



AUGUST 15, 2023
WCU ANNUAL REPORT AND STRATEGIC
ENERGY MANAGEMENT PLAN

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What is Energy Management

Energy management is the proactive and systematic monitoring, control, and optimization of Western Carolina University's energy consumption to conserve use, decrease energy costs, reduce emissions and energy security risks all while maintaining a conducive learning environment.

Executive Summary

General Statute 143-64.12 requires that Western Carolina University (WCU) submit to the State Energy Office an Annual Consumption Report and an Annual Strategic Energy Plan. This report will provide an overview of the key activities within the WCU Energy Management Program. The Annual Strategic Energy Management Plan for the university highlights the achievements and efforts of the entire campus related to energy conservation.

The main campus is in Cullowhee, North Carolina, with an additional instructional site in Asheville at Biltmore Park Towne Square. Our campus is situated on 600 acres housing almost 4 million square feet of academic, athletic, and residential living facilities with a current enrollment just under 11,700. During the fiscal year 2022-23, WCU spent \$5,283,825 in utilities. This number includes electricity, natural gas, #2 oil, propane and water. Based on this year's numbers, WCU is at an energy intensity of 81,197 BTU/sqft and 24.42 gal/sqft for water intensity. All state-owned buildings use the metric of energy use intensity (EUI) and water use intensity (WUI) which allow different types of buildings to be compared by analyzing consumption per square foot. For EUI, everything that uses energy (lighting, heating, etc.) is compared to the gross square footage of campus. With campus activity returning to pre-pandemic levels and with new facilities coming online, EUI must continually be tracked. Facilities Management will continue aggressively implementing efficiency projects to minimize the impact. There are efficiency opportunities at WCU but continuing to achieve a lower EUI requires two factors: continuing to identify energy efficiency opportunities and funding for essential projects. Moving forward with energy efficiency projects in existing buildings is vital to reducing campus EUI. Ensuring that newly constructed and renovated campus buildings are designed and constructed with aggressive energy efficiency standards will have an even greater impact on the university's future EUI and must be prioritized.

General Statute 143-64.12 that became law in 2007 stated that all state-owned buildings achieve a 20% reduction in BTUs/sq ft by 2010 and a 30% reduction in BTUs/sqft by 2015. In October of 2018, Governor Roy Cooper issued Executive Order 80 which mandated that state-owned buildings achieve a 40% reduction in BTUs/sqft by 2025. Based on the annual BTUs/sqft of 81,197, WCU is at an all-time low of -55% from the 2002-03 baseline by statute. **WCU leads the UNC System universities in BTU/sqft**

reduction. This is something that should be recognized, celebrated, and was achieved by hard work across campus.

Chart 1 below shows the efforts across campus comparing the 2022-23 WCU averages to the UNC System Averages from 2021-22 fiscal years.

Chart 1 UNC WCU Annual Comparison

| How WCU Compares to the FY 21-22 UNC System Averages | | |
|---|-------------------------------------|------------------------------|
| | UNC System Averages FY 21-22 | WCU FY 22-23 Averages |
| Cost Per Square Foot | \$2.20 | \$1.24 |
| BTUs/sqft reduction | -35% | -55% |
| Total BTU/sqft | 110,269 | 81,197 |
| Cost Per Million BTU | \$19.95 | \$15.24 |
| Annual Cost Per Student | \$946.22 | \$444.88 |
| Cost Per 1000 Gallons Water | \$11.65 | \$4.38 |
| Water Usage per Gross Sqft | 21.47 | 24.42 |

As for gallons per square foot, WCU is at a 53% reduction from the same 2002-03 baseline. While this is good for WCU, the UNC System average is 21.47 gal/sqft. WCU still has some work to do on lowering this number. It should be noted that WCU has one of the lowest costs in the UNC System based on thousands of gallons at just \$4.38/1000 gallons. While conserving water is important, at this cost WCU continues to look first at reducing electricity and natural gas usage for the best value. WCU continues to place importance on work orders where hot water is leaking, since either electricity or natural gas is used to heat the water. Energy management is concerned about the amount of makeup water being used monthly in the steam plant and has elevated the conversation to get this under control.

An often-overlooked metric tracked on the Annual Report is the Total Avoided Cost. This metric provides a continued look at how well an energy management program is doing. By looking at the annual costs and the annual savings in BTUs/sqft, the Total Avoided Costs are monies that WCU would have needed to pay utility bills if WCU had not had an energy management program in place. Since 2002-03, WCU has avoided over \$54.1 million dollars. This year alone WCU avoided more than \$6.3 million dollars. While these

monies cannot be pulled out of a bucket to pay bills, it is extremely clear that the energy management program has continued to be highly successful on campus.

One of the funding opportunities that WCU takes advantage of every year was created by General Statute 116-30.3B. This statute is more commonly referred to as the UNC System 1292 Carry Forward. This year, WCU requested \$611,455 in Carry Forward funds which is WCU's largest request to date, more than doubling last years' request of \$256,000. Facilities Management and Finance working together have shown this to be a repeatable source of energy project funds. The 1292 goal for FY22-23 was to request to \$500,000 per year. That was blown away by this year's \$611,455 request. The new goal for FY 23-24 is to request over \$1 million dollars in 1292 Carry Forward. That is an audacious goal for sure.

Primary Impacts to Energy Management FY22/23

As campus changes and grows, this continues to enforce the need for an energy management program. With an annual budget for utilities of over \$5 million dollars, having an energy management department is critical to manage this large amount of university expenditures as well as the associated environmental resources and emissions. While campus is served by two electricity providers (Duke Energy Carolinas and Western Carolina Power), monthly energy management is reading, reporting, and identifying opportunities on more than 135 electric and sub accounts, 16 natural gas (Dominion), 5 propane (Blossman), 4 fuel oil (Colonial) accounts and 120 water (Western Carolina University Water Plant), steam, condensate, and cooling tower meters.

While everything is moving forward, WCU must continue to be aware of the instability currently within the cost of natural gas. As described below in the Natural Gas section, global challenges continue to cause a disruption and market volatility. The basic principle is that natural gas must have pipelines and without the creation of new pipelines then the issue becomes how much can the pipeline support and who owns the capacity within the pipeline? These fluctuations have significantly increased the monthly costs to WCU, and the costs will continue to be monitored. Energy management has been a leader within the UNC System to address these issues. WCU was asked to lead a discussion panel on the issue with natural gas at this year's Appalachian Energy Summit in June 2023.

FY 21-22 closed with the creation and hiring of a Senior Energy Manager position within Facilities Management. This position provides leadership and direction for the university for all energy related matters, systems, and especially our Building Automation System. Bringing in a local resource that has spent many years working statewide for the State Energy Office was a tremendous gain for the WCU family. Especially one with a rich family history at WCU. This hire has created a renewed interest in faculty and staff interaction and most importantly a new set of eyes on what will make WCU grow to be

more energy efficient and sustainable. One of the primary tasks identified was a much-needed improvement in the WCU data collection of utility spending. WCU is in the process of converting to a new Energy Management Software, by the Siemens based company Brightly. This should all be fully up and running by the end of Q3 of 2023. More importantly, this new software will allow WCU, for the first time, to have a dashboard that will display up to date campus spending. Thanks should go out to the Campus Sustainable Initiative, who funded this new software and dashboard through their grant process.

The new Senior Energy Manager came in and went right to work figuring out where WCU could become more efficient and sustainable. As highlighted above, the annual 1292 request was tripled and is heading towards \$1MM by the end of 2024. A new set of eyes also spotted issues with the current rates being charged for water and steam across campus. Both steam and water rates have been increased after many years from lack of oversight. Moving forward these increases will be passed along across campus to auxiliary services. By using the old rates this meant that expenses were being paid out of the facilities management budget when it should have been passed along. This saving alone is over \$200,000 per year that is being redirected to repairs across campus. This new position in a short time has worked hard to change the culture across facilities to highlight the holistic need for energy efficiency to be included in all daily activities, repairs, and conversations. Efforts toward doing more on campus is the goal for the coming year.

Conclusion:

Having an Energy Management Department along with a good Strategic Energy Management Plan enables WCU to:

- **Reduce costs** – as energy costs rise.
- **Reduce carbon emissions** and the environmental damage they cause and to reduce its carbon footprint to promote a green, sustainable image.
- **Reduce risk** – the more energy WCU consumes, the greater the risk that as energy prices increase or supply shortages happen, this could affect the programs offered by the university.
- **Identify** – energy savings projects by using Life Cycle Cost Analysis (LCCA) and other methods to measure and verify potential energy savings.

Annual Report

Chart 1 shows the costs associated with fuel sources purchased this year. The cost of electricity and natural gas make up the largest expenses with water coming in third. Electricity makes up 56% of the WCU utility spending while Natural Gas makes up 30%. WCU continues to use smaller amounts of #2 oil and propane, but this year's #2 Fuel Oil has increased as a temporary boiler has been installed as the steam plant is currently under construction. These lesser fuels make up 6% of the WCU utility costs with water being 8% of the overall total utility spend. The Energy Management program will look at saving money by reducing the kilowatt hours and will save BTUs/sqft by looking at reducing natural gas and other fuels.

