

Western Carolina University

**2012-2013 FY
Strategic Energy Plan**

**Submitted October 5, 2013
Office of Sustainability & Energy Management
Facilities Management**



Western Carolina University

Strategic Energy Plan 2012-2013

Mission Statement

To develop smart energy solutions in all aspects of our institution while creating 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”. The purpose of this program, which has remained constant from its beginning, is to take a comprehensive 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 economic 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 strategy for this program includes a holistic approach to integrating sustainability across campus. This consists of overall management of our energy usage, assistance with energy related issues regarding our mechanical systems and capital projects, outreach to all divisions across campus, organizing sustainability related events, distributing informational materials, assisting with student research and projects, class lectures and instruction, service learning projects, collaborating with all departments, increasing involvement with faculty, staff and student groups, and supporting the overall educational mission of our University. Due to the current state of the economy and our recovery, we seem to have entered into a “new normal” regarding budget constraints while needing to provide a high level, quality educational experience for our students. Our efforts have required us to employ creative measures for supporting our overall mission. To this end, we 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/>.

One of our focuses for the past year has been the development of a UNC System-wide lighting only Energy Service Performance Contract (ESPC) for a majority of our campus. This is considered a flagship project and the first of its kind in the nation. This past spring the UNC System selected Johnson Controls, Inc. (JCI) to perform this project with 13 of the UNC schools participating. JCI partnered with CREE lighting, a NC based global company and one of the nation’s leading manufacturers of energy efficient LED lighting, to provide most of the lighting solutions for this project. This project will provide more efficient, effective lighting and thus create better and safer work, research, study and living environments. This project will allow reductions in campus utility costs to pay for the project over seven years. At the same time they will save money for taxpayers at about \$25 million for all 13 campuses.

In fall 2012 we completed our first two LEED certified buildings projects. Health and Human Sciences, a \$46M project, will be Silver LEED. It included natural day lighting, passive solar design, lighting controls, building and energy management controls, a living roof and a solar thermal hot water heater. Our other LEED project included the renovation of a residence hall. Harrill Hall will be Gold LEED and incorporates a geothermal system for heating and cooling, lighting controls, building automation and energy management controls, and an energy dashboard kiosk called Eco Screen© from Automated Logic Controls (ALC). We are currently in the final stages of receiving certification for both of these facilities. The energy usage for Harrill has been reduced approximately 50 percent with an avoided utility cost of \$20K in the first 5 months post renovation as compared to the previous three year average.

This past year WCU began a Master Planning effort to guide our development over the next several years. The goals of this endeavor will address issues related to new building needs, utilization of existing space, parking and transportation, technology infrastructure, sustainability, safety and security, preservation of campus heritage and integration of the campus with the surrounding community. The outcomes of our master planning effort will greatly impact the future of sustainability and energy usage on our campus.

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Consumption Data

Table 1 below summarizes our energy usage over the past 11 years. We are pleased to report that our energy performance has achieved the highest reduction level since we began our Energy Management program in 2002. Our total BTU per sq. ft. is the lowest we have realized to date and our percent reduction of BTU per sq. ft. is the highest at 37%. Since 2002-2003 our avoided energy costs have totaled \$18.1M from energy savings incurred. Our energy cost per FTE is \$501.85.

Table 1: WCU Energy Performance, 2002-to-2013

FISCAL 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	-29%
2008-2009	\$4,406,505	\$11.59	\$1.43	122,962	-31%
2009-2010	\$4,187,337	\$11.71	\$1.39	118,456	-34%
2010-2011	\$4,175,589	\$10.92	\$1.33	121,789	-32%
2011-2012	\$4,293,145	\$11.51	\$1.34	116,339	-35%
2012-2013	\$4,333,509	\$11.44	\$1.30	113,331	-37%

Our continued performance improvement is primarily a result of taking obsolete and heavily used facilities offline and replacing and or renovating existing structures with high performance buildings. LEED Silver is our building standard for campus. 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. This past year we automated the meter reading process which allows greater ability to identify anomalies on a monthly basis. Our utility costs will go up an average of 4.5% over the next three years as Duke was just approved for another rate increase. It is imperative that we continue to strengthen our energy management program so we can meet our energy reduction goals as our campus grows.

