

## Energy Plan



**WAKE TECHNICAL COMMUNITY COLLEGE**  
**SUSTAINABLE ENERGY PLAN**

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**EXECUTIVE SUMMARY**

SCORECARD RESULTS

An assessment of current energy management efforts was performed; current performance falls into all categories on the SEP-Performance Scorecard (Appendix 1). Wake Technical Community College (Wake Tech) has initiated action in several of the key sustainable focus areas and is poised to obtain solid results in each area. In particular, the assessment revealed the following strengths in current efforts and initiatives.

- ***Energy Data Management*** Wake Technical Community College currently has a program for collecting and analyzing monthly energy billing information for all locations utilizing Microsoft Excel. This effort will produce a comprehensive database of facility usage and cost information that is available for use in monitoring excessive variations, identifying and recovering billing errors, and targeting facilities for follow-up evaluation.
- ***Energy Supply Management*** Wake Tech, in connection with Progress Energy, is in the process of reviewing its current electricity usage and metering structure to determine that the most economical billing rates are used on an annual basis. Wake Tech is also working with Progress Energy to improve the reliability of service to all locations. All locations are sub-metered, this action will allow Wake Tech to identify energy reduction opportunities.
- ***Energy Use in Facilities*** All building HVAC systems are centrally monitored and controlled by Metasys ®. Temperature set points have been adjusted. Currently, “The Declaration of Temperature Settings” is 70 degrees in the winter and increase to 73 degrees in the summer. Exterior lighting is controlled by either photo-electronics or timers. Some overhead lights have been refitted with fixtures that use less energy and produce less heat. As renovations take place, an energy audit will be conducted and identify areas of energy waste and make evaluations for reducing energy consumption.
- ***Equipment Efficiency*** A maintenance program is in place to ensure that equipment and systems are operating reliably; HVAC system maintenance includes filter changes, coil cleaning and regular inspections. This will be handled by Wake Tech’s current vendor to maintain equipment efficiency and be part of the work scope.
- ***Organization Integration*** Wake Tech has implemented an Energy Conservation & Awareness Committee with staff, faculty and students. To date we have accomplished an Energy Awareness Campaign and a finalized logo/slogan for the

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program. In addition, we have formed Students for Environmental Education Club (SEE). The program has identified staff, faculty and students who will be involved in energy planning and conservation measures. All the committees are working on improving energy conservations efficiency and initiatives.

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## SUSTAINABLE ENERGY PLAN

### BASELINE ENERGY USE

Due to the continually increasing cost of energy, it is important that Wake Tech reduce its utilities cost and its energy consumption. The cost saved by reducing energy usage is referred to as avoided costs. In other words, avoided cost is the difference between utility costs at current usage versus utility costs at reduced usage. The College chose fiscal year 2006 as its baseline year for monitoring avoided costs. An example of the tracking system is illustrated in Appendix 2.

Because of the way electricity and gas meters are set up, Wake Tech currently has a program for collecting and analyzing monthly energy billing information for all locations utilizing Microsoft Excel Spreadsheet.

### ACTIONS

The assessment also identified the following actions. These actions are addressed in this Sustainable Energy Plan under the following categories.

- ***Process Improvement***
  - Facility walkthrough
  - Evaluate building commissioning
  - Utility management software
  - Energy Efficient Purchasing Policy
  - Facilities Policy & Procedure Manual
- ***Program Implementation***
  - Energy awareness program
  - Load profiling
  - Controls tune up
- ***Projects***
  - Upgrade air handlers
  - Energy Audits
  - Lighting upgrades

### SAVINGS ESTIMATE AND FINANCIAL EVALUATION

Initial opportunities for savings in energy usage are estimated to 10% to 15%. As an example, our first major initiative is to conduct projects that are obtainable and show simple payback. Such as temperature set backs, lighting retrofits, drink machines and changes in policy.