Chart 1 WCU Cost Pie Chart

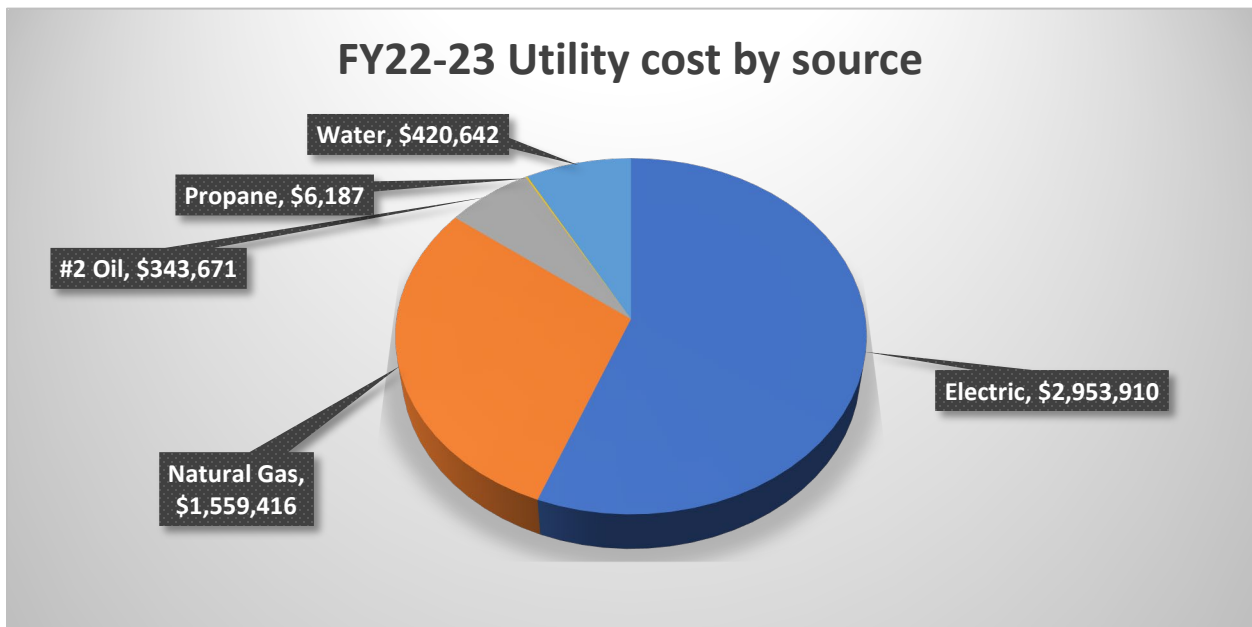
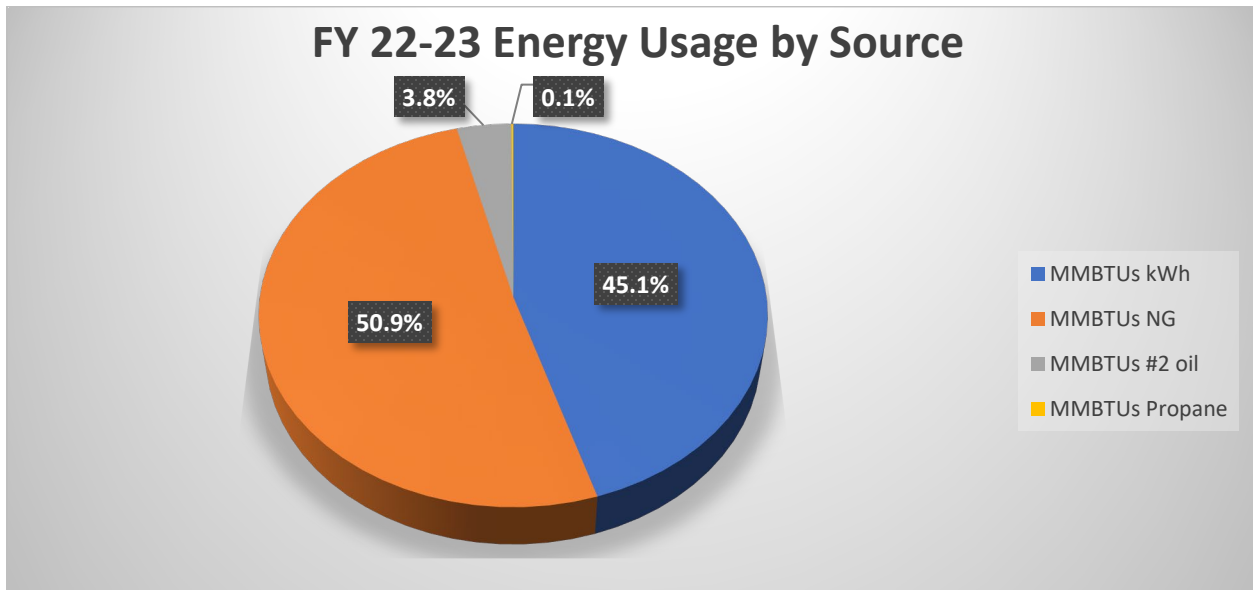


Chart 2 shows purchased fuel sources with a common denominator based on the BTUs of energy held within each source. There are significantly more BTUs in natural gas than in electricity. The Energy Management program will continue to identify energy conservation projects that reduce Natural Gas and thus reduce WCUs BTUs/sqft annually. With the completion of the new Steam Plant and an estimated 30% reduction in natural gas usage, energy management will keep watch to see that these savings are achieved.

Chart 2 WCU Energy Usage by Source



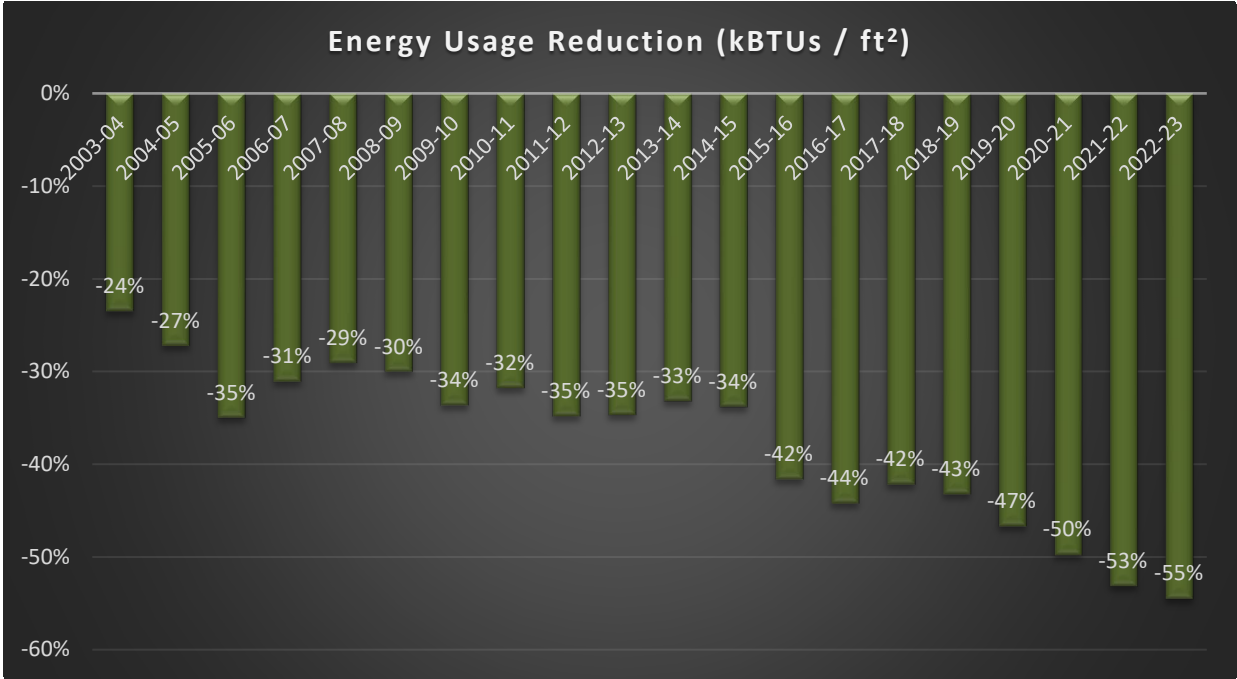
These two charts provide an explanation of the work done by the energy management program and shows the relationship between cost and BTUs. While electricity has a much higher cost, natural gas has a higher BTU count per therm. The UNC System is required to achieve a 40% reduction in BTUs/sqft by 2025 from a 2002-03 baseline as required by Governor Cooper's Executive Order 80. The goal of our energy management program is to reduce natural gas usage on campus, while at the same time maintaining comfort levels during the winter in our facilities. This is partly achieved by making sure the steam plant is operating properly with minimum steam leakage and making sure the Steam System is returning a maximum amount of condensate to the plant.

As shown in Chart 1 above the individual cost associated with electricity is by far our largest cost. The energy management program is keenly aware of the cost differences shown between electricity and natural gas. Another goal of the program is to try and reduce the amount annually paid for utilities. While this is a great goal, it is seldom achieved. With the continued growth on campus with both new buildings and increased students, and the ever-increasing utility rates, it is all but impossible to reduce cost. The energy management program looks at all energy conservation measures and calculates the savings in both cost and BTUs/sqft. This provides a better model for project identification. The bottom line is that if WCU wants to save BTUs/sqft then WCU must reduce natural gas usage and if WCU wants to reduce cost, WCU needs to reduce the amount of electricity used.

Based on General Statute 143-64.12 the State Agencies and the UNC System were required to achieve a 20% reduction in BTUs/sqft from a 2002-03 baseline by 2010 and

a 30% reduction by 2015. Governor Cooper’s Executive Order 80 added on to the statute stating that state-owned buildings are to achieve a 40% reduction by 2025. Graph 1 shows that WCU has surpassed these mandates and has achieved a record 55% reduction. **WCU now leads all state-owned buildings in BTU/sqft reductions.**

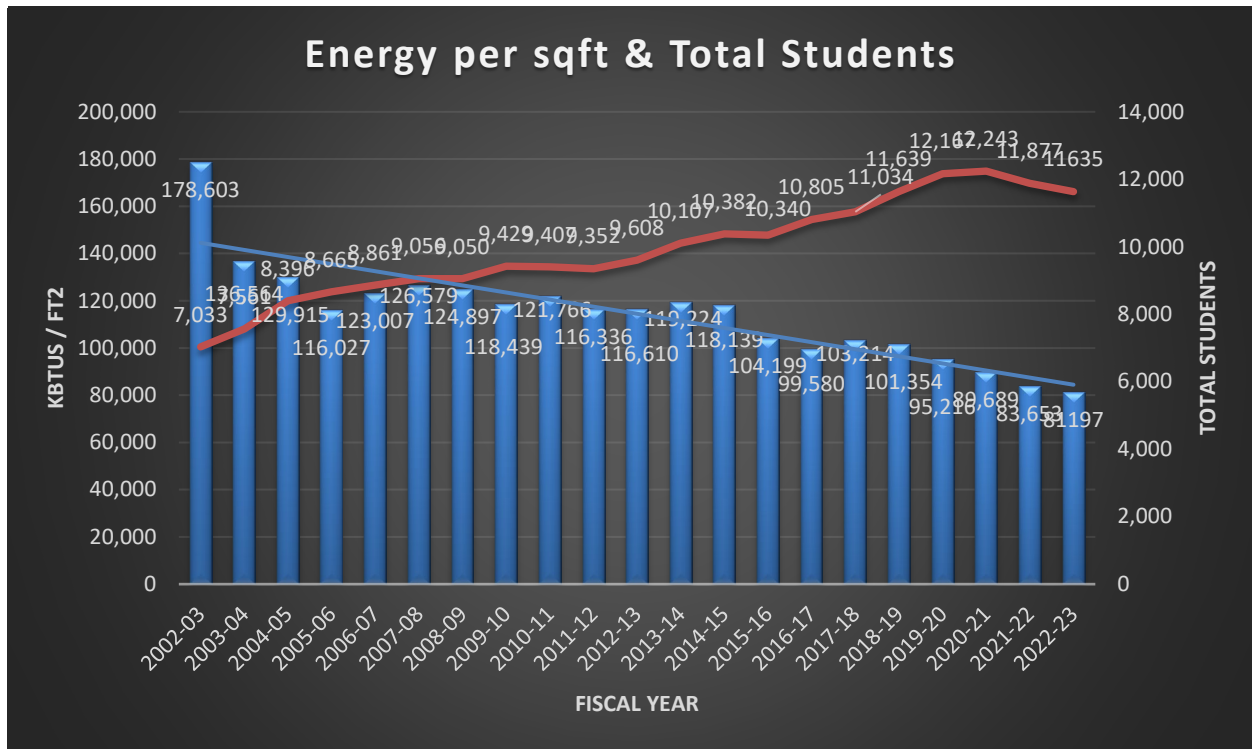
Graph 1 Annual Percentage Reduction in Btus/sqft



Graph 2 shows the correlation as it relates to the increase of the WCU student population. WCU has continued to drive down the energy usage intensity while at the same time the number of students attending WCU continues to rise. Not included in this graph is the number of additional facility and staff required to provide for both the educational programming and facility needs of the additional students.

