilization practices on campus by tightly integrating environmentally and socially preferable purchasing programs with zero waste initiatives.
- Embrace that health, diversity, tolerance, and human rights are principles by which policy and process are designed.
- Participate in research initiatives and outreach activities that educate our communities, nourish our natural ecosystems, and enrich our cultural experiences.

#### Sustainability Essential Character

Appalachian has a decades-long commitment to sustainability, offering multiple degree programs and engaging our community through innovative initiatives. We honor this history, and boldly move forward, inspired by our unique mountain setting and with a genuine respect for the natural environment. We recognize that sustainability is a journey, and "**sustain Appalachian**" is our commitment to advance our knowledge, to demonstrate innovative practices, and to lead by example.

#### **Core Sustainability Values**

- Focus on our role as educators, practitioners, and researchers, instilling the knowledge and values of sustainability into our entire community.
- Understanding that decisions throughout the University have sustainability implications which must be considered and addressed.
- Realization that sustainability must focus on interrelated environmental, societal, and economic issues and resources.
- Openness to continually educate ourselves on the principles and possibilities of sustainability and a willingness to pursue innovative solutions.
- Commitment to transparent reporting of our sustainability goals, initiatives and progress to the Appalachian community and beyond.
- Respecting the planet's natural environment and our unique mountain setting, embracing our role as a steward to these vital resources

# **Appalachian's Guiding Commitments**

Aside from our values-based and strategic commitments to sustainability, there have been many commitments made by the State of North Carolina, the UNC System and ASU. These various commitments provide a policy backdrop which supports our goal of climate neutrality and strengthens the various initiatives that must be undertaken. The commitments include:

- State of North Carolina; Executive Order 156 (1996, Gov. Hunt)
- ASU : Signatory of the Talloires Declaration (1997)
- ASU: Appalachian Strategic Plan (2007)
- ASU : Created ASU Sustainability Council (2007)
- UNC Tomorrow Commission Final Report (2007)
- NC Senate Bill 668 : Energy Conservation in State Buildings (2007)
- ASU : Board of Trustees Commitment to LEED Building Standards (2008)
- ASU : Created Research Institute for Environment, Energy, and Economics (2008)
- ASU : Signatory of the President's Climate Commitment (2008)
- ASU : Committed to AASHE STARS Sustainability Reporting (2008, ongoing)
- ASU : Created ASU Office of Sustainability (2009)
- UNC System-Wide Sustainability Policy (2009)
- ASU : Appalachian 2020 Campus Master Plan (2010)

# III. Present Campus GHG Emissions

# **Current GHG Emissions Measurements : Clean Air – Cool Planet**

## **Emissions By Source**

	Annual Emissions, FY 2006-2009				
Scope	Emissions Source	FY 2006 MT eCO2	FY 2007 MT eCO2	FY 2008 MT eCO2	FY 2009 MT eCO2
Scope 1	Steam and Backup Generators	21,774.3	22,914.5	21,208.4	21,863.6
	Fleet Vehicles	2,172.9	2,486.2	2,189.2	2,371.9
	Refrigerants/ Chemicals	394.3	125.1	76.3	390.7
	Agriculture	-	7.3	1.5	11.0
Scope 2	Purchased Electricity	39,623.4	43,968.1	44,767.3	39,467.6
Scope 3	Faculty/Staff Commuting	1,879.9	1,953.1	2,021.8	2,048.0
	Student Commuting	1,662.2	1,745.2	1,833.7	1,928.5
	Directly Financed Air Travel	3,383.3	4,018.8	5,531.1	4,120.7
	Directly Financed Ground Travel	661.3	707.9	767.3	723.4
	Study Abroad	901.9	842.9	836.6	1,643.6
	Solid Waste	361.7	341.5	346.0	590.0
	Wastewater	60.0	60.5	62.0	57.4
	Paper	-	-	-	212.4
	Scope 2 T&D Losses	3,918.8	4,348.5	4,427.5	3,903.4
Total	Scope 1 Emissions	24,341.5	25,533.1	23,475.4	24,637.1
Total	Scope 2 Emissions	39,623.4	43,968.1	44,767.3	39,467.6
Total	Scope 3 Emissions	12,829.1	14,018.5	15,828.0	15,227.4
	All Scopes	76,794.0	83,519.7	84,070.7	79,332.1
Offsets	Forest Preserves	-68	-68	-68	-68
	Composting	-19.2	-19.2	-33.1	-40.4
	Renewable Energy	0	-0.3	-1.3	-4.3
	Total Offsets	-87.2	-87.5	-102.4	-112.7
Ne	t Emissions	76,706.8	83,432.2	83,968.3	79,219.4

#### **Trends**

When evaluating the historical emissions data for 2006 through 2009 a few trends need to be discussed. From an overall emissions perspective, the numbers rise for the first two year and then fall in the third. Following are a number of observations and explanations that will bring more meaning to this somewhat raw data.

