

Western Carolina University

2009-2010

Strategic Energy Plan

Submitted October 8, 2010

Energy Management Office

Facilities Management



Western Carolina University

*Strategic Energy Plan
2009-2010*

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.

Executive Summary

Western Carolina University (WCU) continues to expand its efforts in the areas of sustainability, waste reduction, energy management and reducing our "Carbon Paw Print". One of our focuses for the past few years has been the development of pursuing an Energy Service Performance Contract (ESPC) for several buildings on our campus. This \$5.083M project includes updates on the following campus buildings: Liston B. Ramsey Activity Center, Hunter Library, Stilwell Science Building, Hoey Auditorium, McKee Building and Coulter Building. In September 2009, we negotiated and signed an Investment Grade Audit Agreement (IGA) with ConEdison Solutions, Inc. to serve as our Energy Service Company (ESCO) for this project. The scope of energy conservation measures for the project include: improvements to our HVAC system, lighting system, lighting occupancy controls, building envelope, water conservation, energy management system, HVAC controls, new frictionless centrifugal chiller at Hunter Library central chiller plant, new solar hot water heating system, new solar photovoltaic system, computer plug load management, steam trap replacement, steam plant boiler combustion air controls and a energy dashboard kiosk for sustainability programming at Hunter Library. The IGA phase was completed July 2010 and the full report was presented to WCU in September 2010. In Fall 2010, the report will be completing a detailed design, energy measurement and verification review process by WCU, Celtic Energy, Inc. (Third Party Measurement and Verification Consultants), North Carolina Energy Office and the State Construction Office. The project will be presented for approval to WCU Board of Trustees in December 2010, UNC Board of Governors in January 2011, and the Office of State Budget Management, State Energy Office and Treasurer's Office in February 2011. Financing will also be procured February 2011 with final approval from NC Council of State in March 2011. Construction will begin immediately following the final authorization. The construction phase is expected to last 31 weeks through October 2011.

In April 2010 we submitted a grant application for American Recovery and Reinvestment Act stimulus funds through the North Carolina Energy Office. We requested \$717K to complete an HVAC renovation and retro-commissioning for H.F. Robinson Administration Building. This 72,500 sqft facility had the first two phases of a commissioning plan completed in 2008, utilizing the Energy Reserve Fund Grant money. This funding was cut due to budget constraints and the project stopped. We received a Planning Phase Report, Investigation Phase Report and Master List of Findings that identified several issues and resolutions. The information would be useful for making improvements once money could be identified. The reports included detailed information about the HVAC system being well past its useful life, as well as the need to upgrade controls from pneumatic to DDC. Several air quality concerns, comfort problems and energy issues exist. Summer 2010 we were notified that the grant was approved. The project will go through its design phase Fall 2010 and then its construction phase in January 2011. The projected completion date is December 31, 2011.

Western Carolina University

Strategic Energy Plan 2009-2010

In 2009-10 we continued to expand our campus energy conservation program “Reducing Our Carbon Paw Print”. The purpose of this program, which has remained constant from its beginning, is to take a holistic approach at educating faculty, staff and students about the importance of sustainability, waste reduction, 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 sustainability, 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 campus energy usage. Our comprehensive strategy for this program includes: organizing campus events, distributing informational materials, assisting student research and projects, class lectures and instruction, collaborating with departments across campus and increasing involvement with faculty, staff and student groups. Due to the current state of the economy, and the budget constraints imposed on our efforts, we had to employ creative measures for conveying our message and educating the WCU campus community. To this end, we have developed a zero/low waste policy for events and strive to operate in the most efficient and effective way possible while achieving our program goals. For more information regarding our efforts please visit <http://energy.wcu.edu/>.

In December 2009 we launched the WCU Sustainability Council. This is a campus-wide organization that is open to all faculty, staff and students. The Council’s mission is to increase awareness, support, and facilitate sustainable practices throughout our university, local, and regional communities. To support our objectives, we have created subcommittees to cover all areas of campus life. Our subcommittees include: programming and outreach, education and academic integration, and planned and natural environments. Since its inception, the Council has supported campus events, advised the Energy Management Office on improving programming efforts, started the “Energy Tip of the Month”, began a campus wide sustainability curriculum assessment and has helped promote smart printing practices. To learn more information about the Sustainability Council please visit <http://www.wcu.edu/27314.asp>.