Growth can be seen across campus the new additions this year including Black Rock, Shining Rock, and Water Rock, our three new residence halls and a long-awaited Steam Plant. We will add three new residential living facilities and an updated steam plant. All these additions make the students time here at WCU valuable and will provide lifelong memories.

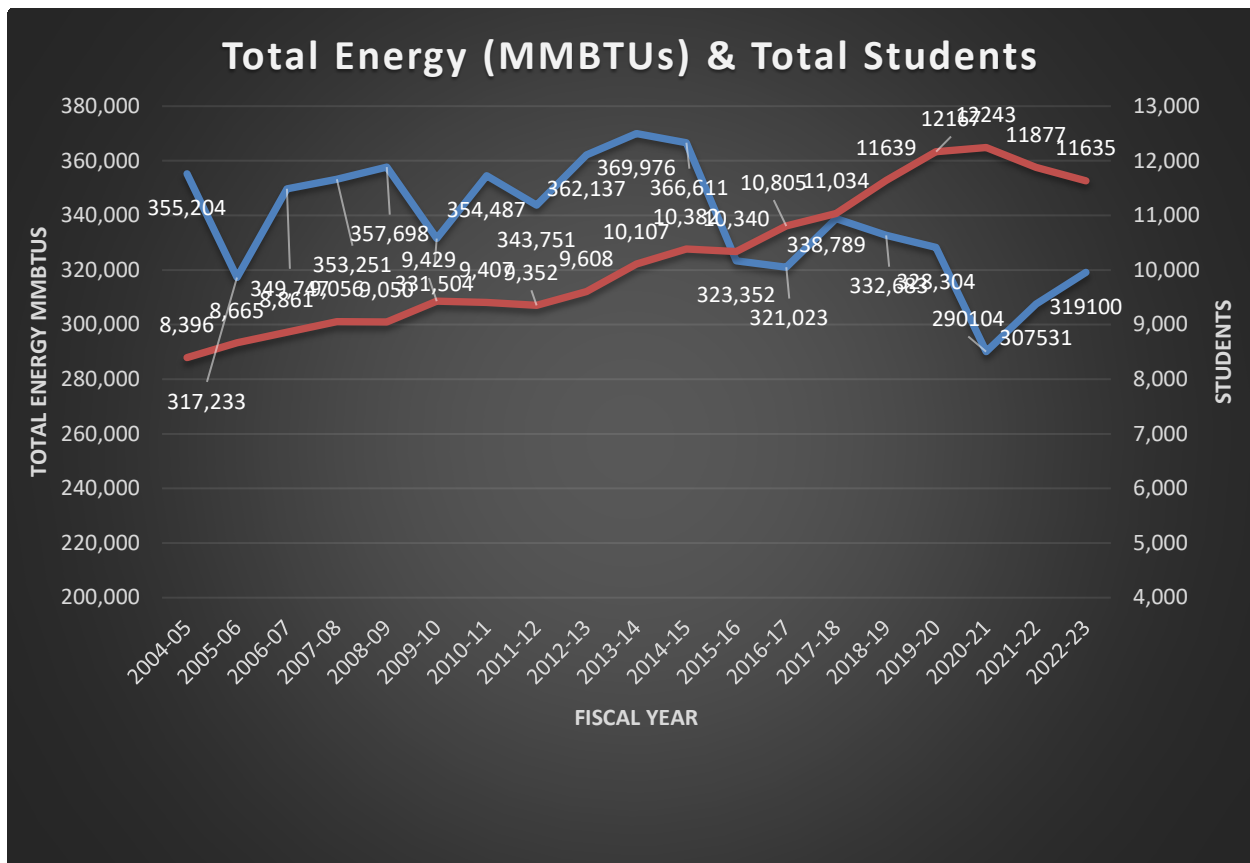
Graph 2 Annual Reduction in BTUs/sqft versus Total Enrollment



To look further at the relationship between the students and energy on campus the metric that was used above was BTUs/sqft. The total number of BTUs used on campus will continue to show that WCU has a successful energy management program.

Graph 3 shows the total number of students in relation to the total BTUs. The red line shows the slight reduction of students this year and the blue line shows an uptick in BTU usage. This uptick is due to the increase in #2 Oil to power the temporary boiler sitting in front of McKee. This was temporary until the steam plant was back in operation in early August. With the new steam plant #2 Fuel Oil on campus will only be used at times when our natural gas is curtailed on campus.

Graph 3 Annual Reduction in Total Campus BTUs versus Total Enrollment



Natural Gas

There continues to be a move away from coal as the primary fuel source for power plants. As coal plants are being retired, natural gas plants are taking their place. Natural Gas is now the biggest fuel source used to produce electricity in North Carolina. According to US Energy Information Administration, natural gas use for electricity generation in NC has more than quadrupled in the past decade. Natural gas primarily moves one way, through a pipeline. Before the transition away from coal, natural gas was primarily used for heating and industrial processes. Now as natural gas becomes the primary fuel source for electricity, this creates a competition for pipeline space to serve the growing need for natural gas. Notwithstanding arguments on both sides as to the use of fossil fuels, the problem stems from the lack of pipeline capacity and the increased need to move more natural gas. NC is beginning to have pipeline capacity issues. When pipeline capacity becomes an issue, the companies running the pipelines can charge more to the customers using the pipelines. Those additional costs get passed along to WCU and the students in the end.

During FY 22/23, WCU has seen a huge cost increase in natural gas. This is due to several factors to include the War in Ukraine, the explosion of both NORSTROM 1 and 2 pipelines and the increase in the amount of LNG being transported from the US to other countries to help supply NG to help pick up the gap left behind by the war. These events caused a spike in the cost of NG for WCU to the highest point in September 2022 where WCU paid \$10.34 per dekatherm. The calendar year for 2022 finished the year with an average monthly cost of \$7.54 per dekatherm. This is more than double costs of previous seven years.

At WCU we have taken advantage of the UNC State Contract 405N for the transportation of NG to our Steam Plant. Under this contract Texican Natural Gas Company provides NG for many State Agencies and many UNC System Schools. Texican is paid to transport large amounts of NG to our Steam Plant under this contract. In FY 21/22, WCU paid an additional commodity charge above the final monthly settlement price of \$0.989 per dekatherm per the 405N contract. This changed in December 2022 when the Department of Administration (DOA) picked up the final year option with Texican and renegotiated a new commodity charge. The renegotiated price shocked all the participants under this contract. DOA agreed to a new commodity charge of \$4.67 above the monthly settlement price for NG. Texican as well as other NG companies have claimed to have been “under-collected” during much of 2022. Meaning that these companies paid more for the transportation of the NG to customers and thus lost revenue. However, you spin this information, WCU will continue to pay more for NG through December 2023.

WCU worked closely with UNC Greensboro to expose this information from DOA and then WCU set up a conference call with the other UNC System Schools to discuss this huge increase. Without the leadership shown by WCU, the whole UNC System would not have known about this issue until the bills came due. WCU Energy Management has spent many hours calculating the effects of this increase and passed along the need for additional funds within this utility account. Based on the size of the NG need, only the steam plant gets NG from Texican, the other campus facilities rely on Dominion for NG.

During this time, Energy Management has been working with Dominion to figure out if switching the steam plant off Texican and over to Dominion. The primary issue has been that Dominion continues to have both rate increases and decreased throughout the year. Dominion has been unable to provide a long-range rate schedule to WCU. This long-range rate schedule must be available for Energy Management to accurately calculate the annual cost of NG. At this point, it has been determined that the best path is to switch our transportation for the steam plant from Texican back to Dominion.

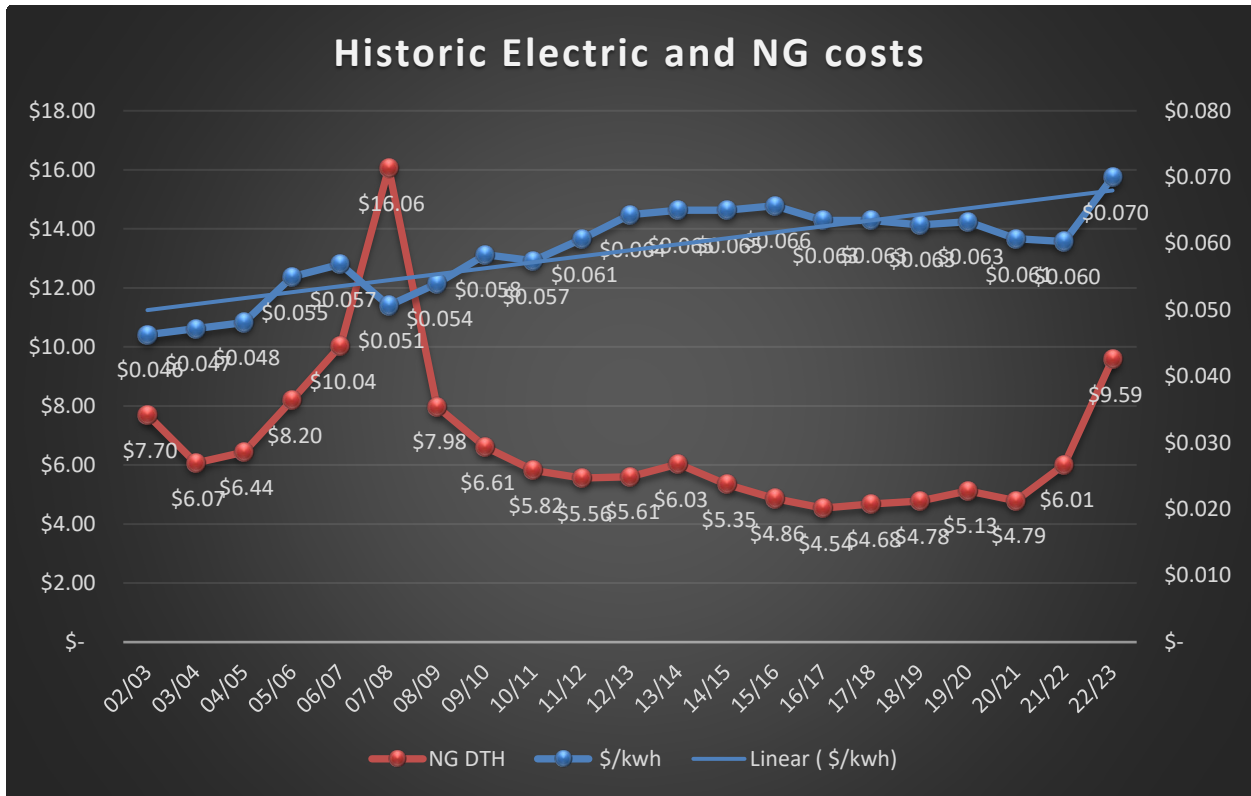
Part of this decision is that for the first time in many years the new steam plant can be swapped from NG over to #2 Fuel Oil. This allows for WCU to move to an interruptible

NG rate. This will save additional costs for this account as well. WCU filled out and submitted the required paperwork to Dominion in May 2023 and will move to Dominion for the steam plant full time in September. The WCU approval was helped with the closing of the paper mill in Canton as Dominion looks to gain more customers after losing such a big account.