<u>Evolving data collection methodology</u> : 2006 represented our first inventory, thus our data collection methods were (and still are) under development. Each year we uncover new data that often lead to increases in our reported footprint. We have made the conscious decision to not go back to update the totals each time a discovery like this is made. GHG inventories and climate action planning are learning exercises, and we recognize them as such. It is anticipated that this process will smooth out in the next two to three years.

<u>Emphasis on travel as learning experience and tracking issues</u>: Increased emphasis has been placed on education-oriented travel for students. This program has and will continue to experience growth. Corresponding to this growth is the realization that all travel is planned, budgeted and paid for in multitude of ways. Better tracking in this area can enhance the management that our various travel programs receive.

<u>Growth in enrollment and square footage</u>: Part of our reality is a campus footprint that is growing both in enrollment and in square footage. In the period 2002-2009, we increased square footage by 29%. In that same period, enrollment increased by approximately 21%. In general, these are trends that we expect will continue. In that face of growth, reducing our climate footprint becomes an even more difficult challenge

<u>Ongoing energy savings measures</u>: ASU has embarked on an aggressive program to reduce its energy usage. Driven in part by UNC-system policy and state legislation, our physical plant has made great strides in this area. In the period 2005-2009, our energy use per square foot has decreased by approximately 15%. A major project to repair/enhance our steam delivery infrastructure has increased condensation return from 8% to approximately 50%, with a target of 70-80% for the coming years. In addition to numerous self-funded energy and lighting upgrades, ASU was the first UNC campus to utilize performance contracting as an innovative method to fund energy saving measures.



Photo courtesy of ASU Communicatio

# IV. GHG Emissions Mitigation Strategies

# **Specific Programs by Emissions Source**

Steam Plant (Space Heating & Hot Water) (Scope 1)				
Initiative Description	Time Horizon           Now         2010-15           Tomorrow         2015-25           Future         2025-50	<u>Impact</u> High Medium Low	Difficult/Cost High Medium Low	
<ul><li>Continue Steam Loop Repair Enhancement</li><li>Saves water and Natural Gas</li></ul>	Now	High	Medium	
<ul><li>"Continuous Commissioning"</li><li>Ensure operational efficiency</li></ul>	Now	Medium	Medium	
<ul><li>High Efficiency Building</li><li>LEED Silver Policy in place</li><li>Performance Contracting</li></ul>	Now, Tomorrow, Future	High	Medium/High	
Solar Thermal heating and Hot Water systems for New & Existing Bldgs	Now, Tomorrow	High	Medium	
Solar Thermal Preheat of Steam at the Boiler Plant	Tomorrow	High	High	
<ul><li>Energy Use / Heating Policy</li><li>Heat to 70 degrees, Time of day,</li></ul>	Now, Tomorrow	High	Low, Medium	
Micro-Boilers <ul> <li>Next Generation, New Fuels?</li> </ul>	Tomorrow	High	High	

Refrigerants & Chemicals (Scope 1)			
Initiative Description	Time HorizonNow2010-15Tomorrow2015-25Future2025-50	<u>Impact</u> High Medium Low	Difficult/Cost High Medium Low
Identify/Inventory/Track Usage <ul> <li>Includes health/safety benefit</li> </ul>	Now	Medium	Medium
Research Alternatives, Create Policy	Now, Tomorrow	Medium	Medium
Replace / Retrofit Equipment	Tomorrow	Low/Medium	Medium/ High

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Agriculture (Scope 1)			
Initiative Description	Time Horizon           Now         2010-15           Tomorrow         2015-25           Future         2025-50	<u>Impact</u> High Medium Low	Difficult/Cost High Medium Low
Track livestock and associated footprint	Now	Low	Low
Identify best practices for carbon sequestration via agriculture • Expansion of these practices	Now, Tomorrow	Low	Low/Medium
Increase food production to help feed ASU population	Tomorrow, Future	Medium	Medium, High