In April 2010, Energy Management and the Eco CATS student organization organized a community event to celebrate the 40th Anniversary of Earth Day on the University Center Lawn. The festival, appropriately called “Happy Bearthday Earthday”, included live music, hula-hooping, games, eco-demonstrations and an informational fair. For the first time we collaborated with Aramark, our Dining Services provider. Aramark contributed to the festival by providing local food choices, more vegetarian menu options, free reusable coffee mugs and a large birthday cake to enjoy for dessert. We will continue this event next year and hope to expand efforts to include more recycling drives at campus events and campus Sustainability Day in October 2010.

As we look towards next fiscal year, we will be able to fill the Energy Management Specialist position that has been vacant for the past year due to budget shortfalls. This job is critical for advancing our efforts on campus and also maintaining our building automation systems, energy management systems and Facilities Management information technology support. We will also be gaining a Graduate Assistant to help facilitate and expand in our programming efforts. This individual is working towards a M. Ed of College Student Personnel, with a focus on sustainability. We look forward to utilizing a student to increase our objectives while contributing to this individual’s educational experience. As our needs grow, as well as the job market for green professionals, we hope to offer this opportunity every year and make it a permanent position in our office.

Western Carolina University

Strategic Energy Plan 2009-2010

Consumption Data

Table 1 below summarizes our energy usage over the past 8 years. Overall, our energy performance has remained stable. Total utility costs decreased this year due to the historically low costs of natural gas and relative price stability in a usually volatile commodities market. Our total BTU per sqft has decreased while % change BTU per sqft has increased.

Table 1: WCU Energy Performance, 2002-to-2010

YEAR	TOTAL UTILITY COST	\$/MM BTU	\$/GS F	BTU/SQFT	% 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%
2008-2009	\$4,406,505	\$11.59	\$1.43	122,962	-31%
2009-2010	\$4,187,337	\$11.71	\$1.39	118,456	-34%

Our performance improvement is primarily a result of taking a obsolete and heavily used facility offline and replacing it with a high performance building. We also attribute energy reductions to retiring old equipment, installing new equipment with higher operating efficiencies, actively managing building occupancy schedules 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 sqft of 34%. We are concerned that our energy performance will decrease as we bring new buildings online, retrofit existing facilities with superior HVAC systems, as well as adding air conditioning and increasing ventilation to meet current air quality standards in the coming year. We have completed several capital projects in the past few years; thus far the data is contrary to this theory. It indicates that our energy performance is improving in relation to our btu/sqft.

Western Carolina University

*Strategic Energy Plan
2009-2010*

Consumption Data (See Table 2 – attached)

Energy Tactics Table

A. Energy Demand Management

Past 12 Months Activities 2008-2009	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				
Review of Energy Usage for all campus facilities	Monthly	Monthly			10 hours/month	3	<ul style="list-style-type: none"> • Energy Manager • FM Staff 	FM Operating Budget
Duke Energy EE Rider Program. Monitor potential savings to determine opting in.	Monthly	Monthly	TBD	TBD	2 hours/month	2	<ul style="list-style-type: none"> • Energy Manager • Administrative Assistant 	FM Operating Budget
Review natural gas rates for steam plant consumption. Incurred savings thru comparing costs natural gas vs. #6 fuel oil	Monthly	Monthly		\$1.79M	1 hour/month	2	<ul style="list-style-type: none"> • Business Officer • Energy Manager 	FM Operating Budget
All new buildings will be submetered and integrate into EMS. New construction includes: Balsam Residence Hall and Courtyard Dining Hall	Monthly & Interval	Monthly & Interval				5	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialists • Project Manager • Harris Integrated Solutions, Inc. • Trane 	Privatized and Non-Appropriated
Energy Service Performance Contract	Monthly	Monthly	TBD	TBD	5.083M	15	<ul style="list-style-type: none"> • Energy Manager • ConEdison Solutions, Inc. • Celtic Energy, Inc. 	Private Source
Retro-Commission HF Robinson Administration Building	Monthly	Monthly			717K	12	<ul style="list-style-type: none"> • Energy Manager • WCU HVAC Shop • WCU Capital Projects Staff • Parsons • Design Firm 	ARRA Stimulus Funds

Western Carolina University

Strategic Energy Plan 2009-2010

							(TBD)	
Continued to monitor campus wide heating and cooling temperature set points, exceptions and building schedules based on state mandate requirements and University Policy #4	Weekly	Weekly			10 hours/month	3	<ul style="list-style-type: none"> • HVAC Supervisor • Energy Manager • Energy Management Specialist 	FM Operating Budget
Install T-8 electronic ballast for lighting when replacing bad T-12 and magnetic ballasts	10 ballasts/month	10 ballasts/month			\$16/Fixture + Labor	7	<ul style="list-style-type: none"> • FM Electric Shop 	FM Operating Budget
New Construction: Courtyard Dining Hall & Balsam Residence Hall	Monthly & Interval	Monthly & Interval			\$17.1M \$25M		<ul style="list-style-type: none"> • Project Manager • Contractors and subs 	Privatized and Non-Appropriated

