

UNIVERSITY OF NORTH CAROLINA
at
PEMBROKE

PEMBROKE, NC 28372



STRATEGIC
ENERGY / WATER
PLAN

2013 / 2014



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I. EXECUTIVE SUMMARY

UNC Pembroke continues to develop and maintain its efforts towards conservation of energy and water resources within all campus facilities. We are creating, implementing and following an effective Strategic Energy/Water Conservation Plan. The objective of the Strategic Energy/Water Conservation Plan is to foster economically and environmentally responsible usage of valuable resources in accordance with state legislation, while providing a positive and comfortable learning environment for students, faculty, staff and visitors.

Key Elements of the plan include:

- Educate and engage faculty, staff and students in energy and water conservation through presentations, emails, handouts, web pages and other effective forms of communication that help in understanding that effective energy conservation supports the primary mission of the university.
- Create a “Sustainability” Committee to get faculty, staff and student organizations more involved with conservation as part of a larger scope of campus environmental stewardship efforts.
- Continue accurate measurements and analysis of electricity, fossil based fuels and water usage. Quarterly reviews of consumption, trends and costs will be posted and advertised for the campus community to review.
- Continue to conduct annual reviews of utility billing rates with each supplier and continue monthly audits of each utility invoice by our energy management efforts.
- Implement up to date training for Facility Operations staff in order to perform planned service and upgrades that improve the performance of all facility equipment and university owned vehicles to reduce energy waste.
- Continue to benchmark and develop KPI’s (key performance indicators) that clearly measure real energy and water conservation progress while factoring for facility and student growth.
- Has committed 23% of campus facilities square footage to a Guaranteed Energy Savings Performance Contract.



North Carolina Legislative basis for plan:

**GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2007 / SENATE BILL 668**

RATIFIED BILL

AN ACT TO PROMOTE THE CONSERVATION OF ENERGY AND WATER

SECTION 3.1.(a) G.S. 143-64.12. Authority and duties of State agencies. The Department; State agencies and State institutions of higher learning.

(a) The Department of Administration through the State Energy Office shall develop a comprehensive program to manage energy, water, and other utility use for State agencies and State institutions of higher learning and shall update this program annually. Each State agency and State institution of higher learning shall develop and implement a management plan that is consistent with the State's comprehensive program under this subsection to manage energy, water, and other utility use. The energy consumption per gross square foot for all State buildings in total shall be reduced by twenty percent (20%) by 2010 and thirty percent (30%) by 2015 based on energy consumption for the 2002-2003 fiscal year. Each State agency and State institution of higher learning shall update its management plan annually and include strategies for supporting the energy consumption reduction requirements under this subsection. Each community college shall submit to the State Energy Office an annual written report of utility consumption and costs.



Executive Support for Energy Culture Change

- a. Maintain work with key members of Senior Administration Staff to develop and publicize Strategic Energy & Water Management Policies that define:
 - i. The universities commitment to a fiscally and environmentally responsible Energy and water management plan.
 - ii. Measurable and achievable goals and objectives with reasonable timelines.
 - iii. Accountability and resources for plan implementation
 - iv. Continuous improvement efforts after initial implementation.
- b. Expand our comprehensive Strategic Energy and Water Management Plan to guide:
 - i. Efforts for initial implementation of the baseline measurement & identification of energy and water conservation opportunities, concept development of projects and process changes and prioritization of improvement efforts.
 - ii. Provide funding and staff resources to define, develop, and execute approved energy and water related capital projects, expense projects and process improvements.
 - iii. Schedule reviews of conservation and efforts and regular updates to the plan.
- c. Continue to educate faculty, staff and students through scheduled presentations, emails, handouts, subcommittees and other effective forms of communication about the Energy and Water management Policies and the Strategic Energy and Water Management Plan. This will provide guidance into conservation measures and techniques they can implement in our daily campus environment and also within home activities.
- d. Include Strategic Energy and Water Management Plan presentations in appropriate campus and department meetings.
- e. Create a Strategic Energy and Water Management Plan “Professional Development” presentation for faculty and staff.
- f. Create a “Sustainability” Committee to get faculty, staff and student organizations involved as part of larger scope environmental stewardship efforts.