Purchased Electricity (Scope 2)				
Initiative Description	Time Horizon           Now         2010-15           Tomorrow         2015-25           Future         2025-50	<u>Impact</u> High Medium Low	<u>Difficult/Cost</u> High Medium Low	
<ul><li>High Efficiency Buildings</li><li>LEED Silver Policy in place</li><li>Performance Contracting</li></ul>	Now, Tomorrow Future	Medium	Medium	
<ul><li>Continue Lighting Retrofit Efforts</li><li>Good Payback</li></ul>	Now	Medium	Low	
<ul> <li>Build / Install On Campus Solar PVE</li> <li>Potential 2MW @ State Farm</li> </ul>	Now, Tomorrow	High	Medium/High	
<ul> <li>Purchase Green Power</li> <li>Possible funding source for Renewable Energy Initiative</li> </ul>	Tomorrow, Future	High	Medium/High	
Build / Install Off Campus Renewable Energy • Good wind potential in area	Tomorrow, Future	High	Medium/High	
<ul> <li>Energy Use Practices and Policy</li> <li>Cooling, Computers, Data Center, Lights, Time of Use,</li> </ul>	Now, Tomorrow	Medium	Medium	

Faculty/Staff/Student Commuting (Scope 3)				
Initiative Description	Time Horizon           Now         2010-15           Tomorrow         2015-25           Future         2025-50	<u>Impact</u> High Medium Low	<u>Difficult/Cost</u> High Medium Low	
<ul> <li>Incent Walking / Biking</li> <li>More on/near Campus housing for Faculty/Staff/Students</li> </ul>	Now, Tomorrow, Future	Medium	Medium/High	
<ul> <li>Decent Cars on Campus</li> <li>Higher Parking Fee / Carbon Tax</li> </ul>	Now, Tomorrow	Medium	Low	
Car Sharing Program Ride Sharing Program	Now	Low/Medium	Low	
<ul><li>Regional Bus System</li><li>Increase Holiday Schedule</li></ul>	Now, Tomorrow	Medium	Low	
Increase Distance Learning Capability and Offerings	Now, Tomorrow, Future	Low/Medium	Low/Medium	
Eliminate Freshman Cars	Now, Tomorrow	Medium	Low/Medium	
<ul> <li>Incent Alt fueled Vehicle</li> <li>Reduced Rates, Plug-In Stations, Preferred parking</li> </ul>	Now, Tomorrow	Low	Low/Medium	
<ul><li>Increase Bus Service into County</li><li>Park &amp; Ride System</li></ul>	Now, Tomorrow Future	Medium	Low/Medium	

Study Abroad & Air Travel (Scope 3)					
Initiative Description	Time HorizonNow2010-15Tomorrow2015-25Future2025-50	<u>Impact</u> High Medium Low	Difficult/Cost High Medium Low		
Identify / Implement / Teach Best Travel Practices	Now, Tomorrow	Low	Low		
<ul><li>Track Air Travel Centrally</li><li>Approval process?</li></ul>	Now, Tomorrow	Medium	High		
Identify Shortest/Most Effective Routes & Carriers	Now	Low	Medium		
Perform "In-Country" Service Projects	Now	Medium	Low		

Fleet Vehicles (Scope 1) & Ground Travel (Scope 3)					
Initiative Description	Time Horizon           Now         2010-15           Tomorrow         2015-25           Future         2025-50	<u>Impact</u> High Medium Low	Difficult/Cost High Medium Low		
Reduce Fleet Size	Now, Tomorrow	Low	Low		
<ul><li>Increase Fuel Efficiency</li><li>Utilize Alt Fuels</li></ul>	Now, Tomorrow	Medium	Medium		
Partner with other Schools, Institutions and Entities	Tomorrow, Future	Medium	High		
See Commuting Section					

Solid Waste & Paper (Scope 3)					
Initiative Description	Time HorizonNow2010-15Tomorrow2015-25Future2025-50	<u>Impact</u> High Medium Low	Difficult/Cost High Medium Low		
<ul><li>Perform Waste Audit</li><li>Contributes to other initiatives</li></ul>	Now	Low	Medium		
Institute Environmentally Preferable Purchasing Program (paper, chemicals, furniture,)	Now, Tomorrow	High	Medium		
Implement Document Imaging/Sharing/Workflow Capabilities	Tomorrow, Future	Medium	High		
<ul><li>Encourage Paperless Office</li><li>Eliminate Junk Mail, Phone Books</li></ul>	Tomorrow, Future	Medium	Medium		
<ul><li>Eliminate Waste in Dining Services</li><li>Bottled Water?</li></ul>	Now, Tomorrow	Medium	Medium		
Increase Recycling Efforts <ul> <li>Increase Receptacles and improve signage</li> </ul>	Now, Tomorrow	Medium	Medium		
Increase Composting Efforts <ul> <li>Post Consumer, In process</li> </ul>	Now	Medium	Medium		
Student/Academics Opportunities <ul> <li>E-Books, ASULearn,</li> </ul>	Tomorrow, Future	Medium	High		