Detailed Consumption Data (See Table 2 – attached)

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Energy Tactics Table

A. Energy Demand Management

Past 12 Months Activities 2012-2013	Measurement		Savings		Cost	Assigned to	Funding Source
	Expected	Actual	Expected	Actual			
Review of Energy Usage for all campus facilities	Weekly	Weekly			10 hours/week	<ul style="list-style-type: none"> Energy Manager Energy Management Specialist FM Staff 	FM Operating Budget
Automated and revised meter reading process	Weekly	Weekly			10 hours/week	<ul style="list-style-type: none"> Energy Manager Energy Management Specialist 	FM Operating Budget
Review and validate meter readings	Weekly	Weekly			5 hours/week	<ul style="list-style-type: none"> Energy Management Specialist FM Staff 	FM Operating Budget
Review opt-in for Duke Smart Saver Program. We opted-out January 2012 due to cost increase (\$39K).	Annually	Annually			\$0	<ul style="list-style-type: none"> Energy Manager 	FM Operating Budget
Review natural gas rates for steam plant consumption. Incurred savings thru comparing natural gas vs. #6 fuel oil & hedging 50% of usage via a strip thru Oct. 2013.	Monthly	Monthly		\$2,204,105	1 hour/month	<ul style="list-style-type: none"> Business Officer Energy Manager 	FM Operating Budget
UNC System Lighting Performance Contract	Weekly	Weekly	7 year payback	7 year payback	TBD	<ul style="list-style-type: none"> Energy Manager Energy Management Specialist 	3 rd Party Financing
New Construction: Health Sciences Building (Silver LEED Certified)	Monthly & Interval	Monthly & Interval	14% more efficient than baseline building	Completion date August 2012	\$46M	<ul style="list-style-type: none"> WCU Project Manager Vannoy Construction 	Capital
Harrill Hall Renovation (Gold LEED Certified)	Monthly & Interval	Monthly & Interval	50% more efficient (past 5 months)	Completion date August 2012	\$20K	<ul style="list-style-type: none"> WCU Project Manager New Atlantic Construction 	Non-Appropriated
Monitor campus heating and cooling temp set points, BAS alarms, exceptions, & building schedules based on state mandate requirements & University Policy #4	Weekly	Weekly			10 hours/month	<ul style="list-style-type: none"> HVAC Supervisor Energy Manager Energy Management Specialist 	FM Operating Budget
Lighting upgrade in seven Residence Halls (1040 T-8 ballasts, 405 CFLs, & 147 LEDs)	Monthly	Monthly	\$12,438/year	\$12,438/year	\$41,268	<ul style="list-style-type: none"> Residential Living 	Residential Living

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Next 12 Months Activities 2013-2014	Measurement		Savings		Cost	Assigned to	Funding Source
	Expected	Actual	Expected	Actual			
Review of Energy Usage for all campus facilities	Weekly	Weekly			10 hours/ week	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist • FM Staff Energy 	FM Operating Budget
Automated and revised meter reading process	Weekly	Weekly			10 hours/ week	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist 	FM Operating Budget
Review and validate meter readings	Weekly	Weekly			5 hours/ week	<ul style="list-style-type: none"> • Energy Management Specialist • FM Staff 	FM Operating Budget
Review opt-in for Duke Smart Saver Program. We opted-out January 2012 due to cost increase. Lighting Performance Contract might make it beneficial to opt back in.	Annually	Annually			\$49K	<ul style="list-style-type: none"> • Energy Manager 	FM Operating Budget
Review natural gas rates for steam plant consumption. Incurred savings thru comparing natural gas vs. #6 fuel oil & hedging 50% of usage via a strip thru Oct. 2013.	Monthly	Monthly	TBD	TBD	2 hours/ month	<ul style="list-style-type: none"> • Business Officer • Energy Manager 	FM Operating Budget
UNC System Lighting Performance Contract	Weekly	Weekly	7 year payback	7 year payback	TBD	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist 	3 rd Party Financing
Harrill Hall Renovation – LEED Gold	Monthly & Interval	Monthly & Interval	28% more efficient than baseline building	Project still under construction	\$15.5M	<ul style="list-style-type: none"> • WCU Project Manager • New Atlantic Construction 	Non-Appropriated
Virtualized building automation system (Schneider Electric)	Monthly & Interval	Monthly & Interval			10 hours/ month	<ul style="list-style-type: none"> • Energy Management Specialist 	FM Operating Budget
Purchased thermal imaging camera to help identify energy related losses for building envelope, steam traps, electrical panels, motors, etc.	Interval	Interval	TBD	TBD	\$8K	<ul style="list-style-type: none"> • Energy Management Specialist • FM Staff 	FM Operating Budget
Continued to monitor campus heating & cooling temp set points, BAS alarms, exceptions, & building schedules based on state mandate requirements & University Policy #4	Weekly	Weekly			10 hours/ month	<ul style="list-style-type: none"> • WCU HVAC Shop • Energy Manager • Energy Management Specialist 	FM Operating Budget