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GOALS AND MEASURES

Specific Goals

- The primary goal of the Sustainable Energy Plan is to reduce Wake Tech's total energy usage by 10% to 15%.
- The Facility Service Division will be responsible for developing, reporting and meeting specific energy management performance measurements that are part of the Energy Star Management Guidelines.
- Enter all energy usage data as required into the Excel Spreadsheet Utility Chart no later than submission due date.
- Replace all existing T12/electromagnetic ballast lighting assemblies in all buildings requiring retrofit with a T8/electronic ballast and lamp that is Energy Star approved.
- Replace all existing exit light fixtures with a LED energy efficient exit light fixture.
- To the extent that funding is available replace undersized and obsolete Variable Frequency Drives (VFDs) where appropriate.
- To the extent that funding is available replace air handling units with energy efficient units.
- Purchase hybrid vehicles.
- Submit at least one article quarterly on the subject of energy management to interact with faculty, staff and employees via E Mail, Monitors and Campus Connections Web Information Page for Wake Tech.
- Energy Conservation Chairman to plan at least one workshop each year on sustainability with the NC Department of Energy.
- Create/update as required an Energy Conservation Website. <http://facilities.waketech.edu/energy/index.php>
- Distribute energy awareness posters and other outreach materials to faculty, staff and students.
- Create a policy and procedure to procure Energy Star approved products.
- Create/update information and assistance in forming a ride sharing program as well as information regarding mass transit and bicycle path.
- Where operations permit, allow flexible work hours for participation in ride sharing programs and home.
- Conduct an assessment of load and energy reduction.

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### SUSTAINABLE ENERGY PLAN

#### Long Range Goals

- Develop a Water Management Plan.
- Implement a plan to evaluate underground utilities replacement. The goal is to check underground piping for natural gas, compressed air, chilled water and hot water systems. These systems sometimes leak. The work includes identifying mains and other pipes as problem areas suspected of leaks.
- Implement life cycle cost improvements as identified during facility energy audits as funding is made available.
- Apply sustainable design to all new buildings to include renovation projects. All energy efficiency and sustainable design principles will be considered when designing new buildings and alterations for the benefit or reduce life cycle cost and enhance occupant satisfaction.
- Design a campus that will highlight sustainability and renewable energy improvements.
- Continue using existing acquisition system that promotes Energy Star products.
- Implement Preventive Maintenance program that includes identification and correction of energy conservation operations and maintenance deficiencies that are correctable at low cost.
- Increase trained number of Energy Managers as needed to ensure effective implementation.
- Control electric, gas and water loads to minimize utilities cost and mitigate the impact of sudden disruptions in the supply of energy in accordance with goals.
- Continue with annual performance evaluations.
- Develop and implement outreach programs to motivate employees to modify behavior to become more efficient in their use of energy and water and to minimize waste.

We are in the process of determining the annual return on investment for each of our programs and projects.

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**THE PLAN**

1. BASELINE ENERGY USE

Wake Tech is developing an Energy/Utility Management Program. Each fiscal year a budget will be created for Energy Conservation such as utility bills, lighting retrofits, etc.

Wake Tech has established a program for collecting and analyzing monthly energy billing information, utilizing Microsoft Excel.

Wake Tech's energy mixes are approximately 90 electricity and 10% natural gas. Because of the way electricity and gas meters are set up, Wake Tech can show usage by building; however, data is provided in the appendices example based on meter with a legend identifying a meter to a building. Currently there are 25 buildings being tracked and benchmarked with a total of 908,823 square feet. In our base of 2006 our usage was 78.6 kBtu. Based on the kBtu's for 2006, Wake Tech will prioritize its examination of energy use and methods of reducing energy consumption in high use areas.

2. PLANNED ACTIONS AND PROJECTS

The SEP Performance Scorecard reveals the processes, programs and projects that should be undertaken to drive the College's energy management performance to the next higher level. These actions, encompassing each of the five focus areas: energy information, energy supply, facilities operations, systems and equipment, and business integration; can be grouped into the following three categories.

2.1 Process Improvement

- The full service contractor provider and designee for Wake Tech will conduct selective facility walkthroughs to identify areas of energy waste and make

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recommends for reducing energy consumption. This service is performed at no cost to the College.

Assigned to: Vendor for HVAC Equipment

- The full service contract provider and designee for Wake Tech will commission programs to comprehensively test buildings to verify that systems and equipment perform to specifications.  
Assigned to: Vendor for HVAC Equipment
- The full service contract provider and designee for Wake Tech will implement a utility management program. This program will monitor energy consumption, billing information, usage and cost deviations, trends, etc. This data will identify areas of excessive energy use and variations, potential billing errors, and where reduction initiatives are achieving the desired results. Wake Tech will be able to adopt specific energy use and cost metrics and utilize comparison and benchmarking to set performance targets for each meter.  
Assigned to: Vendor for HVAC Equipment
- The amount of electricity usage and time of use drives the rate structure. Wake Tech will currently review all rates annually based on the existing meters.  
Assigned to: Energy Conservation Chairman or designee
- Institute an energy efficiency purchasing policy.  
Assigned to: Energy Conservation Chairman/Business Office
- Institute a policy & procedure manual.  
Assigned to: Energy Conservation & Awareness Sub Committee