WCU will not be alone in switching off Texican. Already, UNC Greensboro and UNC Wilmington have both moved away from Texican and to Piedmont Natural Gas. It will be interesting to see how the 405N contract changes during the bidding process in Q3 of this year. Based on research of the NG market and from other actions, the cost for Texican basis will most likely be in the \$3.00 - \$4.00 range per dekatherm. With more UNC System accounts coming off the Texican contract, this will mean that natural gas marketer who gets the 405N contract will have a lower volume of NG to purchase. This lower volume will mean a higher price to access the pipeline per customer. While not the current \$4.67 it is still more expensive than what WCU will be paying with Dominion.

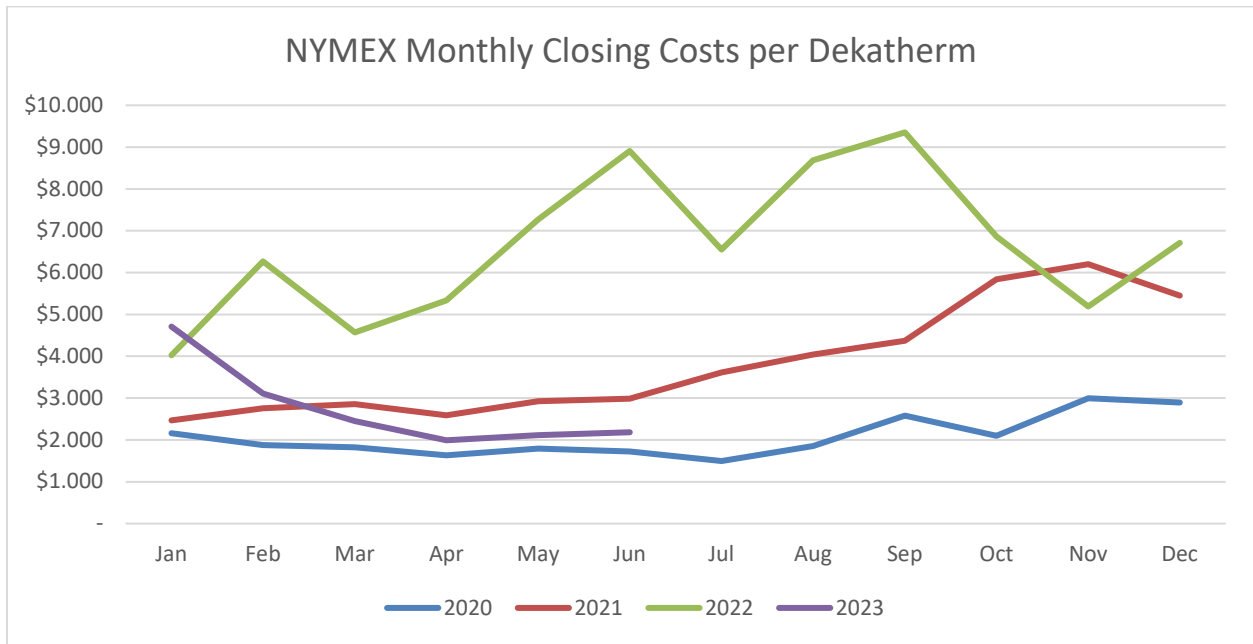
Graph 4 provides a clear understanding of these metrics. While the cost of electricity has risen over the years, WCU had been fortunate to see a stagnation in this cost for the past few years. But as you can see in the graph, electricity rates have risen and that is reflected in the graph below. Graph 4 also shows the uptick over the last two years of the cost per Dekatherm and the overall trend for natural gas since 2002-03. With everything going on in the world, natural gas costs seem to be the most impacted. As you can see the cost for natural gas jumped significantly this year.

Graph 4 Historic Electric and Natural Gas Costs



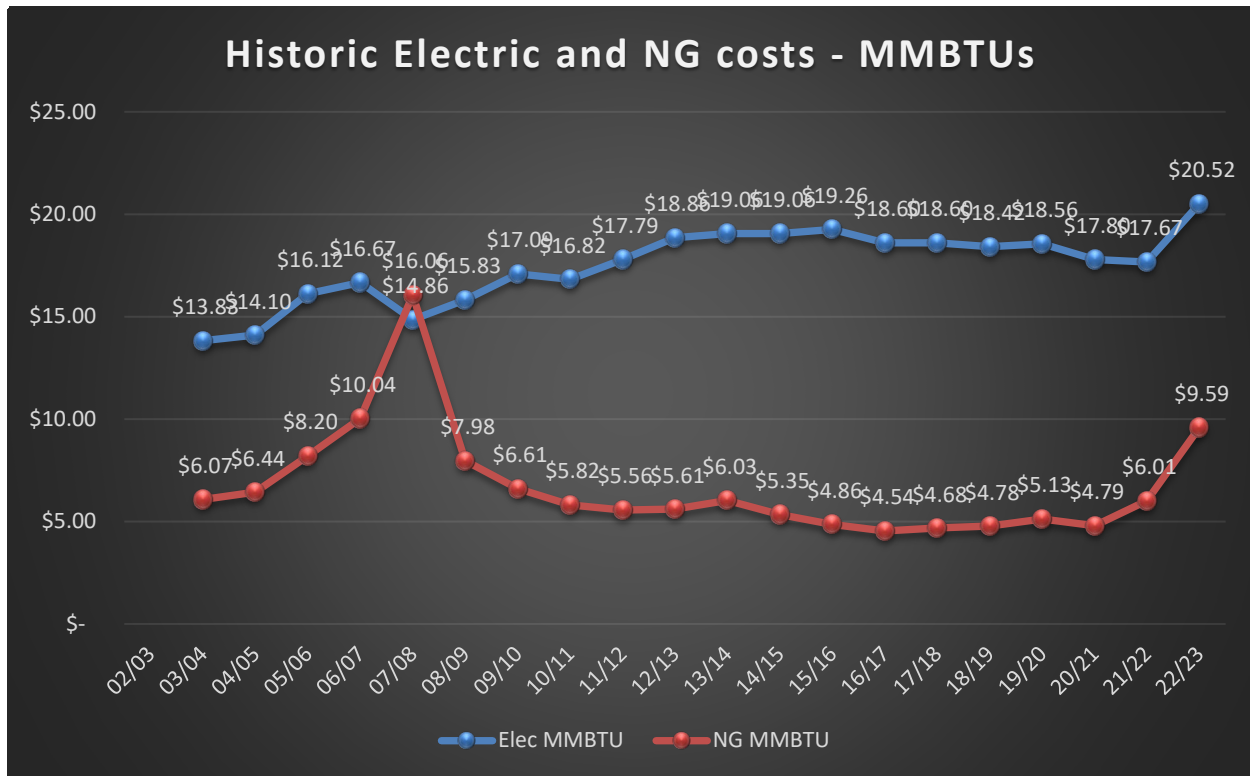
Graph 5 shows the overall volatility of natural gas costs for this year as compared to the last three years. It is easy to realize that world events are causing issues here in Cullowhee and WCU. The green line below shows that volatility and the associated costs with natural gas for FY 22-23. Both graphs clearly show the effect of those costs on WCU and the campus. The purple line for this year shows that natural gas has gone back to more historic levels and in a range where it should be. While you may have read about the reduction in gas reserves around gasoline, natural gas storage right now is at a five-year high and looks to continue that way soon. This will help keep prices down for FY23-24, but as you can see as we get closer to winter, the price could rise as usual.

Graph 5 Monthly Closing Costs per Dekatherm



There continues to be a push for electrification across the nation. The Energy Management Program continues to monitor what that impact might look like here at WCU. Graph 6 shows the cost comparison for both electricity and natural gas using the same common denominator of 1,000,000 BTUs. This is commonly referred to as a Dekatherm. As the graph points out the cost per dekatherm of electricity is \$20.52 and the cost per dekatherm of natural gas is \$9.59. It must be noted that natural gas is not 100 percent efficient. In most cases it is at least 80% or better. This small lack of efficiency will slightly increase the cost of natural gas. If at any time there is a switch from natural gas to 100 percent electricity as the sole fuel source on campus, additional measures will need to be accommodated. Natural gas using equipment within the affected facilities will need to be replaced with equipment that only use electricity for heating. All of this can be accomplished if that is the direction WCU would like to explore. Based on the information contained within this graph, WCU will need to significantly increase the annual energy budget to ensure resources are budgeted for increased cost for electricity.

Graph 6 Historic Electric and Natural Costs per Million BTUs



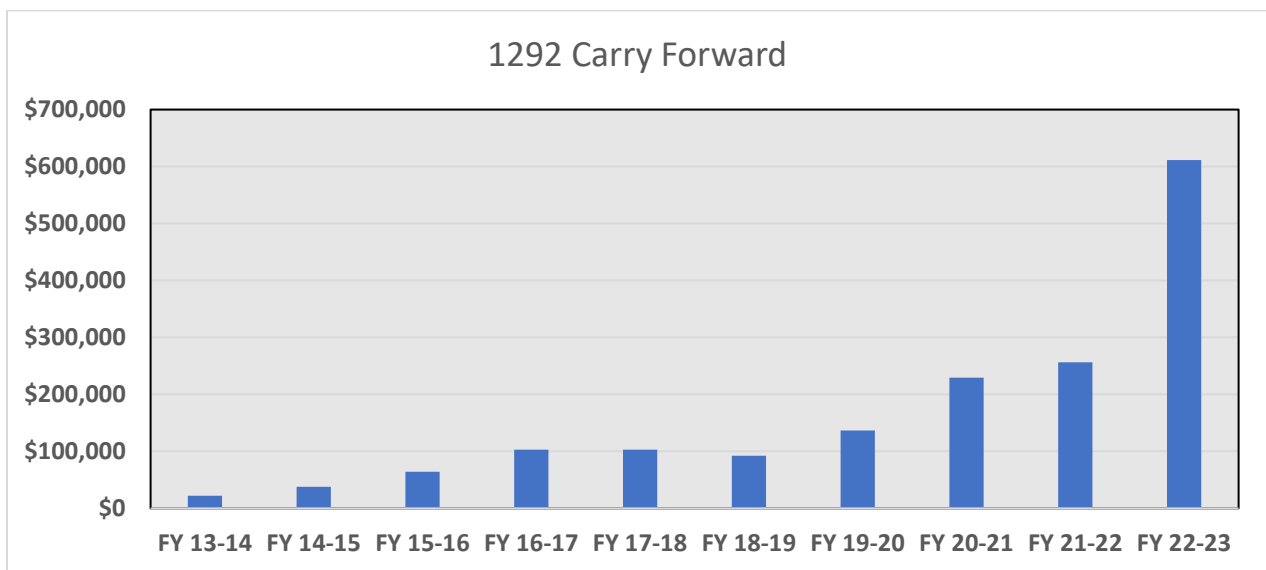
1292 Carry Forward

General Statute 116-30.3B, more commonly known as the UNC System 1292 Carry Forward, allows UNC System schools who have funds left over in the utility account at the end of the fiscal year and who have identified and measured energy savings projects through the year to carry funds forward left-over funds into the next fiscal year. These Carry Forward funds must be used for new energy efficiency projects in the next fiscal year. This year, WCU requested \$611,455 in Carry Forward funds which is the largest request to date. With Facilities Management and Finance working together, this continues to be a repeatable source of funds. The goal of the Energy Management program for FY 22-23 was to get this year's Carry Forward request to \$500,000. With this year's request of \$611.455 the goal was clearly shattered. As noted last year, to date through FY 21-22 WCU had been able to Carry Forward just over \$1 million dollars in the last nine years. Having hired a Senior Energy Manager to work more closely with the departments to identify additional projects and to calculate the savings increases, the 1292 Carry Forward has greatly improved from this renewed focus. The new goal for

FY23-24 is to get the 1292 Carry Forward saving to \$1 Million Dollars a year. This is a bold new goal for Energy Management indeed.

