

Western Carolina University

**2007 -2008
Strategic Energy Plan**

**Submitted October 1, 2008
Energy Management Office
Facilities Management**



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1. Mission Statement

To develop smart energy solutions in all aspects of our institution and create a comprehensive approach for leading the Western Carolina University community towards a sustainable future.

2. Executive Summary

During 2007-2008 Western Carolina University continued its efforts to progress in the area of waste reduction, lowering utility costs, developing new programs and reducing our carbon “Paw Print”. One of our focuses has been on the development of pursuing a Performance Contract for our campus. In February 2008, we received approval to proceed with the project from the State Energy Office. During the planning phase, it was decided the optimal choice for WCU was to hire a 3rd Party Owner’s Representative to assist us with navigating the process of selecting an Energy Service Company (ESCO) and negotiating the other requirements necessary for completing this capital project. In May 2008, we released an RFP to employ the Owner’s Representative and subsequently chose Celtic Energy, Inc.. The RFP to select an ESCO will be posted October 2008 and should be completed by January 2009. In early spring 2009, the ESCO will begin conducting the Detailed Energy Study on several buildings across campus and installation of the indentified energy conservation measures should occur later in the year.

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In 2007-08 we continued our campus wide energy conservation program called WHEE Save. WCU is home to the Catamounts and we felt the best way to show our school spirit and encourage participation was to incorporate our mascot into our energy program by learning to “Reduce Our Carbon Paw Print.” The purpose of this program is to educate faculty, staff and students about energy consumption and how it affects the economy, environment and our overall footprint on the Earth. Our goals are to raise awareness about the ecological and economical benefits of conserving energy, teach methods on how to reduce energy consumption on campus, have a positive impact on long term energy consumption habits of our university community and lower overall energy consumption. We have a comprehensive approach for this program including informational materials, lectures, organizing events, involvement with faculty, staff and student groups. Every year we celebrate Earth Day on the University Center Lawn in April. On January 31, 2008 we organized an event called Focus the Nation 2008. This was a national teach-in discussing topics of sustainability that occurred simultaneously across the country in schools of higher education and K-12. We had a variety of activities including a film festival, numerous workshops and information fair. It was well attended; a huge success and we hope to organize this event again in January 2009.

We also initiated a project to install utility meters on campus buildings. This included seven of our largest appropriated funded buildings (Hunter Library, HF Robinson, Ramsey Activity Center, Fine and Performing Arts Center, Center for Applied Technology, McKee and Stillwell). Once completed, we will be measuring electricity, domestic water and steam (condensate). The new meters will integrate into our campus network and send real time information back to Itron Enterprise Energy Management Suite software. This data will be valuable for our Performance Contract and all of our energy management functions. We will continue to develop meter projects until all campus buildings are incorporated into the new system.

In December 2007 we applied for funding from the NC Energy Reserve Fund Grant. We were awarded a total of \$125,000 to complete three projects. This included \$80,000 to Retro-Commission H.F. Robinson Administration Building, \$30,000 to perform a campus wide steam trap survey and \$15,000 to relight the Warehouse. These projects will commence Fall 2008.

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Table 1 below summarizes our energy usage over the past 6 years. Overall, our energy performance has remained stable. Total utility cost and energy consumption increased as expected, primarily due to rising fuel costs and an increase in total gross square footage (GSF- See Table 2).

Table 1: WCU Energy Performance, 2002-to-2008

YEAR	TOTAL UTILITY COST \$	\$/MM BTU	\$/GSF	BTU / SQ.FT.	% CHANGE, BTU/SQ FT (cumulative)
2002-2003	\$3,075,813	\$6.35	\$1.14	178,764	0
2003-2004	\$3,300,828	\$9.18	\$1.26	136,616	-24%
2004-2005	\$3,798,840	\$9.59	\$1.25	129,989	-27%
2005-2006	\$4,288,287	\$12.77	\$1.45	113,548	-36%
2006-2007	\$4,404,131	\$11.66	\$1.43	123,042	-31%
2007-2008	\$4,873,216	\$12.89	\$1.61	124,607	-30%

This improvement is primarily a result of retiring old equipment, installing new equipment with higher operating efficiencies, actively managing building occupancy schedules, building improvements and successful educational programs for faculty, staff and students. Since the beginning of the Utility Savings Initiative in 2003, the combined benefits of these items reflect a reduction of energy consumption per gross square foot of 30%

3. Consumption Data (See Table 2 – attached)

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4. Accomplishments and Goals