Next 12 months Activities 2008-2009	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				
Review of Energy Usage for all campus facilities	Monthly	Monthly			10 hours/month	3	<ul style="list-style-type: none"> • Energy Manager • FM Staff 	FM Operating Budget
Review natural gas rates for steam plant consumption. Incurred savings thru comparing costs natural gas vs. #6 fuel oil	Monthly	Monthly	TBD	TBD	2 hour/month	2	<ul style="list-style-type: none"> • Business Officer • Energy Manager 	FM Operating Budget
Energy Service Performance Contract	Monthly	Monthly	TBD	TBD	5.083M	30	<ul style="list-style-type: none"> • Energy Manager • ConEdison Solutions, Inc. • Celtic Energy, Inc • Subcontractor 	Private Source
Retro-Commission HF Robinson Administration Building	Monthly	Monthly			717K	12	<ul style="list-style-type: none"> • Energy Manager • WCU HVAC Shop • WCU Capital Projects Staff • Parsons • Design Firm (TBD) 	ARRA Stimulus Funds

Western Carolina University

Strategic Energy Plan 2009-2010

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New Construction: Health Building (Silver LEED Certified) & Blue Ridge Residence Hall	Monthly & Interval	Monthly & Interval			46M 25M		<ul style="list-style-type: none"> • FM Project Manager • Contractor & Subs 	Capital
Hunter Library Window Replacement	Monthly	Monthly			2\$19K		<ul style="list-style-type: none"> • FM Project Management • Contractor & Subs 	COPS Appropriated
Bookstore Renovation	Monthly	Monthly			\$684K		<ul style="list-style-type: none"> • FM Project Management • Contractor & Subs 	Non-Appropriated
Install T-8 electronic ballast for lighting when replacing bad T-12 and magnetic ballasts	10 ballasts/month				\$16/Fixture + Labor	7	<ul style="list-style-type: none"> • FM Electric Shop 	FM Operating Budget
Continued to monitor campus wide heating and cooling temperature set points, exceptions and building schedules based on state mandate requirements and University Policy #4	Weekly	Weekly			10 hours/month	2	<ul style="list-style-type: none"> • FM HVAC Shop • Energy Manager 	FM Operating Budget
All new buildings will be submetered and integrate into EMS. New construction includes: Blue Ridge Residence Hall & Health Building	Monthly & Interval	Monthly & Interval				4	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialists • Harris Integrated Solutions, Inc. 	Privatized and Non-Appropriated

B. Energy Supply Management

Past 12 months Activities 2008-2009	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				
Review of Energy Usage for all Auxiliary facilities	Monthly	Monthly			10 hours/month	3	<ul style="list-style-type: none"> • Energy Manager • FM Staff 	FM Operating Budget
Perform steam trap survey and leak assessment. Repair system during steam shut-down in May	Annually	Annually				21	<ul style="list-style-type: none"> • FM HVAC & Plumbing Shop 	FM Operating Budget

Western Carolina University

Strategic Energy Plan 2009-2010

Next 12 months Activities 2008-2009	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				
Review of Energy Usage for all Auxiliary facilities	Monthly	Monthly			10 hours/month	3	<ul style="list-style-type: none"> • Energy Manager • FM Staff 	FM Operating Budget
Perform steam trap survey and leak assessment. Repair system during steam shut-down in May	Annually	Annually				21	<ul style="list-style-type: none"> • FM HVAC & Plumbing Shop 	FM Operating Budget

C. Organizational Integration

Past 12 months Activities 2008-2009	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				
Created WCU Sustainability Council	On-going	On-going			10-15 hours/month	1	<ul style="list-style-type: none"> • Energy Manager 	FM Operating Budget
Continue campus wide energy conservation awareness and education program.	On-going	On-going			10 hours/month	1	<ul style="list-style-type: none"> • Energy Manager 	FM Operating Budget
Member of WCU Wellness Council as Energy/Sustainability representative	On-going	On-going			1 hours/month	1	<ul style="list-style-type: none"> • Energy Manager 	FM Operating Budget
Updated Strategic Energy Plan	Annually	Annually			30 hours/year	1	<ul style="list-style-type: none"> • Energy Manager 	FM Operating Budget
Presented display table at WCU Employee Appreciation Day and other campus events as needed	Annually	Annually			10 hours/year	1	<ul style="list-style-type: none"> • Energy Manager 	FM Operating Budget
Member of UNC Sustainability Committee (Operations and Maintenance Sub-Committee). Developing UNC system wide policy on sustainability.	On-going	On-going			15 hours	1	<ul style="list-style-type: none"> • Energy Manager 	FM Operating Budget
Organized campus event Earth Day.	Annually	Annually			20 hours/year	1	<ul style="list-style-type: none"> • Energy Manager 	FM Operating Budget
Teach LEAD 143-02 Eco PEAKS,	Annually	Annually			5 hours/	2	<ul style="list-style-type: none"> • Energy Manager • Asst. Director 	FM Operating Budget