Graph 7 provides an annual look at the past 1292 submissions and the total requested. This year's efforts can clearly be seen. Already additional ECMs have been identified for next year's 1292. These projects include some chiller and cooling tower replacements, and more building envelope upgrades. Energy Management is working with Design and Construction to have vendors provide energy savings calculations as they submit proposals. This will help to identify the best projects and allow for increased 1292 savings moving forward. WCU is allowed to Carry Forward savings for 12 years for all ECMs. This provides WCU a great opportunity to add projects each year that really affect the overall 1292 goals.

Graph 7 Annual 1292 Carry Forward



Future Facility Energy Management Projects and potential 1292 Projects

1. There are 5 buildings on campus that are on an outdated Schneider BAS system that is no longer supported. WCU has moved forward with a special service agreement with Harris Integrated Solutions, our preferred BAS vendor of Automated Logic on campus. With the creative use of a Service Agreement and with permission of State Construction, this project will kick off in October of 2023. The total annual savings is expected to be almost \$50,000 per year.
2. The Stillwell Science Lab is going through a renovation to replace many of the fume hoods after the recent construction of Apodaca STEM Building. This project was engineered by McKim and Creed and work is set to begin the week of July 17th July and will continue through November. McKim and Creed will provide energy savings calculations as part of the requirements.
3. In the Killian building, WCU is doing a complete replacement of the HVAC system including new duct work. Energy management is happy that this project will also include new energy efficient windows as well. The total project cost is approximately \$3,570,000 and will be done in several phases over the next 3 years. As part of this project, we must upgrade the BAS in Killian Annex as the Annex BAS is also powered by the BAS in Killian. So, care must be taken with this project. The buildings will be operational and occupied as much as possible while construction is being completed.
4. Energy Management has identified the cost of installing demand response on campus through an integration with the campus BAS and Campus Power. This would allow EM to set a monthly demand limit and then shed load across campus. The proposed cost of \$30,000 and further details is being examined.
5. For the first time in many years, WCU has a new steam plant with adequate back up fuel. WCU will now move to an interruptible gas rate for this new facility. Based on recent calculations, this will provide increased 1292 savings for the coming year.
6. Egress and Exit Lighting Replacement to LED – Campus wide has been identified as a quick energy payback project.
7. There are several cooling towers and chillers that need to be replaced on campus to include Hunter Library and Judaculla Residence Hall Cooling Towers Replacement, HFR Chiller Replacement and CAT Building Chiller Replacement.
8. There are several roof replacements that include Bird Roofing Replacement, Facilities Roof Replacement, Reid Gym Roof Replacement and HFR Roof Replacement.

WCU Annual Strategic Plan

Based on the WCU Campus Master Plan, the WCU Strategic Energy Plan must support and collaborate with the goals and objectives of the Campus Master Plan. Many of the Strategic Directives to include Academic Excellence, Student Experience, Employee Excellence and Responsible Stewardship cannot be fully achieved without the work of the Energy Management Program. The Energy Management Program must provide an optimal learning environment for the students, a healthy living and workplace by providing enhanced indoor air quality and being good stewards of the taxpayer resources used to pay utility bills, update facilities and equipment. These plans must work together to be successful.

The Strategic Plan must address the requirements mandated to WCU found within General Statutes 143-64.12, 116-30.3B and Executive Order 80. The plan must address requirements from the UNC Board of Governors Sustainability Policy. The Strategic Plan will identify daily, weekly, monthly, and yearly activities to be performed by the Energy Management Team. Many of these tasks will move around based on the urgency within a project, equipment failure or time constraints. Currently the Energy Management Team consists of a Senior Energy Manager, the Campus Energy/BAS Manager, and a BAS Controls Technician.

Yearly Tasks to be completed by Energy Management Staff

1. Annual Consumption Report Due **August 15th**
This involves the collection of all utility data to include electricity (Duke and WCU Power), natural gas (PSNC and Texican), #2 Oil, propane and water (WCU Water and TWSA).
2. Annual Program Update Due **August 15th**
This report provides an annual look at how WCU is doing to meet the requirements found within the statutes and policies.
3. Annual Strategic Energy Plan Due **August 15th**
This report provides the annual direction and activities of the energy management program and team.
4. Annual 1292 Report Due **May 15th**
This report provides WCU the ability to potentially carry forward identified energy savings from one fiscal year's budget into the next.
5. Attending the State Energy Conference (**April 25-26, 2023**)
This provides a networking and learning opportunity for staff.
6. Attend Appalachian Energy Summit Mid-Year if held.
7. Attend Appalachian Energy Summit Annual Meeting (**June 2023**)
8. Identify training opportunities for staff to increase overall and specific knowledge directly related to WCU mission.
9. Manage the WCU utility budget and utility spending.

10. Provide leadership across WCU as it relates to energy issues.
11. Aid Sustainability during Student Orientation.
12. Communicate energy management goals and achievements to faculty, staff, and students.

Monthly Tasks to be completed by Energy Management and Facilities Staff

1. Oversee the reading of all electric, gas and water meters on campus.
This is completed by the electrical and plumbing shop.
2. Compile the data into a monthly report.
This information is compiled by the energy manager. Once approved, it is sent out and used to charge residential living and others on campus for utilities used.
3. Insert this data into spreadsheets and data base.
Information is manually entered into the proper locations for annual tracking.
4. Analyze and investigate any anomalies.
During the monthly data entry any readings that are out of range will be investigated and tracked down.
5. Report any meters that are not functioning for repair.
Work orders will be filled out and submitted for repair.
6. Walk a selected number of facilities across campus to identify potential energy savings opportunities and projects.
These will be Level 1 energy assessments to identify savings opportunities. Work orders will be created on identified issues.
7. Talk to Electrical Shop Supervisor and HVAC/Plumbing Shop Supervisor to identify potential 1292 report projects.
If projects are identified, energy management will calculate savings and fill out 1292 paperwork and store in proper folder.
8. Energy/BAS manager and BAS Tech will monitor alarms on the BAS system.
The goal is to have only the most important alarms that are being monitored. Minimizing unnecessary alarms that are of limited value.
9. BAS Tech will run a locked value report.
This allows energy management to see equipment that is in hand and running without the control of the BAS.
10. Monthly communication with Design and Construction to help manage projects across campus.
11. Energy Management will work with Design and Construction to ensure energy management is included in all energy related projects across campus.
12. Senior Energy Manager and Energy/BAS Manager will provide specific energy management training for internal growth and knowledge.
13. Senior Energy Manager will work with Chief Sustainability Officer to identify ways to collaborate and provide education to faculty, staff, and students.

Weekly/Daily Tasks to be completed by Energy Management Staff

1. Provide daily team updates with energy management staff.
2. Attend other meetings as they are required.
3. Provide oversight of contractors on site as it relates to BAS improvements.
Guiding contractors through buildings, unlocking doors, or other duties as needed to ensure job is completed.
4. Assist contractors as needed with controls upgrades/testing and balancing.
5. Aid end users with operation and scheduling of Buildings as necessary.
6. Attend weekly commissioning meeting as required for all HVAC projects on campus.
7. Attend weekly small projects meeting to gain knowledge of potential energy savings projects.
8. Assist with commissioning of new buildings and re-tuning/calibrating older buildings. Replace/repair/calibrate controls systems as needed.
9. Energy Management will communicate weekly with design and construction to continue to identify energy saving within projects.
10. Review and comment on all construction related documents in a timely fashion.
11. Continue to be a resource/facilitator for HVAC shop and HVAC technician as needed for repair and replacement of BAS and HVAC parts and equipment.
12. Daily monitoring of the BAS to identify issues and submit work orders for repairs.
13. Provide additional data to vendors as required in a timely fashion.
14. Identify energy savings opportunities through the BAS system. Once identified, Senior Energy Manager will calculate potential savings.
15. Senior Energy Manager will meet weekly with the Chief Sustainability Officer to coordinate and communicate projects that Energy Management is currently working on.

WCU Energy Management Program

To address the requirements of General Statute 143-64.12 the State Agencies and the UNC System were required to achieve a 20% reduction in BTUs/sqft from a 2002-03 baseline by 2010 and a 30% reduction by 2015. Governor Cooper's Executive Order 80 added on to the statute stating that state-owned buildings are to achieve a 40% reduction by 2025. WCU has developed this Energy Management Program to effectively manage the ongoing use of electricity, natural gas and other fuel as well as water. As the campus continues to grow in square footage, staff, faculty and students it is even more important to manage utility spending. This allows WCU to remain good stewards of all the resources that are awarded to us. When it comes to saving energy, the goal of the Energy Management Program is simple. WCU must constantly monitor, control, and conserve energy in all buildings and across campuses. Typically, this involves the following steps:

1. Metering energy consumption and collecting the data.
2. Finding opportunities to save energy and estimating how much energy each opportunity could save. By analyzing our meter data, WCU can find and quantify routine energy waste and investigate the energy savings that could be made by replacing equipment (e.g., lighting) or other building upgrades.
3. Taking action to target the opportunities to save energy (i.e., tackling the routine waste and replacing or upgrading the inefficient equipment). Typically, you'd start with the best opportunities first.
4. Tracking your progress by analyzing your meter data to see how well your energy-saving efforts have worked.

(And then back to step 2, and the cycle continues...)

It is critical that Energy Management continue to focus on the 5 areas below. By focusing on these areas, WCU can maintain the great work that has been accomplished to this point.

Energy Data Management – WCU has a program for collecting and analyzing monthly utility billing information using spreadsheets. This data is compared year to year and month to month to assess fluctuations and abnormalities that may occur. The problem is that by the time the data is reviewed it is 30 days old. While this has worked well for years, WCU needs the ability to see energy usage data today and not the end of the month. The goal is to move the progress to more real time data. This would allow WCU to see changes immediately as they take place allowing actions to be taken when problems are occurring in real time.

Energy Supply Management – WCU is proactive in selection of electrical rates and cost-effective fuel rates for all campus buildings. Energy supply management must also demonstrate choices that achieve the campus and UNC System goals to be carbon neutral by 2050, the state goal of 40% reduction in greenhouse gas emissions by 2025. Facilities Management thoroughly reviews utility invoices for deviations indicating billing

errors. Work is being done to incorporate a demand-side management program that aims to lower electricity demand at peak times to help save WCU money. The goal of this plan would create a program that would reduce demand charges in real time. By being able to measure demand, WCU could set a limit on the actual demand being used at any time. If tied to the building automation system would allow for additional energy savings and a reduction in the overall electricity bought by WCU.