A. Energy Data Management

Past Year Activities 2007-2008	Measurement	Savings Actual or Calculated	Cost	Funding Source
Review of Energy Usage for Fee Supported Auxiliary Buildings	Monthly	No changes	10 hours per month	FM Operating Budget
Utilize Energy Management Software – Itron Enterprise Energy Management (EEM) Suite	Bill analyst, meter data analyst, baseline performance, bill/meter reconciliation, alarm management, rate modeler, forecasting & meter data validation	To be determined	\$13,250	FM Operating Budget
Migrated BAS into single web sever based front end. Simplifies user operation and is accessible from any computer on campus network	Continuous	Enhanced functionality and usability	160 hours (ongoing as needed)	FM Operating Budget
Installation of meters at Ramsey Activity Center, Hunter Library, Fine & Performing Arts, Stillwell, HF Robinson, McKee, Center for Applied Technology	Interval readings for electric, water, steam condensate. Sends real time data to Itron EEM	Will see impact next Fiscal Year	\$245,819	R & R
All new buildings will have proper meters that integrate into Itron EEM Suite. New construction includes: Student Recreation Center, Dining Facility & Residence Hall	Interval readings for electric, water, steam condensate	Will see impact next Fiscal Year	To be determined	Capital

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Planned Activities 2008-2009	Measurement	Savings Estimated	Cost	Funding Source
Utilize Energy Management Software – Itron Enterprise Energy Management (EEM) Suite	Bill analyst, meter data analyst, baseline performance, bill/meter reconciliation, alarm management, rate modeler, forecasting & meter data validation	To be determined	\$13,250	FM Operating Budget
Explore new options to optimizing the WCU BAS mega-site	Ensuring better performance of HVAC and lighting equipment. Improving occupancy comfort	To be determined	To be determined	Performance Contract
Post WCU energy usage, GHG Emissions and other energy related information on new website	On-Going	To be determined	To be determined	FM Operating Budget

B. Energy Supply Management

Past Year Activities 2007-2008	Measurement	Savings Actual or Calculated	Cost	Funding Source
Utility Billing review	Monthly	To be determined	10 hours	FM Operating Budget
Review energy source options for new Steam Plant	On-Going	To be determined	20 hours	Capital
Review natural gas rates for steam plant consumption. Incurred savings thru matching fuel costs	Monthly	\$653,522	2 hours	Salary

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Planned Activities 2008-2009	Measurement	Savings Estimated	Cost	Funding Source
Utility Rate Schedule change from LG (Large Service) to OPT-G (Optional Power Time-Of-Use)	On-Going	To be determined	15 hours	FM Operating Budget
Utilize Itron EEM Suite to lower peak demand usage of new OPT-G Schedule	Monthly	To be determined	15 hours	FM Operating Budget
Investigate renewable energy technologies for energy supply. Solar hot water heating seems most applicable. Cullowhee dam hydro-power retrofit is being considered.	On-going	To be determined	To be determined	FM Operating Budget

C. Energy Use in Facilities

Past Year Activities 2007-2008	Measurement	Savings Actual or Calculated	Cost	Funding Source
New Health & Gerontological Building to be Silver LEED Certified	On-Going	To be determined	48 M	Capital
Replace single pane windows with double pane/low-e at Facilities Management Building	Monthly	To be determined	To be determined	R & R
Replace roof on University Bookstore (reflective white membrane) and Moore Building. New system has insulated panels with membrane roof	Monthly	To be determined	\$383,745 (Moore), TBD (Bookstore)	Auxiliary Services, R & R
Solar Hot Water Heating System at Highlands Biological Station	Monthly	To be determined	\$9,400	R & R
Install T-8 electronic ballast for lighting when replacing bad T-12 and magnetic ballasts	As needed	To be determined	10 Ballasts per week	FM Operating Budget
Install CFL bulbs to replace all bad incandescent bulbs	As needed	To be determined	218 units per year at \$5.77 each \$1257.86 total	FM Operating Budget

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Notified campus of Exceptional Drought Conditions on 8/27/07 as announced by NC Governor's Office. Included water conservation tips and requested cooperation to reduce water usage from campus community. Ceased washing all motor pool and motor fleet management vehicles until further notice from state.	As needed	To be determined	1 hour	FM Operating Budget
Continued to monitor campus wide heating and cooling temperature set points based on state mandate requirements and University Policy #4	Daily	To be determined	4 hours per week	FM Operating Budget
Established BAS Protocol for troubleshooting, temperature set point exceptions and collecting building schedules	As needed	To be determined	20 hours Initially/4 hours per month	FM Operating Budget
Request activity and operation schedule from designated building coordinators at the beginning of every term for all buildings. Utilized to set HVAC equipment schedules accordingly. Special events are sent to Energy Management weekly, monthly as needed basis	As needed	To be determined	10 hours per month	FM Operating Budget
Utilize HOBO (temp/humidity) Data Loggers and BoxCar Pro 4.3 software to assist troubleshooting HVAC issues	As needed	To be determined	As needed	FM Operating Budget
Notified campus and enforced 78 temperature set point mandate from NC Governor's office during peak demand heat wave period in August	As needed	To be determined	20 hours	FM Operating Budget