Western Carolina University

Strategic Energy Plan 2009-2010

(leadership and sustainability) in Fall 2008. Class is in Western PEAKS, a freshman year experience living-learning program.					week (Fall)		Facilities Residential Living	and Residential Living
Advisor for Eco CATS Student Club, advisor for Clean Energy Initiative & advise collaboration with other student clubs	On-going	On-going			20 Hours per month	1	• Energy Manager	FM Operating Budget

Next 12 months Activities 2008-2009	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				
WCU Sustainability Council	Monthly	Monthly			10-15 hours/month	3	• Energy Manager • Energy Management Specialists • Graduate Assistant	FM Operating Budget
Continue campus wide energy conservation awareness and education program	On-going	On-going			10 hours/month	3	• Energy Manager • Energy Management Specialists • Graduate Assistant	FM Operating Budget
Start monthly sustainable energy tip	Monthly	Monthly			1 hour/month	3	• Energy Manager • Energy Management Specialists • Graduate Assistant	FM Operating Budget
Collaborate programming with campus groups: Dining Services & Residential Living	Monthly	Monthly			5 hours/month	2	• Energy Manager • Graduate Assistant	FM Operating Budget
Member of WCU Wellness Council as Energy/Sustainability representative	On-going	On-going			2 hours/month	1	• Energy Manager	FM Operating Budget
Updated Strategic Energy Plan	Annually	Annually			30 hours/year	3	• Energy Manager • Energy Management Specialists • Graduate Assistant	FM Operating Budget

Western Carolina University

Strategic Energy Plan 2009-2010

Create/Update websites: Facilities Management, Energy Management, Recycling & Sustainability Council	On-going	On-going			5 hours/month	3	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialists • Graduate Assistant 	FM Operating Budget
Presented display table at WCU Employee Appreciation Day and other campus events as needed	Annually	Annually			10 hours/year	3	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialists • Graduate Assistant 	FM Operating Budget
Organized campus event. Campus Sustainability Day and Earth Day	Annually	Annually			40 hours/year	3	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialists • Graduate Assistant 	FM Operating Budget
Teach LEAD 143-02 Eco PEAKS, (leadership and sustainability) in Fall 2008. Class is in Western PEAKS, a freshman year experience living-learning program	On-going	On-going			5 hours/Week (Fall)	2	<ul style="list-style-type: none"> • Energy Manager • Graduate Assistant 	FM Operating Budget
Advisor for Eco CATS Student Club, advisor for Clean Energy Initiative & advise collaboration with other student clubs	On-going	On-going			10 Hours per month	2	<ul style="list-style-type: none"> • Energy Manager • Graduate Assistant 	FM Operating Budget

Western Carolina University

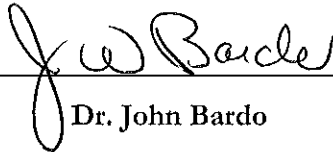
Strategic Energy Plan
2009-2010

Energy Declaration

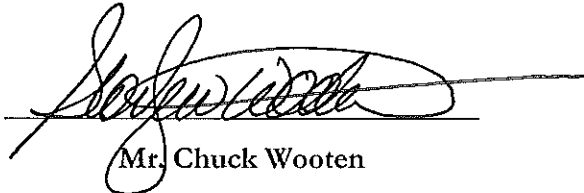
I have read the Strategic Energy and Water Plan for Western Carolina University.

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

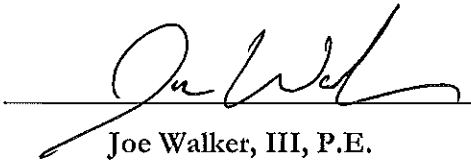
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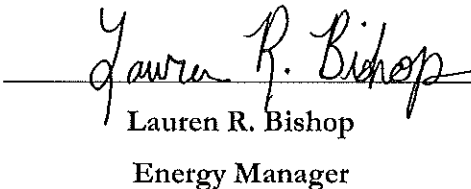
Dr. John Bardo
Chancellor



Mr. Chuck Wooten
Chief Financial Officer



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



Lauren R. Bishop
Energy Manager