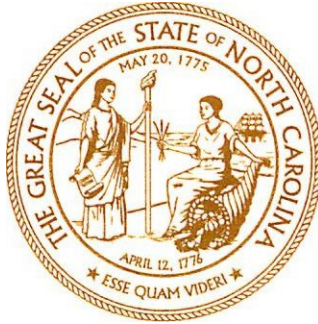
Energy Use in Facilities – Building HVAC and lighting controls are updated as renovations occur or as Retro-Commissioning takes place. New buildings have state-of-the-art Building Automation System (BAS) controls. New and existing building control systems will be evaluated and adjusted for optimum energy usage. The work of both the Energy Manager and Controls technician is critical to ensure optimum operation and most of all maintain the best learning environment possible. As a new requirement of the energy management team, every building will be walked every 3 months. This provides an ideal time to identify projects, spot issues and communicate with campus staff and students. These building assessments are fundamental to controlling unnecessary plug loads while allowing us to see changes in use and occupancy more often.

Equipment Efficiency – WCU requires all equipment replacements to meet or exceed code requirements. Preventive Maintenance (PM) has been moved primarily to second shift and is key to our energy efficiency program. PM has a major impact on any energy management program. It is no different here at WCU. By performing PM, WCU can keep energy using equipment running in the most efficient way. Energy Management will continue to help specify energy consuming equipment and will continue to identify and evaluate cost-effective modifications or replacements. All equipment shall be selected by Life Cycle Cost Analysis as required by statute. While funding for replacement and equipment upgrades can have their challenges, WCU will continue to take advantage of the UNC System 1292 Carry Forward funds. Larger and more capital intense equipment and projects will be identified and are normally funded through R&R capital projects.

Organization Integration & Awareness Training – The Senior Energy Manager will continue to work closely with the University Sustainability Officer for various energy conservation measures and training efforts within the appropriate University departments. The Sustainability Office priorities since 2018 are to pursue compliance with the UNC Sustainability Policy (600.6.1). Energy management is recognized in the sustainability plan under a category of “Operational Priority” with an expectation for continuous improvement for all campuses. These efforts are aimed at improving behavior and awareness in ways that contribute to the WCU continued ability to exceed the state of North Carolina mandated conservation goals. In communicating with staff, faculty, and students the goals of the Energy Management Program, WCU is hoping for continued assistance and most of all new ideas that may help the campus save energy and the environment.

Appendix 1

Executive Order 80



State of North Carolina

ROY COOPER
GOVERNOR

October 29, 2018

EXECUTIVE ORDER NO. 80

NORTH CAROLINA'S COMMITMENT TO ADDRESS CLIMATE CHANGE AND TRANSITION TO A CLEAN ENERGY ECONOMY

WHEREAS, North Carolina residents deserve to be better educated, healthier, and more financially secure so that they may live purposeful and abundant lives; and

WHEREAS, N.C. Const. art. XIV, ss 5 requires the conservation, protection, and preservation of state lands and waters in public trust; and

WHEREAS, North Carolina is well positioned to take advantage of its technology and research and development sectors, along with its skilled workforce, to promote clean energy technology solutions and a modernized electric grid; and

WHEREAS, public-private partnerships in North Carolina foster market innovations and develop clean energy technology solutions that grow the state's economy; and

WHEREAS, the effects of more frequent and intense hurricanes, flooding, extreme temperatures, droughts, saltwater intrusion, and beach erosion have already impacted and will continue to impact North Carolina's economy; and

WHEREAS, climate-related environmental disruptions pose significant health risks to North Carolinians, including waterborne disease outbreaks, compromised drinking water, increases in disease-spreading organisms, and exposure to air pollution, among other issues; and

WHEREAS, to maintain economic growth and development and to provide responsible environmental stewardship, we must build resilient communities and develop strategies to mitigate and prepare for climate-related impacts in North Carolina.

NOW, THEREFORE, by the authority vested in me as Governor by the Constitution and the laws of the State of North Carolina, IT IS ORDERED:

1. The State of North Carolina will support the 2015 Paris Agreement goals and honor the state's commitments to the United States Climate Alliance.

The State of North Carolina will strive to accomplish the following by 2025:

- a. Reduce statewide greenhouse gas emissions to 40% below 2005 levels;
 - b. Increase the number of registered, zero-emission vehicles ("ZEVs"; individually, "ZEV") to at least 80,000;
 - c. Reduce energy consumption per square foot in state-owned buildings by at least 40% from fiscal year 2002-2003 levels.
2. Cabinet agencies shall evaluate the impacts of climate change on their programs and operations and integrate climate change mitigation and adaptation practices into their programs and operations. Council of State members, higher education institutions, local governments, private businesses, and other North Carolina entities are encouraged to address climate change and provide input on climate change mitigation and adaptation measures developed through the implementation of this Executive Order. Consistent with applicable law, cabinet agencies shall actively support such actions.
 3. The Secretary or designee of each cabinet agency and a representative from the Governor's Office shall serve on the North Carolina Climate Change Interagency Council ("Council"), which is hereby established. The Secretary of the North Carolina Department of Environmental Quality, or the Secretary's designee, shall serve as the Council Chair. The North Carolina Department of Environmental Quality shall lead the Council by providing strategic direction, scheduling and planning Council meetings, determining the prioritization of activities, facilitating stakeholder engagement, and assisting in the implementation of pathways to achieve the goals provided in Section 1 of this Executive Order.

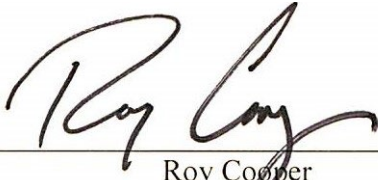
The duties of the Council shall include the following:

- a. Recommend new and updated goals and actions to meaningfully address climate change;
- b. Develop, implement, and evaluate programs and activities that support statewide climate mitigation and adaptation practices;
- c. Establish workgroups, as appropriate, to assist the Council in its duties;
- d. Consider stakeholder input when developing recommendations, programs, and other actions and activities;
- e. Schedule, monitor, and provide input on the preparation and development of the plans and assessments required by this Executive Order;

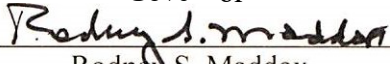
- f. Review and submit to the Governor the plans and assessments required by this Executive Order.
4. The North Carolina Department of Environmental Quality ("DEQ") shall develop a North Carolina Clean Energy Plan ("Clean Energy Plan") that fosters and encourages the utilization of clean energy resources, including energy efficiency, solar, wind, energy storage, and other innovative technologies in the public and private sectors, and the integration of those resources to facilitate the development of a modern and resilient electric grid. DEQ shall collaborate with businesses, industries, power providers, technology developers, North Carolina residents, local governments, and other interested stakeholders to increase the utilization of clean energy technologies, energy efficiency measures, and clean transportation solutions. DEQ shall complete the Clean Energy Plan for the Council to submit to the Governor by October 1, 2019.
5. The North Carolina Department of Transportation ("DOT"), in coordination with DEQ, shall develop a North Carolina ZEV Plan ("ZEV Plan") designed to increase the number of registered ZEVs in the state to at least 80,000 by 2025. The ZEV Plan shall help establish interstate and intrastate ZEV corridors, coordinate and increase the installation of ZEV infrastructure, and incorporate, where appropriate, additional best practices for increasing ZEV adoption. DOT shall complete the ZEV Plan for the Council to submit to the Governor by October 1, 2019.
6. The North Carolina Department of Commerce ("DOC") and other cabinet agencies shall take actions supporting the expansion of clean energy businesses and service providers, clean technology investment, and companies with a commitment to procuring renewable energy. In addition, DOC shall develop clean energy and clean transportation workforce assessments for the Council to submit to the Governor by October 1, 2019. These assessments shall evaluate the current and projected workforce demands in North Carolina's clean energy and clean transportation sectors, assess the skills and education required for employment in those sectors, and recommend actions to help North Carolinians develop such skills and education.
7. Cabinet agencies shall prioritize ZEVs in the purchase or lease of new vehicles and shall use ZEVs for agency business travel when feasible. When ZEV use is not feasible, cabinet agencies shall prioritize cost-effective, low-emission alternatives. To support implementation of this directive, the North Carolina Department of Administration ("DOA") shall develop a North Carolina Motor Fleet ZEV Plan ("Motor Fleet ZEV Plan") that identifies the types of trips for which a ZEV is feasible, recommends infrastructure necessary to support ZEV use, develops procurement options and strategies to increase the purchase and utilization of ZEVs, and addresses other key topics. DOA shall complete the Motor Fleet ZEV Plan and provide an accounting of each agency's ZEVs and miles driven by vehicle type for the Council to submit to the Governor by October 1, 2019, and annually thereafter.
8. Building on the energy, water, and utility use conservation measures taken pursuant to N.C. Gen. Stat. 143-64.12(a), DEQ shall update and amend, where applicable, a Comprehensive Energy, Water, and Utility Use Conservation Program ("Comprehensive Program") by February 1, 2019, and biennially beginning December 1, 2019, to further reduce energy consumption per gross square foot in state buildings consistent with Section 1 of this Executive Order. The Comprehensive Program shall include best practices for state government building energy efficiency, training for agency staff, cost estimation methodologies, financing options, and reporting requirements for cabinet agencies. DEQ and cabinet agencies shall encourage and assist, as requested, higher education institutions, K-12 schools, and local governments in reducing energy consumption. To achieve the required energy consumption reductions:

- a. By January 15, 2019, each cabinet agency shall designate an Agency Energy Manager, who shall serve as the agency point of contact.
 - b. Each cabinet agency shall develop and submit an Agency Utility Management Plan to DEQ by March 1, 2019, and biennially thereafter, and implement strategies to support the energy consumption reduction goal set forth in Section I of this Executive Order. DEQ shall assess the adequacy of these plans and their compliance with this Executive Order.
 - c. By September 1, 2019, and annually thereafter, each cabinet agency shall submit to DEQ an Agency Utility Report detailing its utility consumption, utility costs, and progress in reducing energy consumption.
 - d. DEQ shall develop an annual report that describes the Comprehensive Program and summarizes each cabinet agency's utility consumption, utility costs, and achieved reductions in energy consumption. DEQ shall complete this report for publication on its website and for the Council to submit to the Governor by February 1, 2019, and annually thereafter beginning December 1, 2019.
9. Cabinet agencies shall integrate climate adaptation and resiliency planning into their policies, programs, and operations (i) to support communities and sectors of the economy that are vulnerable to the effects of climate change and (ii) to enhance the agencies' ability to protect human life and health, property, natural and built infrastructure, cultural resources, and other public and private assets of value to North Carolinians.
- a. DEQ, with the support of cabinet agencies and informed by stakeholder engagement, shall prepare a North Carolina Climate Risk Assessment and Resiliency Plan for the Council to submit to the Governor by March 1, 2020.
 - b. The Council shall support communities that are interested in assessing risks and vulnerabilities to natural and built infrastructure and in developing community-level adaptation and resiliency plans.
10. DEQ shall prepare and manage a publicly accessible Web-based portal detailing the Council's actions and the steps taken to address climate-related impacts in North Carolina. Cabinet agencies shall submit data, information, and status reports as specified by the Council to be published on the portal. In addition, DEQ shall develop, publish on the portal, and periodically update an inventory of the state's greenhouse gas emissions that, among other things, tracks emissions trends statewide by sector and identifies opportunities for additional emissions reductions.
11. By October 15, 2019, and annually thereafter, the Council shall provide to the Governor a status report on the implementation of this Executive Order.
12. This Executive Order is consistent with and does not otherwise abrogate existing state law.
13. This Order is effective October 29, 2018 and shall remain in effect until rescinded or superseded by another applicable Executive Order.