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Planned Activities 2008-2009	Measurement	Savings Estimated	Cost	Funding Source
Performance Contract	Monthly	To be determined	TBD	Capital
Replace roof on Killian Annex and Reynolds Hall (reflective white membrane)	Monthly	To be determined	TBD	R & R & Residential Living
HF Robinson Administration Building Retro-Commissioning	Monthly	To be determined	\$80,000	NC Energy Reserve Fund Grant
Campus Steam Trap Survey	Monthly	To be determined	\$30,000	NC Energy Reserve Fund Grant
Warehouse Re-Lighting	Monthly	To be determined	\$15,000	NC Energy Reserve Fund Grant
Continue to send out campus wide energy announcements	As needed	To be determined	As needed	FM Operating Budget
Continue to request building schedules at the beginning of every semester	As needed	To be determined	10 hours per month	FM Operating Budget
Install CFL's lighting to replace incandescent	As needed	To be determined	To be determined	NC Energy Reserve Fund Grant
Install LED Exit signs	As needed	To be determined	To be determined	NC Energy Reserve Fund Grant
Continue to upgrade lighting to T-8	As needed	To be determined	To be determined	FM Operating Budget

D. Equipment Efficiency

Past Year Activities 2007-2008	Measurement	Savings Actual or Calculated	Cost	Funding Source
Forsyth Renovation upgraded BAS installed utility meters, added economizers and retrofitted light fixtures to T-8.	On-Going	To be determined	4 M	Capital

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Stillwell Renovation Phase II - upgraded lighting, HVAC replacement, improved insulation and building envelope	To be determined	To be determined	\$12 M	Bond
Stillwell Renovation Phase I – upgraded lighting, HVAC replacement, improved insulation and building envelope	To be determined	To be determined	\$12 M	Bond
Perform steam trap survey to assess system issues	Annually	To be determined	\$1,213 90 61 hours	FM Operating Budget
Repaired leaky steam lines during steam shut-down in May	Annually	To be determined	\$18,002 35 37231 76 hours	FM Operating Budget
Steam line infrastructure replacement on lower campus	Monthly	Estimated Loss \$100,000 condensate/year	\$742,934	R & R
Replaced old boiler with high efficiency LP system	To be determined	To be determined	\$25,000	R & R

Planned Activities 2008-2009	Measurement	Savings Estimated	Cost	Funding Source
Perform steam trap survey to assess system issues	Annually	To be determined	To be determined	FM Operating Budget
Repaired leaky steam lines during annual steam shut-down in May	Monthly	To be determined	To be determined	FM Operating Budget
Construct Central Chiller Plant for new Dining Facility and Residence Hall	To be determined	To be determined	To be determined	Privatized

E. Organizational Integration

Past Year Activities 2007-2008	Measurement	Savings Actual or Calculated	Cost	Funding Source
Joined AASHE as institutional member – Association for the Advancement of Sustainability in Higher Education.	On-going	To be determined	\$1,000	FM Operating Budget

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Participating in Pilot Phase of STARS (Sustainability, Tracking & Rating System). Also, part of WCU response to UNC-I Report, section 4.6, Our Environment.	On-going	To be determined	60 Hours	FM Operating Budget
Continue WHEE Save – campus wide energy conservation awareness and education program. Includes energy reports in publications, emails, distribution of informational materials (brochures, posters, stickers), new employee orientation & one-on-one meetings	On-going	To be determined	20 Hours per month	FM Operating Budget
Member of WCU Wellness Council as Energy/Sustainability Initiatives representative	On-going	To be determined	2 Hours per month	FM Operating Budget
Member of Faculty Learning Community for Campus Sustainability Initiatives as Energy Management liaison for WCU	On-going	To be determined	2 Hours per month	Volunteer time
Shifted Energy Management Specialist position from HVAC Shop to Energy Management	On-going	To be determined	4 Hours	FM Operating Budget
Continued regular discussion of energy savings objectives in planning stages of all bond projects	On-going	To be determined	On-going	FM Operating Budget
Updated Strategic Energy Plan	Annually	To be determined	40 Hours	FM Operating Budget
Presented display table at Southern Energy and Environmental Expo (SEE Expo) Asheville, NC	Annually	To be determined	40 hours	FM Operating Budget
Presented display table at WCU Employee Appreciation Day and other campus events as needed	Annually	To be determined	3 Hours	FM Operating Budget
Organized all day campus event - Focus the Nation on Jan 31, 2008 National teach-in on sustainability.	Annually	Almost 1,000 attendees	50 Hours	FM Operating Budget
Teach USI 140 Eco PEAKS, (leadership and sustainability) in Fall 2007 & 2008. Class is in Western PEAKS, a freshman year experience living-learning program.	Annually	To be determined	10 hours per week	Volunteer Time