Waste Water (Scope 3)					
Initiative Description	<u>Time Horizon</u> Now2010-15Tomorrow2015-25Future2025-50	<u>Impact</u> High Medium Low	Difficult/Cost High Medium Low		
Install High Efficiency Water Appliances	Now	Medium	Low		
Implement Rain Water Collection	Now, Tomorrow	Medium	Medium		
Reduce Surface Run-off	Now, Tomorrow, Future	Medium	Medium/High		

# **Potential RECs and Carbon Offset Programs**

ASU owns a utility company, New River Light & Power Co.(NRL&P), which serves the campus and the Town of Boone. Currently (NRL&P) is exempt from the renewable energy portfolio standards. This allows the utility and the University more flexibility to market and sell RECS. Conversely, this could be seen negatively by sustainability groups who see this as a utility not taking on its share of sustainability initiatives.

ASU is a regional leader in renewable energy research and implementation. ASU's student body pays an additional fee so that they may fund various projects on campus, the most visible being the 100KW wind turbine (largest in the state of NC) atop the highest point on campus. As we continue to implement these capabilities on our campus, both for efficiency and for educational missions, we will seek to market and sell the electricity and the RECS to our best benefit. Our status as a leading renewable energy institution could also lead to partnership opportunities with utilities and corporations in the region and country who are eager to transform energy creation and distribution.

Carbon Offset programs are highly controversial, and at this juncture, are not mandatory. Given our status as a state university, purchasing offsets is not currently considered in the schools or the state's best financial interest. As policy evolves, this could change overnight. The ASU Energy Center and OOS both have the knowledge and the ability to assist ASU and NRL&P as they navigate this evolving business and regulatory landscape.

An idea for an offset program is to create an on-campus offset program that is funded with point-of-use "taxes". Should carbon mitigation become mandatory or industry-standard, the costs associated should be aligned with the actions that create the GHG gases, thus bringing awareness to the good and bad consequences associated with certain behaviors, and to make sure that the "costs" are very closely associated with the activity. Examples of this could be; a carbon tax/fee added to a parking pass, a steam bill, an electric bill, or an airline ticket. By building the offset program/projects on-campus, we get the benefit of purchasing the offset. Further, every year thereafter, we get added benefit as these projects continually enhance our efficiency and/or renewable energy efforts.

## The Role of Academics and Outreach

As an institution of higher learning, ASU exists to educate it students, the region and the State of North Carolina. For over 20 years, ASU has been a leader in sustainability education, offering undergraduate and master's degrees in both Sustainable Development and Appropriate Technology. More recently, we have started an Environmental Science degree program, initiated a Sustainable MBA program, and have founded the Research Institute of Environment, Energy and Economics (RIEEE, rieee.appstate.edu).

Beyond these focused programs, sustainability has found its way into our broader curriculum. Examples of these initiatives include:

- A General Education Curriculum with Sustainability learning built in.
- Green Living Residence Life Community
- A Green Sections Initiative, offering Green-focused section of existing courses. (proposed)

As ASU continues to build a sustainable community in which we educate all of our community members in these principles. These sustainable practices also extend outside our campus walls, the outreach component. Our campus communicates it sustainable nature and features. LEED buildings will have signage highlighting sustainable features. The free community bus system, which operates both biodiesel and hybrid vehicles, is available to all community members. Numerous workshops are offered annually on topics ranging from sustainable development to renewable energy to green entrepreneurship.

Our students blend into our community, and are leaders in the local sustainability movement. ASU faculty and staff serve with many local community service agencies, and are frequent speakers and successful green business persons as well. Our web site, sustain.appstate.edu, is a clearinghouse for green events, resources and stories from throughout our region. Our goal is not only to educate the University community, but our entire community. Sustainability and climate change issues are vital to our world, and to quote Dr. Jeff Boyer, who founded our Sustainable Development program over 20 years ago, "we don't want to keep this bottled-up on campus, do we?"