IN WITNESS WHEREOF, I have hereunto signed my name and affixed the Great Seal of the State of North Carolina at the Capitol in the City of Raleigh, this the 29th day of October, in the year of our Lord two thousand eighteen.



Roy Cooper
Governor



Rodney S. Maddox
Chief Deputy Secretary of State

ATTEST:



Appendix 2

143-64.10

Article 3B.

Conservation of Energy, Water, and Other Utilities in Government Facilities.

Part 1. Energy Policy and Life-Cycle Cost Analysis.

§ 143-64.10. Findings; policy.

- (a) The General Assembly finds all of the following:
- (1) That the State shall take a leadership role in aggressively undertaking the conservation of energy, water, and other utilities in North Carolina.
 - (2) That State facilities and facilities of State institutions of higher learning have a significant impact on the State's consumption of energy, water, and other utilities.
 - (3) That practices to conserve energy, water, and other utilities that are adopted for the design, construction, operation, maintenance, and renovation of these facilities and for the purchase, operation, and maintenance of equipment for these facilities will have a beneficial effect on the State's overall supply of energy, water, and other utilities.
 - (4) That the cost of the energy, water, and other utilities consumed by these facilities and the equipment for these facilities over the life of the facilities shall be considered, in addition to the initial cost.
 - (5) That the cost of energy, water, and other utilities is significant and facility designs shall take into consideration the total life-cycle cost, including the initial construction cost, and the cost, over the economic life of the facility, of the energy, water, and other utilities consumed, and of operation and maintenance of the facility as it affects the consumption of energy, water, or other utilities.
 - (6) That State government shall undertake a program to reduce the use of energy, water, and other utilities in State facilities and facilities of the State institutions of higher learning and equipment in those facilities in order to provide its citizens with an example of energy-use, water-use, and utility-use efficiency.

(b) It is the policy of the State of North Carolina to ensure that practices to conserve energy, water, and other utilities are employed in the design, construction, operation, maintenance, and renovation of State facilities and facilities of the State institutions of higher learning and in the purchase, operation, and maintenance of equipment for these facilities. (1975, c. 434, s. 1; 1993, c. 334, s. 2; 2001-415, s. 1; 2006-190, s. 8; 2007-546, s. 3.1(b).)

§ 143-64.11. Definitions.

For purposes of this Article:

- (1) "Economic life" means the projected or anticipated useful life of a facility.
- (2) "Energy-consumption analysis" means the evaluation of all energy-consuming systems, including systems that consume water or other utilities, and components of these systems by demand and type of energy or other utility use, including the internal energy load imposed on a facility by its occupants, equipment and components, and the external energy load imposed on the facility by climatic conditions.
- (2a) "Energy Office" means the State Energy Office of the Department of Environmental Quality.
- (2b) "Energy-consuming system" includes but is not limited to any of the following equipment or measures:
 - a. Equipment used to heat, cool, or ventilate the facility;
 - b. Equipment used to heat water in the facility;
 - c. Lighting systems;
 - d. On-site equipment used to generate electricity for the facility;

- e. On-site equipment that uses the sun, wind, oil, natural gas, liquid propane gas, coal, or electricity as a power source; and
 - f. Energy conservation measures, as defined in G.S. 143-64.17, in the facility design and construction that decrease the energy, water, or other utility requirements of the facility.
- (3) "Facility" means a building or a group of buildings served by a central distribution system for energy, water, or other utility or components of a central distribution system.
 - (4) "Initial cost" means the required cost necessary to construct or renovate a facility.
 - (5) "Life-cycle cost analysis" means an analytical technique that considers certain costs of owning, using, and operating a facility over its economic life, including but not limited to:
 - a. Initial costs;
 - b. System repair and replacement costs;
 - c. Maintenance costs;
 - d. Operating costs, including energy costs; and
 - e. Salvage value.
 - (6) Repealed by Session Laws 1993, c. 334, s. 3, effective July 13, 1993.
 - (7) "State agency" means the State of North Carolina or any board, bureau, commission, department, institution, or agency of the State.
 - (8) "State-assisted facility" means a facility constructed or renovated in whole or in part with State funds or with funds guaranteed or insured by a State agency.
 - (9) "State facility" means a facility constructed or renovated, by a State agency.
 - (10) "State institution of higher learning" means any constituent institution of The University of North Carolina. (1975, c. 434, s. 2; 1989, c. 23, s. 1; 1993, c. 334, s. 3; 2001-415, s. 2; 2006-190, ss. 9, 10, 11; 2007-546, s. 3.1(c); 2009-446, s. 1(f); 2013-360, s. 15.22(o); 2015-241, s. 14.30(u).)

§ 143-64.12. Authority and duties of the Department; State agencies and State institutions of higher learning.

(a) The Department of Environmental Quality 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, and that addresses any findings or recommendations resulting from the energy audit required by subsection (b1) of this section. 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 biennially and include strategies for supporting the energy consumption reduction requirements under this subsection. Each community college shall submit to the State Energy Office a biennial written report of utility consumption and costs. Management plans submitted biennially by State institutions of higher learning shall include all of the following:

- (1) Estimates of all costs associated with implementing energy conservation measures, including pre-installation and post-installation costs.
- (2) The cost of analyzing the projected energy savings.
- (3) Design costs, engineering costs, pre-installation costs, post-installation costs, debt service, and any costs for converting to an alternative energy source.
- (4) An analysis that identifies projected annual energy savings and estimated payback periods.

(a1) State agencies and State institutions of higher learning shall carry out the construction and renovation of facilities in such a manner as to further the policy set forth under this section and to ensure the use of life-cycle cost analyses and practices to conserve energy, water, and other utilities.

(b) The Department of Administration shall develop and implement policies, procedures, and standards to ensure that State purchasing practices improve efficiency regarding energy, water, and other utility use and take the cost of the product over the economic life of the product into consideration. The Department of Administration shall adopt and implement Building Energy Design Guidelines. These

guidelines shall include energy-use goals and standards, economic assumptions for life-cycle cost analysis, and other criteria on building systems and technologies. The Department of Administration shall modify the design criteria for construction and renovation of facilities of State buildings and State institutions of higher learning buildings to require that a life-cycle cost analysis be conducted pursuant to G.S. 143-64.15.

(b1) The Department of Administration, as part of the Facilities Condition and Assessment Program, shall identify and recommend energy conservation maintenance and operating procedures that are designed to reduce energy consumption within the facility of a State agency or a State institution of higher learning and that require no significant expenditure of funds. Every State agency or State institution of higher learning shall implement these recommendations. Where energy management equipment is proposed for any facility of a State agency or of a State institution of higher learning, the maximum interchangeability and compatibility of equipment components shall be required. As part of the Facilities Condition and Assessment Program under this section, the Department of Administration, in consultation with the State Energy Office, shall develop an energy audit and a procedure for conducting energy audits. Every five years the Department shall conduct an energy audit for each State agency or State institution of higher learning, and the energy audits conducted shall serve as a preliminary energy survey. The State Energy Office shall be responsible for system-level detailed surveys.

(b2) The Department of Administration shall submit a report of the energy audit required by subsection (b1) of this section to the affected State agency or State institution of higher learning and to the State Energy Office. The State Energy Office shall review each audit and, in consultation with the affected State agency or State institution of higher learning, incorporate the audit findings and recommendations into the management plan required by subsection (a) of this section.

(c) through (g) Repealed by Session Laws 1993, c. 334, s. 4.

(h) When conducting a facilities condition and assessment under this section, the Department of Administration shall identify and recommend to the State Energy Office any facility of a State agency or State institution of higher learning as suitable for building commissioning to reduce energy consumption within the facility or as suitable for installing an energy savings measure pursuant to a guaranteed energy savings contract under Part 2 of this Article.

(i) Consistent with G.S. 150B-2(8a)h., the Department of Administration may adopt architectural and engineering standards to implement this section.

(j) The State Energy Office shall submit a report by December 1 of every odd-numbered year to the Joint Legislative Energy Policy Commission, the Joint Legislative Oversight Committee on Agriculture and Natural and Economic Resources, and the Fiscal Research Division describing the comprehensive program to manage energy, water, and other utility use for State agencies and State institutions of higher learning required by subsection (a) of this section. The report shall also contain the following:

- (1) A comprehensive overview of how State agencies and State institutions of higher learning are managing energy, water, and other utility use and achieving efficiency gains.
- (2) Any new measures that could be taken by State agencies and State institutions of higher learning to achieve greater efficiency gains, including any changes in general law that might be needed.
- (3) A summary of the State agency and State institutions of higher learning management plans required by subsection (a) of this section and the energy audits required by subsection (b1) of this section.
- (4) A list of the State agencies and State institutions of higher learning that did and did not submit management plans required by subsection (a) of this section and a list of the State agencies and State institutions of higher learning that received an energy audit.
- (5) Any recommendations on how management plans can be better managed and implemented. (1975, c. 434, s. 3; 1993, c. 334, s. 4; 2000-140, s. 76(f); 2001-415, s. 3; 2006-190, s. 12; 2007-546, s. 3.1(a); 2008-198, s. 11.1; 2009-446, s. 1(e); 2010-31, s. 14.3; 2010-196, s. 2; 2013-360, s. 15.22(p); 2014-120, s. 55; 2015-241, s. 14.30(u); 2017-57, s. 14.1(f).)

§ 143-64.13: Repealed by Session Laws 1993, c. 334, s. 5.

§ 143-64.14: Recodified as § 143-64.16 by Session Laws 1993, c. 334, s. 7.

§ 143-64.15. Life-cycle cost analysis.

(a) A life-cycle cost analysis shall be commenced at the schematic design phase of the construction or renovation project, shall be updated or amended as needed at the design development phase, and shall be updated or amended again as needed at the construction document phase. A life-cycle cost analysis shall include, but not be limited to, all of the following elements:

- (1) The coordination, orientation, and positioning of the facility on its physical site.
- (2) The amount and type of fenestration and the potential for daylighting employed in the facility.
- (3) Thermal characteristics of materials and the amount of insulation incorporated into the facility design.
- (4) The variable occupancy and operating conditions of the facility, including illumination levels.
- (5) Architectural features that affect the consumption of energy, water, and other utilities.

(b) The life-cycle cost analysis performed for any State facility shall, in addition to the requirements set forth in subsection (a) of this section, include, but not be limited to, all of the following:

- (1) An energy-consumption analysis of the facility's energy-consuming systems in accordance with the provisions of subsection (g) of this section.
- (2) The initial estimated cost of each energy-consuming system being compared and evaluated.
- (3) The estimated annual operating cost of all utility requirements.
- (4) The estimated annual cost of maintaining each energy-consuming system.
- (5) The average estimated replacement cost for each system expressed in annual terms for the economic life of the facility.

(c) Each entity shall conduct a life-cycle cost analysis pursuant to this section for the construction or the renovation of any State facility or State-assisted facility of 20,000 or more gross square feet. For the replacement of heating, ventilation, and air-conditioning equipment in any State facility or State-assisted facility of 20,000 or more gross square feet, the entity shall conduct a life-cycle cost analysis of the replacement equipment pursuant to this section when the replacement is financed under a guaranteed energy savings contract or financed using repair and renovation funds.