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Involvement in Student Programs – Advisor for Eco CATS Student Club, advisor for Clean Energy Initiative & advise collaboration with other student clubs	On-going	To be determined	20 Hours per month	Volunteer Time
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Planned Activities 2008-2009	Measurement	Savings Estimated	Cost	Funding Source
Launch new program called “Reducing our carbon Paw Print”	On-going	To be determined	On-going	FM Operating Budget
Continue to emphasize energy conservation and achieving s668 energy efficient standards in state buildings during design and construction of new buildings	On-going	To be determined	On-going	FM Operating Budget
Member of UNC Sustainability Committee (Operations and Maintenance Sub-Committee) Developing UNC system wide policy on sustainability.	On-going	To be determined	20 hours	FM Operating Budget
Continue to promote WHEE Save for faculty, staff & students along with Green Living Guide for students	Quarterly	To be determined	25 hours	FM Operating Budget
Presented display table at WCU Employee Appreciation Day and other campus events as needed	Annually	To be determined	3 Hours	FM Operating Budget
Organize campus wide events – Earth Day and Focus The Nation	Annually	To be determined	40 Hours	FM Operating Budget
Collaborate with WCU Faculty for Sustainability lectures for class instruction and assist with student projects related to energy	On-going	To be determined	On-going	FM Operating Budget
Continue to stay involved in variety of student programs and clubs	Weekly	To be determined	On-going	Volunteer Time

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F. Water Management

Past Year Activities 2007-2008	Measurement	Savings Actual or Calculated	Cost	Funding Source
Repair leaks when observed or reported to Facilities Management	As needed	To be determined	60% Plumbing shop labor time per week	FM Operating Budget
Limited pressure washing and watering for landscape during drought	As needed	To be determined	None	FM Operating Budget
Ceased washing motorpool and motor fleet management vehicles during drought	As needed	To be determined	None	FM Operating Budget

Planned Activities 2008-2009	Measurement	Savings Estimated	Cost	Funding Source
Replaced 864 shower heads and 1057 faucets aerators with low flow fixtures in Residence Halls. 1.5 gpm shower heads and 0.5 gpm.	Monthly (August and September)	2,197,700 gallons and \$6,812.87 (\$3.10/1,000gal)	Plumbing shop labor	NC Energy Reserve Fund Grant
Met with Duke to discuss planning for water flow management over Cullowhee Dam and how it impacts our water supply at the water intake for our Water Treatment Plant.	On-going	To be determined	None	FM Operating Budget
Upgrade water fixtures during Performance Contract	Monthly	To be determined	To be determined	Capital
Continue to repair leaks and install low flow shower heads, flush valves	As needed	To be determined	90% Plumbing Shop Labor per week	FM Operating Budget

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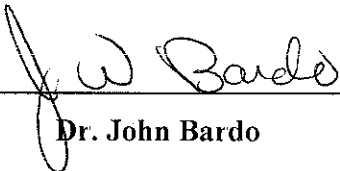
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Energy Declaration

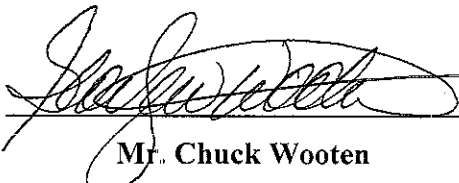
I have read the Strategic Energy and Water Plan for Western Carolina University.

The plan, as presented, supports the reduction required in Senate Bill 668.

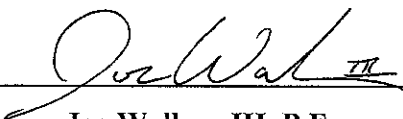
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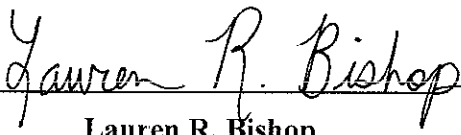
Dr. John Bardo
Chancellor



Mr. Chuck Wooten
Chief Financial Officer



Joe Walker, III, P.E.
Associate Vice Chancellor for Facilities Management



Lauren R. Bishop
Energy Manager