B. Energy Supply Management

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Past 12 Months Activities 2012-2013	Measurement		Savings		Cost	Assigned to	Funding Source
	Expected	Actual	Expected	Actual			
Review of energy usage for all Auxiliary facilities. Validation of meters.	Monthly	Monthly			10 hours/month	<ul style="list-style-type: none"> • Energy Manager • FM Office Staff 	FM Operating Budget
Perform steam trap survey and leak assessment. Repair system during steam shut-down in May	Annually	Annually			15 steam traps + labor	<ul style="list-style-type: none"> • WCU HVAC & Plumbing Shop 	FM Operating Budget
Replace failed condensate lines at Scott, Walker, & Albright-Benton Hall	Monthly	Monthly	TBD	TBD	\$48K	<ul style="list-style-type: none"> • WCU HVAC & Plumbing Shop 	FM Operating Budget

Next 12 Months Activities 2013-2014	Measurement		Savings		Cost	Assigned to	Funding Source
	Expected	Actual	Expected	Actual			
Review of energy usage for all Auxiliary facilities. Validation of meters.	Monthly	Monthly			10 hours/month	<ul style="list-style-type: none"> • Energy Manager • FM Office Staff 	FM Operating Budget
Perform steam trap survey and leak assessment. Repair system during steam shut-down in May	Annually	Annually			TBD	<ul style="list-style-type: none"> • WCU HVAC & Plumbing Shop 	FM Operating Budget

C. Organizational Integration

Past 12 Months Activities 2012-2013	Measurement		Savings		Cost	Assigned to	Funding Source
	Expected	Actual	Expected	Actual			
Teach LEAD 152 Go Green, a First Year Living Learning Community	On-going	On-going			5 hours/week (fall)	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist • Graduate Intern 	FM Operating Budget Student Affairs
WCU Sustainability Council	On-going	On-going			2 hours/month	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist • Graduate Intern 	FM Operating Budget
Continue sustainability awareness program: class presentations, RA training, radio, audits, student research, service learning, etc.	On-going	On-going			20 hours/month	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist • Graduate Intern 	FM Operating Budget
Updated Strategic Energy Plan	Annually	Annually			30 hours/year	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist 	FM Operating Budget
Presented display table at WCU Employee Appreciation Day & other campus events as needed	Annually	Annually			10 hours/year	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist 	FM Operating Budget
Attend Conferences. & Meetings: NC Sustainable Energy Conference, Energy Summit Meetings, UNC Sustainability Officers Meetings, USI Meetings	Annually	Annually				<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist 	FM Operating Budget

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Organized events: Rooted in the Mountains, Sustainability Day, Earth & Wellness Celebration, Recycle Mania, Battle of the Plug, & Wild & Scenic Film Festival	Annually	Annually			20 hours/month	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist • Graduate Intern 	FM Operating Budget
Collaborate programming with campus groups: Dining Services, Residential Living, FYE, Student Affairs, Service Learning, & Campus Rec & Wellness	Monthly	Monthly			5 hours/month	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist • Graduate Intern • Student Affairs 	FM Operating Budget
Update websites: Energy Management & Sustainability, Recycling & Sustainability Council	On-going	On-going			5 hours/month	<ul style="list-style-type: none"> • Energy Manager • Energy Management Specialist • Graduate Intern 	FM Operating Budget
Sustainable WCU Social Media	On-going	On-going			3 hour/month	<ul style="list-style-type: none"> • Energy Manager • Graduate Intern 	FM Operating Budget
Advisor for Eco CATS Student Club. Assist club with Sustainable Energy Initiative	On-going	On-going			2 hours/month	<ul style="list-style-type: none"> • Energy Manager • Graduate Intern 	FM Operating Budget