Baseline Energy Cost & (KPI) FY 12/13

a. Financial Evaluation

Detailed cost and percentage of total expenditures

Fiscal Year	Electricity	Natural Gas	Water / Sewer	LP Gas	Heat Oil #2	Total Utility Expenditures	Consumption BTU / Ratio :
02/03	\$1,031,658	\$487,910	\$657,512	-	\$25,179	\$2,202,259	115,427,340,195
03/04	\$1,036,199	\$441,680	\$739,701	-	\$22,890	\$2,240,470	110,599,892,553
04/05	\$1,071,394	\$399,653	\$821,890	-	\$28,500	\$2,318,937	108,632,859,041
05/06	\$1,071,394	\$443,081	\$897,456	-	\$9,622	\$2,421,553	113,122,326,695
06/07	\$1,481,650	\$375,742	\$983,536	-	\$20,115	\$3,456,914	114,495,528,325
07/08	\$1,756,487	\$532,958	\$1,124,397	-	\$43,072	\$3,254,053	131,302,386,006
08/09	\$1,783,521	\$485,908	\$954,511	-	\$29,311	\$3,398,196	135,506,890,659
09/10	\$1,843,824	\$343,171	\$1,031,474	-	\$35,584	\$3,254,053	129,838,603,900
10/11	\$1,836,240	\$334,134	\$1,012,310	-	\$34,030	\$3,216,714	132,046,544,246
11/12	\$1,744,547	\$284,852	\$944,904	-	\$12,217	\$2,986,520	126,574,205,607
12/13	\$1,627,136	\$285,569	\$910,777	-	\$9,925	\$2,833,407	119,326,073,100

b. Utility Cost per sq/ft.

Fiscal Year	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13
Electrical	\$1.20	\$1.21	\$1.25	\$1.14	\$1.44	\$1.61	\$1.63	\$1.69	\$1.68	\$1.41	\$1.23
Nat. Gas	\$0.57	\$0.51	\$0.47	\$0.47	\$0.37	\$0.49	\$0.44	\$0.31	\$0.31	\$0.23	\$0.22
Water/Sewage	\$0.77	\$0.86	\$0.96	\$0.96	\$0.96	\$1.03	\$0.87	\$0.94	\$0.93	\$0.76	\$0.69
Total Utility	\$2.54	\$2.58	\$2.68	\$2.57	\$2.77	\$3.13	\$2.94	\$2.94	\$2.92	\$2.40	\$2.14

c. Utility Cost per Student.

02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13
\$466	\$446	\$412	\$416	\$465	\$548	\$522	\$488	\$464	\$478	\$452

d. Enrollment

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
4722	5027	5632	5827	5937	6303	6,235	6,664	6,940	6,251	6,269



EVALUATIONS

a. Fiscal Years Energy Evaluations via SEO Annual Report

ENERGY EVALUATION						
Year	Energy \$ Avoided	Energy \$/Gsf	\$/Mmbtu	\$/Mmbtu %Change	Btu/Sf	Btu/Sf % Change
2002-03		\$1.80	\$13.38		134,506	
2003-04	\$0	\$1.75	\$13.57	1%	128,881	-4%
2004-05	\$27,107	\$1.74	\$13.78	3%	126,589	-6%
2005-06	\$103,020	\$1.63	\$13.47	1%	120,721	-10%
2006-07	\$292,816	\$1.83	\$16.40	23%	111,492	-17%
2007-08	\$170,903	\$2.13	\$17.76	33%	120,082	-11%
2008-09	\$91,876	\$2.10	\$16.96	27%	123,928	-8%
2009-10	\$189,740	\$2.03	\$17.12	28%	118,744	-12%
2010-11	\$148,182	\$2.02	\$16.69	25%	120,763	-10%
2011-12	\$526,634	\$1.65	\$16.13	21%	102,453	-24%
2012-13	\$824,745	\$1.45	\$16.11	20%	90,192	-33%