(d) The life-cycle cost analysis shall be certified by a registered professional engineer or bear the seal of a North Carolina registered architect, or both. The engineer or architect shall be particularly qualified by training and experience for the type of work involved, but shall not be employed directly or indirectly by a fuel provider, utility company, or group supported by fuel providers or utility funds. Plans and specifications for facilities involving public funds shall be designed in conformance with the provisions of G.S. 133-1.1.

(e) In order to protect the integrity of historic buildings, no provision of this Article shall be interpreted to require the implementation of measures to conserve energy, water, or other utility use that conflict with respect to any property eligible for, nominated to, or entered on the National Register of Historic Places, pursuant to the National Historic Preservation Act of 1966, P.L. 89-665; any historic building located within an historic district as provided in Chapters 160A or 153A of the General Statutes; any historic building listed, owned, or under the jurisdiction of an historic properties commission as provided in Chapter 160A or 153A; nor any historic property owned by the State or assisted by the State.

(f) Each State agency shall use the life-cycle cost analysis over the economic life of the facility in selecting the optimum system or combination of systems to be incorporated into the design of the facility.

(g) The energy-consumption analysis of the operation of energy-consuming systems utilities in a facility shall include, but not be limited to, all of the following:

- (1) The comparison of two or more system alternatives.
- (2) The simulation or engineering evaluation of each system over the entire range of operation of the facility for a year's operating period.
- (3) The engineering evaluation of the consumption of energy, water, and other utilities of component equipment in each system considering the operation of such components at other than full or rated outputs. (1993, c. 334, s. 6; 2001-415, ss. 4, 5; 2006-190, s. 13; 2007-546, s. 4.1.)

§ 143-64.15A. Certification of life-cycle cost analysis.

Each State agency and each State institution of higher learning performing a life-cycle cost analysis for the purpose of constructing or renovating any facility shall, prior to selecting a design option or advertising

for bids for construction, submit the life-cycle cost analysis to the Department for certification at the schematic design phase and again when it is updated or amended as needed in accordance with G.S. 143-64.15. The Department shall review the material submitted by the State agency or State institution of higher learning, reserve the right to require an agency or institution to complete additional analysis to comply with certification, perform any additional analysis, as necessary, to comply with G.S. 143-341(11), and require that all construction or renovation conducted by the State agency or State institution of higher learning comply with the certification issued by the Department. (2001-415, s. 6; 2007-546, s. 4.2.)

§ 143-64.16. Application of Part.

The provisions of this Part shall not apply to municipalities or counties, nor to any agency or department of any municipality or county; provided, however, this Part shall apply to any board of a community college. Community college is defined in G.S. 115D-2(2). (1975, c. 434, s. 5; 1989, c. 23, s. 2; 1993, c. 334, s. 7; 1993 (Reg. Sess., 1994), c. 775, s. 2.)

Appendix 3

1292 CARRY FORWARD

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2009
SESSION LAW 2010-196
HOUSE BILL 1292

H1292-v-6

AN ACT TO PROVIDE THAT ANY ENERGY SAVINGS REALIZED BY CONSTITUENT INSTITUTIONS OF THE UNIVERSITY OF NORTH CAROLINA SHALL REMAIN AVAILABLE TO THE INSTITUTION AND A PORTION OF THOSE ENERGY SAVINGS SHALL BE USED FOR OTHER ENERGY CONSERVATION MEASURES; AND TO EXPAND THE USE OF OPERATIONAL LEASES BY LOCAL BOARDS OF EDUCATION.

The General Assembly of North Carolina enacts:

SECTION 1. Article 1 of Chapter 116 of the General Statutes is amended by adding a new section to read:

"§ 116-30.3B. Energy conservation savings.

(a) In addition to the funds carried forward under G.S. 116-30.3, the General Fund current operations appropriations credit balance remaining at the end of each fiscal year for utilities of a constituent institution that is energy savings realized from implementing an energy conservation measure shall be carried forward by the institution to the next fiscal year. Sixty percent (60%) of the energy savings realized shall be utilized for energy conservation measures by that institution. The use of funds under this section shall be limited to onetime capital and operating expenditures that will not impose additional financial obligations on the State. The Director of the Budget, under the authority set forth in G.S. 143C-6-2, shall establish the General Fund current operations credit balance remaining in each budget code of each institution.

(b) The Director of the Budget shall not decrease the recommended continuation budget requirements for utilities for constituent institutions by the amount of energy savings realized from implementing energy conservation measures, including savings achieved through a guaranteed energy savings contract.

(c) Constituent institutions shall submit annual reports on the use of funds authorized pursuant to this section as required under G.S. 143-64.12.

(d) As used in this section, 'energy savings,' 'guaranteed energy savings contract,' and 'energy conservation measure' have the same meaning as in G.S. 143-64.17."

SECTION 2. G.S. 143-64.12(a) reads as rewritten:

"(a) The Department of Commerce 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. Management plans submitted annually by State institutions of higher learning shall include all of the following:

(1) Estimates of all costs associated with implementing energy conservation measures, including pre-installation and post-installation costs.

(2) The cost of analyzing the projected energy savings.

(3) Design costs, engineering costs, pre-installation costs, post-installation costs, debt service, and any costs for converting to an alternative energy source.

(4) An analysis that identifies projected annual energy savings and estimated payback periods."

SECTION 3. G.S. 115C-530 reads as rewritten:

"§ 115C-530. Operational leases of school buildings and school facilities.

(a) Local boards of education may enter into operational leases of real or personal property for use as school buildings or school facilities. Operational leases for terms of less than three years shall not be subject to the approval of the board of county commissioners. Operational leases for terms of three years or longer, including periods that may be added to the original term through the exercise of options to renew or extend, are permitted if all of the following conditions are met:

(1) The budget resolution includes an appropriation authorizing the current fiscal year's portion of the obligation.

(2) An unencumbered balance remains in the appropriation sufficient to pay in the current fiscal year the sums obligated by the lease for the current fiscal year.

(3) The leases are approved by a resolution adopted by the board of county commissioners. If an operational lease is approved by the board of county commissioners, in each year the county commissioners shall appropriate sufficient funds to meet the amounts to be paid during the fiscal year under the lease.

(4) Any construction, repair, or renovation of the property is in compliance with the requirements of G.S. 115C-521(c) relating to energy guidelines. For purposes of this section, an operational lease is defined according to generally accepted accounting principles. principles and may be for new or existing buildings.

(b) Local boards of education may enter into contracts for the repair construction, repair, or renovation of leased property if (i) the budget resolution includes an appropriation authorizing the obligation, (ii) an unencumbered balance remains in the appropriation sufficient to pay in the current fiscal year the sums obligated by the transaction for the current fiscal year, and (iii) the repair construction, repair, or renovation is in compliance with the requirements of G.S. 115C-521(c) relating to energy guidelines. Construction, repair, or renovation work undertaken or contracted by a private developer is subject to the requirements of Article 8 of Chapter 143 of the General Statutes. Contracts for new construction and renovation that are subject to the bidding requirements of G.S. 143-129(a) and which do not constitute continuing contracts for capital outlay must be approved by the board of county commissioners.

(c) Operational leases and contracts entered into under this section are subject to approval by the Local Government Commission under Article 8 of Chapter 159 of the General Statutes if they meet the standards set out in G.S. 159-148(a)(1), 159-148(a)(2), and 159-148(a)(3). For purposes of determining whether the standards set out in G.S. 159-148(a)(3) have been met, only the five hundred thousand dollar (\$500,000) threshold shall apply."

SECTION 4. This act becomes effective July 1, 2010, and applies to contracts entered into on or after that date.

In the General Assembly read three times and ratified this the 9th day of July, 2010.

s/ Walter H. Dalton

President of the Senate

s/ Joe Hackney

Speaker of the House of Representatives

This bill having been presented to the Governor for signature on the 9th day of July, 2010 and the Governor having failed to approve it within the time prescribed by law, the same is hereby declared to have become a law. This 10th day of August, 2010.

Appendix 4

UNC Sustainability Policy 600.6.1

The University of North Carolina Sustainability Policy

The University of North Carolina (“The University”) is committed to leading the State of North Carolina as an environmental steward that endeavors to proactively and effectively manage its impact on energy, water and other natural resources. Further, The University is obligated to ensure full compliance with all applicable local, state, and federal environmental laws and regulations. Therefore, it is the policy of The University’s Board of Governors (the “Board”) that The University, including General Administration, the constituent institutions, and affiliated entities, shall establish sustainable development and resource management, or “sustainability” as a core value of institutional operations, planning, capital construction, and purchasing practices.

Budgetary constraints, capital improvement and modernization requirements, and training and management needs required to facilitate the implementation of these sustainable practices are limiting factors and, as such, the University’s General Administration, in collaboration with the constituent institutions and affiliated entities, shall pursue the appropriate enabling legislation and funding to implement this policy. The Board recognizes that the goals of this policy range from short-term to long-term and adds further emphasis on the importance of the aspirational nature of the highest ideals of sustainability. In addition, the Board values Return on Investment (ROI) as a factor in institutional resource planning and decision making and requires an ROI calculation for any new project.

The Board delegates authority to the President to implement the following sustainable practices to apply to each constituent institution and, when appropriate, General Administration and affiliated entities:

Systematic Integration of Sustainability Principles: Systematically incorporate sustainability throughout the institution by integrating the policy goals into the institution’s processes, administration, teaching, research, and engagement. Each constituent institution and affiliated entity and General Administration shall designate an appropriate individual to serve as “Chief Sustainability Officer” to be responsible for implementation of this policy.

Master Planning: Sustainability principles related to infrastructure, natural resources, site development, and community impact shall be incorporated into comprehensive master plans.

Design and Construction: Capital project planning and construction processes shall meet statutory energy and water efficiency requirements and deliver energy, water, and materials efficient buildings and grounds that minimize the impact on and/or enhance the site and provide good indoor environmental quality for occupants.

Operations and Maintenance: The operation and maintenance of buildings 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, and minimize materials use. 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.

Climate Change Mitigation and Renewable Energy: The University shall develop a plan to become carbon neutral as soon as practicable and by 2050 at the latest, with an ultimate goal of climate neutrality.

Transportation: The University shall develop and implement a comprehensive, multimodal transportation plan designed to reduce carbon emissions and dependency on single occupant vehicles.

Recycling and Waste Management: The University shall develop policies and programs that work toward achieving zero waste and will comply with the provisions of NC General Statute 130A-309.14 regarding recycling and waste management.

Environmentally Preferable Purchasing (EPP): Any purchasing shall, to the extent practicable, improve the environmental performance of its supply chain with consideration given to toxicity, recycled content, energy and water efficiency, rapidly renewable resources, and local production and shall also improve the social performance of its supply chain with consideration given to working conditions and historically underutilized businesses.

The President shall develop and implement best practices, guidelines, and implementation plans necessary to achieve the goals of this policy to the constituent institutions and affiliated entities. This policy shall be reviewed every two (2) years by the President, and any necessary revisions and modifications shall be recommended to the Board for its consideration.