Next 12 Months Activities 2013-2014	Measurement		Savings		Cost	Assigned to	Funding Source
	Expected	Actual	Expected	Actual			
Teach LEAD 152 Go Green, A First Year Living Learning Community	On-going	On-going			5hours/week (fall)	<ul style="list-style-type: none"> • CSO • Graduate Assistant 	FM Operating Budget Student Affairs
Teach ES 350 Seminar: Energy, Economy, & Environment					5hours/week (spring)	<ul style="list-style-type: none"> • CSO • Prof. Political Science 	FM Operating Budget Environmental Science
Create Office of Sustainability & Energy Management & designate Chief Sustainability Officer (CSO)	On-going	On-going			TBD	<ul style="list-style-type: none"> • CSO • Energy Management Specialist • Assoc. Vice Chancellor FM 	FM Operating Budget
WCU Sustainability Council	On-going	On-going			2 hours/month	<ul style="list-style-type: none"> • CSO • Energy Management Specialist • Graduate Assistant 	FM Operating Budget
Develop Campus Sustainability Plan	On-going	On-going			TBD	<ul style="list-style-type: none"> • CSO • Assoc. Vice Chancellor FM • Designated Campus Leaders 	FM Operating Budget
Develop quarterly campus newsletter	On-going	On-going			TBD	<ul style="list-style-type: none"> • CSO • Energy Management Specialist • Graduate Assistant 	FM Operating Budget Creative Services
Continue sustainability awareness program: class presentations, RA training, radio, audits, student research, service learning, etc.	On-going	On-going			10 hours/month	<ul style="list-style-type: none"> • CSO • Energy Management Specialist • Graduate Assistant 	FM Operating Budget
Updated Strategic Energy Plan	Annually	Annually			30 hours/year	<ul style="list-style-type: none"> • CSO • Energy Management 	FM Operating Budget

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						Specialist • Graduate Assistant	
Support research efforts for ES 495 and ENGR 400 Capstone Projects	Annually	Annually			10 hours/ year	• CSO • Energy Management Specialist • Graduate Assistant	FM Operating Budget
Presented display table at WCU Employee Appreciation Day and other campus events as needed	Annually	Annually			10 hours/ year	• Energy Manager • Energy Management Specialist • Graduate Assistant	FM Operating Budget
Organized campus events: Rooted in the Mountains, Sustainability Day, Earth & Wellness Celebration, Recycle Mania, Battle of the Plug & Wild & Scenic Film Festival	Annually	Annually			20 hours/ month	• CSO • Energy Management Specialist • Student Affairs • Graduate Assistant	FM Operating Budget Student Affairs
Collaborate programming across all divisions across campus	On-going	On-going			5hours/ month	• SCO • Energy Management Specialist • Graduate Assistant • Student Affairs • Admin & Finance • Academic Affairs • External Affairs	FM Operating Budget
Update websites: Energy Management & Sustainability, Recycling & Sustainability Council	On-going	On-going			1 hours/ month	• CSO • Energy Management Specialist • Graduate Assistant	FM Operating Budget
WCU Sustainability Social Media	On-going	On-going			3 hour/ month	• CSO • Graduate Assistant	FM Operating Budget
Advisor for Eco CATS Student Club. Assist club with Sustainable Energy Initiative	On-going	On-going			10hours/ month	• CSO • Graduate Assistant	FM Operating Budget

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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.

Implemented this ____ day of _____, 2013.

David O. Belcher
Chancellor

Robert T. Edwards
Chief Financial Officer

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

Lauren R. Bishop
Chief Sustainability Officer