

ENERGY AND WATER 5-YEAR STRATEGIC SUSTAINABILITY PLAN

Submitted to:

Co-Chairs Jack Colby, P.E. and William Winner, Ph.D.
CAMPUS ENVIRONMENTAL SUSTAINABILITY TEAM

Submitted by:

ENERGY AND WATER WORKING GROUP

November 11, 2009

I. Energy and Water Working Group Membership

Chair

Paul McConocha	Energy Program Manager	Facilities Operations, NC State
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Working Group Members

Name	Title	Affiliation
Dominic Brown	Senior	Chemical Engineering, NC State
Ellen Buckner	Environmental Affairs Specialist	Env. Health and Safety Center, NC State
Francis De Los Reyes, Ph.D.	Associate Professor	Civil, Construction and Environmental Engineering, NC State
David Dean	Sustainability Outreach Coordinator	Office of Sustainability, NC State
Kathy DeBusk	Extension Associate	Biological And Agricultural Engineering, NC State
Bob Ferrell	FCAP Manager	Facilities Operations, NC State
Wade Fulghum	Program Manager Economic Development	Solar Center, NC State
Joshua Gira	Technical Support Specialist	College of Natural Resources, NC State
Erik Hall	Plant Engineer	Facilities Operations, NC State
Jesse Henderson	Graduate Student	Forestry and Environmental Resources, NC State
Natasha Herting	Senior	Industrial Engineering, NC State
Raji Hewavita	Junior	Environmental Technology, NC State
Jeff Hightower	Director Utility Infrastructure Planning	Facilities Operations, NC State
Kelly Hook	Sophomore	Political Science, NC State
Emma Klaus	Senior	Chemical Engineering, NC State
Kenneth Lill, Jr.	Sophomore	Mechanical Engineering, NC State
Daniel Minkler	Sophomore	Chemical Engineering, NC State
Brian Parham	WESA President, Junior	Biological Sciences, NC State
Charlie Parrish	Env. Engineering Extension	IES Environmental Health and Safety, NC State
Maureen Quinlan	Distributed Generation Extension Specialist	Solar Center, NC State
Randy Reed	Housekeeping Building Environmental Manager	Facilities Operations, NC State
Chadwick Seagraves	Library Technology Services Leader	NCSU Libraries, NC State
Edward Sekmistrz	Energy Engineer	Facilities Operations, NC State
George Smith, Jr.	Mechanical Engr. Control Shop Supervisor	Facilities Operations, NC State
David Townsend	Grounds Management Irrigation Manager	Facilities Operations, NC State
Brandon Vann	Energy Analyst	Facilities Operations, NC State
Patti Woodbury	Administrative Assistant II	Wood And Paper Science
Maurice York	Head, Information Technology	NCSU Libraries, NC State

II. Existing Energy and Water Mandates and Commitments

1. American College and University President's Climate Commitment
2. University of North Carolina Sustainability Policy 600.61
3. N.C. General Statute 143-64 (Senate Bill 668 and 1946)
4. N.C. State Government passed Session Law 2007-546, which states:
 - a. Energy consumption in all existing State buildings will be reduced by 20% by the year 2010, and 30% by the 2015 relative to fiscal year 2002-03.
 - b. All new State buildings will be 30% more efficient than ASHRAE standard 90.1-2004.
 - c. All State agencies will develop a comprehensive plan to manage and report their utilities each fiscal year to the State Energy Office and Department of Administration.
 - d. New water systems shall be designed and constructed to use a minimum of 20% less potable water than indoor water use baseline calculated for the building after meeting the fixture performance requirements by the 2006 North Carolina Plumbing Code.

III. Current Status

A. Current energy and water management activities underway.

Since 2003, NC State has maintained a full time energy management team that manages energy and water through five focus areas:

- Energy Data Management
- Energy Supply Management
- Energy Use in Facilities
- Equipment Efficiency
- Campus Integration

B. Energy and Water Working Group SWOT analysis.

		HELPFUL	HARMFUL
INTERNAL ORIGIN	STRENGTHS	<ul style="list-style-type: none"> • Personnel • Student interests in Energy Research • Educational reference • Interest/momentum • Team approach • Technical depth • Wholesale benefits • Communication Infrastructure • Faculty research • FEEDM, Solar Center, & Advanced Energy 	<ul style="list-style-type: none"> • EWG authority / expertise and diversity • We have the data! • Leadership buy-in • Supply chain upsets • Managing "Plug loads" • HVAC management
	WEAKNESSES	<ul style="list-style-type: none"> • Human nature / apathy • Habits • Decreasing budget • Financial priorities • First cost vs. Life cycle cost • Energy focus vs. water conservation • Institutional inertia 	<ul style="list-style-type: none"> • EWG (staff heavy), need more diversity • Information flow to students • Decentralize IT infrastructure • Purchasing policies • Aging infrastructure
EXTERNAL ORIGIN	OPPORTUNITIES	<ul style="list-style-type: none"> • Educating upper management / campus • UNC Standards • Going green is "COOL" • Learn from others / benchmarking • Raleigh re-use water • Energy Star • Regional example 	<ul style="list-style-type: none"> • Vendor partnerships (CREE et al.) • By law / State and federal • Project Greenlight (IT) • Carbon credits revenue • Water perception • Grants available • U.S. legislation
	THREATS	<ul style="list-style-type: none"> • Monetary silos • Current economy – funding • GHG inventory / lack of standardization • Time 	<ul style="list-style-type: none"> • Technology rapid changes • Financing models • Industry Best Practices vs. Innovation • Supply chain upsets

C. Energy and Water Working Group current metrics.

In fiscal year 2008-09, NC State has:

- Increased energy consumption in BTUs per gross square foot by 2.2%, with an overall increase of 3.1% since FY 2002- 03 (Figure One).
- Rebounded 26.6% to near pre-drought water consumption, while still maintaining 29.4% percent reduction from the FY 2002-03 levels (Figure One).
- Grown in gross square footage by 0.5%, with a total expansion of 23% compared to FY 2002-03.
- Developed an additional 2.6% in student enrollment, with a total increase of 7.5% over FY 2002-03.