b. Fiscal Years Water/Sewer Evaluations via SEO Annual Report

WATER/SEWER EVALUATION					
Year	Water \$ Avoided	\$/Kgal	\$/Kgal %Change	Gal/Sf	Gal/Sf %Change
2002-03		\$21.21		36.13	
2003-04	\$0	\$21.21	0%	40.64	12%
2004-05	-\$82,185	\$21.21	0%	45.16	25%
2005-06	-\$89,723	\$21.21	0%	45.16	25%
2006-07	-\$98,337	\$21.21	0%	45.16	25%
2007-08	-\$115,059	\$22.71	7%	45.27	25%
2008-09	\$104,633	\$23.83	12%	36.63	1%
2009-10	\$139,203	\$26.34	24%	35.81	-1%
2010-11	\$151,990	\$26.20	24%	35.34	-2%
2011-12	\$472,093	\$28.22	33%	27.10	-25%
2012-13	\$579,657	\$27.72	31%	24.84	-31%



Supply Side: Action Plans

Because utility consumption is impacted and consumed in some manner by each and everyone interacting with the campus facilities we will continue to expand and implement the following actions:

- a) Our campus utility committee will include and involve all divisions of the campus community. This committee will meet at the end of each semester with an agenda to discuss past, present and future conservation efforts. Their primary purpose will be to invite and involve the entire campus community to participate in helpful and constructive conservation practices for the upcoming semester.
- b) This committee will support the sub-committee created from the Business Affairs Division which monitors monthly invoices generated by all utility providers. It meets quarterly to discuss rates, conservation initiatives and resolve account billing resolutions when needed.
- c) An Energy Manager Position has been established and advertised. This position will be responsible for the implementation of utility efficiency strategies in new and existing campus buildings. This position will support the appropriate campus offices that impact all campus sustainability issues and will provide utility consumption & cost reporting to the campus and appropriate outside agencies.
- d) The university is participating in the statewide LED Lighting Performance Contract being implemented and directed by UNC General Administration in which JCI is currently in the IGA Phase scheduled to be completed by November 22nd 2013.



Demand Side: Efficiency Measures in Progress & Completed

Computer Power Management Software was installed and expanded on our campus system via our IT Department. The software configured the computers to shutdown, stand-by & hibernate based upon the CPU, disk, keyboard, mouse, and application activity.

Vending machines throughout campus were all upgraded to Energy Star machines.

Updated University Energy / Water Conservation Policy and advertise on Facilities Websites.

Energy Awareness Campaign & Strategy

Over 30% percent of energy consumption was avoided with the assistance of employee awareness and conservation choices.

We continue to calculate the quarterly impact based on campus wide consumption and cost.

Continue to advertise our baseline to the campus community in Btu per sq. ft.

Created incentives such as competition between groups to reduce the baseline in Btu per sq. ft. and reward the lowest consumption results.

The following projects were major parts completed via our Guaranteed Energy Savings Performance Contract on May 31st 2013.

Jones Athletic Center

1. Installed DDC System
2. Replaced Natural Gas Boilers
3. Upgraded HVAC AHU Systems
4. Installed HVAC / RTU's on Aux. Gym
5. Retrofitted VAV Systems

Livermore Library

1. Upgraded HVAC AHU/DDC Systems
2. Replaced two DX Systems

Oxendine Science Bldg

1. Installed DDC System
2. Retrofitted all VAV Systems
3. Retrofitted all Lab Hood Systems



SIGNATURE PAGE

Strategic Energy & Water Plan

I have read and support this Strategic Energy & Water Plan for my Organization

Larry Freeman, *Director of Facilities Operations and Energy Management*

Signed: _____ **Date:** _____

Steve Martin, *Associate Vice Chancellor / Facilities Management*

Signed: _____ **Date:** _____

Richard Cosentino, *Vice Chancellor for Finance & Administration*

Signed: _____ **Date:** _____

Kyle R. Carter, *Chancellor*

Signed: _____ **Date:** _____

This Strategic Energy & Water Mandate serves as a Memorandum of Agreement to support Strategic Energy & Water Plans for the state Utility Savings Initiative.

Director State Energy Office

Date