Photo courtesy of Raymond Sinclair

# V. Projected GHG Emissions

Projected Emissions, FY 2009, 2015, 2025, 2050 (Not including offsets)					
Scope	Emissions Source	FY 2009 MT eCO2	FY 2015 MT eCO2	FY 2025 MT eCO2	FY 2050 MT eCO2
Scope 1	Steam and Backup Generators	21,863.6	16,397.7	12,025.0	-
	Fleet Vehicles	2,371.9	1,897.5	1,114.8	-
	Refrigerants/ Chemicals	390.7	261.8	132.8	-
	Agriculture	11.0	120.5	230.0	339.5
Scope 2	Purchased Electricity	39,467.6	31,574.1	15,787.0	-
Scope 3	Faculty/Staff Commuting	2,048.0	1,740.8	1,065.0	512.0
	Student Commuting	1,928.5	1,639.2	1,002.8	482.1
	Directly Financed Air Travel	4,120.7	3,914.7	3,708.6	3,296.6
	Directly Financed Ground Travel	723.4	687.2	651.1	578.7
	Study Abroad	1,643.6	1,972.3	2,301.0	2,136.6
	Solid Waste	590.0	501.5	354.0	206.5
	Wastewater	57.4	45.9	34.4	23.0
	Paper	212.4	148.7	106.2	63.7
	Scope 2 T&D Losses	3,903.4	3,044.7	1,014.9	-
Tota	l Scope 1 Emissions	24,637.2	18,677.5	13,502.6	339.5
Tota	l Scope 2 Emissions	39,467.6	31,574.1	15,787.0	-
Tota	l Scope 3 Emissions	15,227.4	13,694.9	10,238.0	7,299.2
	All Scopes	79,332.2	63,946.5	39,527.6	7,638.7
.Offsets	Forest Preserves	-68	??	??	??
	Composting	-19.2	??	??	??
	Renewable Energy	0	??	??	??
	Total Offsets	-87.2	??	??	-7,638.7
Ne	et Emissions	76,706.8	??	??	0.0

# VI. Challenges and Opportunities

## **University Commitments**

The University has made the necessary commitments to be successful in this effort. In the early stages of this initiative, the commitments have been theoretical and symbolic. As this effort moves further into implementation, these commitments will need to evolve into resource commitments ranging from time to financial to marketing. The broad list of "driving commitments" detailed in Section III of this document serve as a clear reminder of sustainability's importance on our campus.

#### **Cross-Campus** Collaboration

Our campus' climate and sustainability-oriented activities are far too numerous to mention in this document. To a small extent, many of these initiatives have existed within the departmental silos of the University. Combining academic research with new building design and utilizing student labor to accomplish and educate are prime examples of the type of communication and cooperation that do and must continue to exist to ensure success.

Our recently re-charged Sustainability Council is a good example of the types of cooperation that exist on our campus. The council has over 50 members, is represented by 3 Chancellor's Cabinet members,  $\sim 18$  faculty members,  $\sim 20$  high ranking and highly skilled staff members and 7 dedicated student members. The committee features a co-chair model with the leadership shared between a staff and faculty member.

## **Financial Commitments**

Financial resources available to college campuses and state governments have become stressed amid our current financial crisis. In the face of this, Appalachian will need to make additional financial and resource commitments to live up to the ACUPCC and the goals we have outlined in this document. Equally important, is that projects and initiatives are selected that are well conceived and planned from a cost and benefit standpoint. Most projects detailed in this report can be accomplished on a fairly costneutral basis. Capital investments may be required up front, but over time the benefits will outweigh the costs.

A key skill to be continually developed is the ability to accurately predict costs and benefits along with the timing in which they occur. As with our recent Energy Savings Performance Contract and evidenced by today's renewable energy financing models, creative means of financing are available and will likely be necessary. In these cases, strong analytical and communications skills will be necessary to guide these arrangements from concept, to approval to completion.

## **Data Reporting / Transparency**

Climate Neutrality is a huge goal to undertake. It crosses most every boundary on campus, and the various persons who will be engaged are truly multi-disciplinary. Key to the success of our climate action plan is transparent reporting. No doubt, simple reporting is important, but it is the transparency that will help to build the foundation for awareness of GHG & climate related issues. We pledge to keep our GHG inventory documents and Climate Action Plans up to date, accurate, and available on-line for which all to see and learn.

# VIII. Referenced / Recommended Reading

The following documents can be accessed by contacting the ASU Office of Sustainability at <u>sustain@appstate.edu</u> or 828.262.2664.

- ASU Strategic Plan (2007)
- ASU 2020 Master Plan (2010)
- UNC-System Sustainability Policy (2009)
- State of North Carolina; Executive Order 156 (1996, Gov. Hunt)
- Talloires Declaration Document
- ASU 2006 GHG Inventory
- ASU 2009 GHG Inventory
- ASU's Sustainability Web Site : sustain.appstate.edu



Photo courtesy of ASU Communications

ASU Chancellor Dr. Kenneth Peacock signs the ACUPCC on Earth Day 2008. Looking on are (I to r) are Quint David, Mike O'Connor, Jeff Tiller, Ged Moody & Crystal Simmons.



# Office of Sustainability 2010