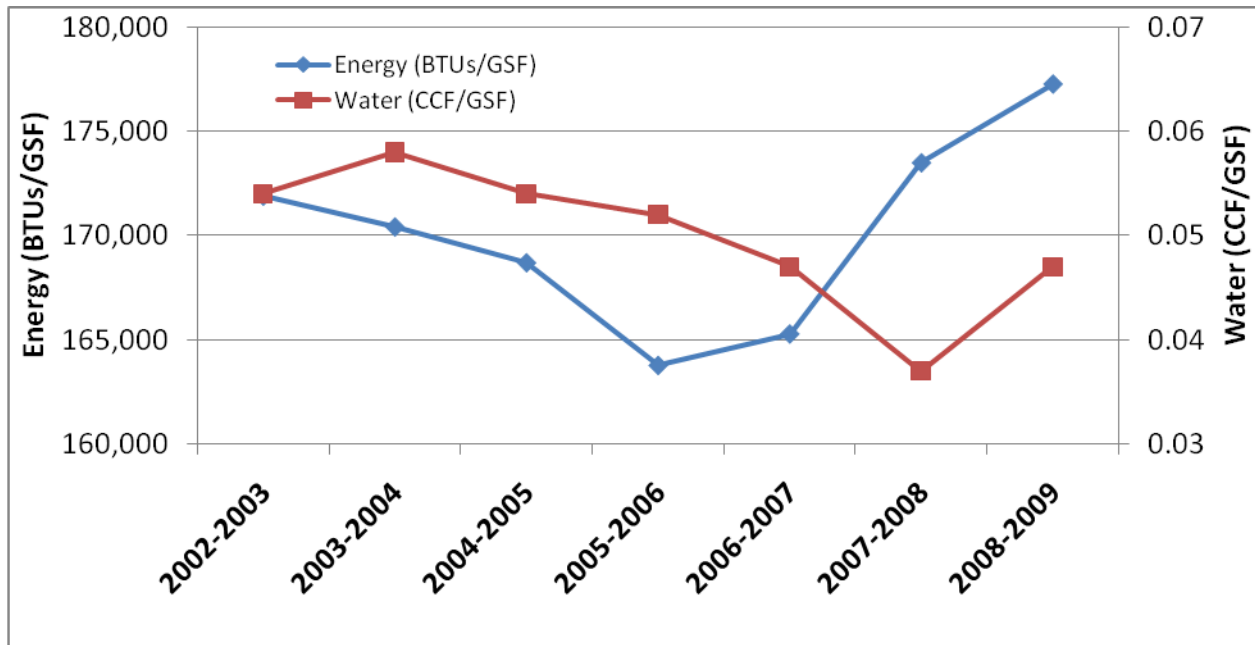


Figure One: NCSU Energy and Water Consumption, 2002 to 2009

IV. Vision Statement

CEST Energy and Water Working Group Vision Statement

New Building Construction and Major Remodels: Capital project planning and construction processes shall be as innovative as possible to meet or exceed statutory energy and water efficiency requirements and deliver energy and water in a manner that minimizes the impact on the environment.

Campus Operations and Maintenance: The operation and maintenance of buildings, equipment and grounds shall meet or exceed statutory requirements to reduce energy and water use, provide excellent air quality and comfort, improve productivity of faculty, staff and students. Further, priority shall be given to the purchase and installation of high-efficiency equipment and facilities as part of an ongoing sustainability action plan following life cycle cost guidelines where applicable.

Education and Outreach: The University will engage the campus community to create educational programs and initiatives that foster an environment of increased awareness resulting in measurable and sustainable reduction in energy and water use.

Climate Change Mitigation and Renewable Energy: The University will adopt an Energy Policy and develop a Climate Action Plan to become climate neutral as soon as practicable and by 2050 at the latest. The University will actively participate in national and international cooperative initiatives that pursue the development of green and sustainable technologies.

V. 5-year Strategies

Energy – NC State will achieve a 20% reduction in building energy consumption by 2015 (target reduction to 137,510 BTUs/GSF), with a stretch goal of achieving a 30% reduction (target reduction to 120,322 BTUs/GSF), compared to the 2002-2003 baseline (171,888 BTUs/GSF).

Water – NC State will achieve a 45% reduction in building water consumption through 2015 (target reduction to 0.0363 CCF/GSF), with a stretch goal of achieving a 50% reduction (target reduction to 0.033 CCF/GSF), compared to the 2001-2002 baseline (0.066 CCF/GSF).

The strategies will be achieved through an 11-point tactical program.

1. Strong Program Leadership
2. Enhanced Energy Awareness aligned with CEST and CAP
3. Aggressive Energy Conservation Policies (e.g., NC State Energy & Water Policy)
4. Engaged Facility Operations
5. Energy Smart Repair and Renovation Capital Programs
6. Identify and Address Poor Energy Performing Buildings
7. More Energy Performance Contracting
8. Green Computing Best Practices
9. Incentive-ize Energy Conservation
10. Build High Performing Buildings
11. Document and Report Savings