#### 2.2 Program Implementation

- Establish an energy awareness program to promote a sense of responsibility and aligned action among, faculty, staff and students. Energy awareness programs recognize energy as a controllable operating expense and a performance responsibility.  
Assigned to: Energy Conservation Chairman
- Daily load profiles are needed for evaluating energy use variations and determining the best cost rates. Load profiles can also show where unexpected spikes are occurring; determining the cause of the spikes can lead to process changes, thereby, reducing energy consumption.  
Assigned to: Vendor for HVAC Equipment



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- Tuning up the existing HVAC control system will generate savings through improved monitoring and control capability of heating and cooling systems. Verification of proper temperature set points and setback or shutdown of systems not needed would contribute to more efficient operation and expected savings. It will also increase response to part-load conditions. .  
Assigned to: Vendor for HVAC Equipment

.3 Projects

- A Project Management Database in Excel will be used to monitor projects.  
Assigned to: Energy Conservation Chairman
- Upgrading existing lighting systems from magnetic to electric ballasts can generate considerable savings. The latter type of lighting system is now the norm for new construction due to its significant energy savings potential, as much as a 35% reduction in lamp and ballast wattage. In the process of engaging a consultant for lighting analysis and will then bid out project. We have an initial project funded for lighting retrofit.  
Assigned to: Facility Engineer Officer or designee

3. SAVINGS OPPORTUNITY ASSESSMENT

3.1 Processes - In general, process improvements are quicker and more straightforward to implement with lower costs; typically they can be expected to generate savings on the order of 1 to 2% of annual expenditures. Wake Tech will collect and analyze monthly energy billing information and compile a comprehensive database usage and cost information.

3.2 Programs - In general, programs take longer to implement with moderate costs; typically they can be expected to generate savings on the order of 5 to 10% of annual expenditures.

3.3 Projects - In general, capital projects to upgrade equipment and facilities are the most costly to implement and entail detailed planning; however, such projects can

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be expected to generate the largest savings, typically of the order of 10 to 20% of annual expenditures.

Through the use of a fore mentioned processes, programs and projects will reduce energy consumption by 10% and optimize avoided costs.

#### 4. FINANCIAL ASSESSMENT (UNDER DEVELOPMENT)

The process improvements should be implemented due to their minimal cost relative to their savings. Based on the indicated simple payback, the Awareness Program and Utilities Management have top priority.

#### 5. GOALS AND MEASURES

.1 *Goals* – Wake Tech has established these goals:

- Lowering usage per square foot.
- Maximizing avoided cost.

.2 *Measures* – Wake Tech will track progress in the implementation of the Sustainable Energy Plan with the following metrics:

- Total energy usage (BTU's) for all locations.
- Total energy costs for all locations.
- Cost per full time equivalent (FTE).

#### 6. BUDGET (UNDER DEVELOPMENT)

- Refer to Capital Improvement Project List.

#### 7. CREATING AN ENERGY MANDATE

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Improved energy and cost management must become a vital initiative and an integral part of the Wake Tech's Energy Management plan. Without an adverse impact on the learning environment, energy must be recognized as a controllable operating expense wherein savings are available for education and other critical areas of need. All members of Wake Tech's community: faculty, staff, and students, have important roles to play in a successful energy management program. Of particular importance is the role of the President, who communicates the priority of energy management to everyone on-site.

An Energy Mandate for Wake Tech has been developed and is proposed as an integral part of this Energy Management Plan.

**ENERGY MANDATE**

- Recognizes energy as a controllable operating expense wherein reduced consumption and optimization of avoided costs result in increased funds for facility improvements.
- Energy management is a responsibility of faculty, staff, students, and the Board of Trustees's.
- All locations will implement an Energy Management Plan.
- The President will be provided progress and results quarterly.

**GOALS**

- Lowering usage per square foot

**TRACKING MEASURES**

- Total energy usage (BTU's) for all locations.
- Total energy cost for all locations.
- Maximizing avoided costs
- Reduce FTE (student) cost

**GRADIENT MEASURES**

- Far Exceeds Expectations. Greater than 20% from baseline
- Exceeds Expectations. Greater than 15% from baseline
- Meets Expectations. Greater than 10% from baseline

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- Needs Improvements. Less than 10% from baseline

8. RESPONSIBILITY

- .1 The Facility Service Division Staff will be responsible for new construction, renovations, maintenance, and operations of the facility. The major focus will be on projects within the Facility Service Division Staff to have the most energy saving potential programs. The Facility Service Division Staff will also be responsible for ensuring that all processes are in accordance with the North Carolina State Energy Plan.
- .2 The Energy Conservation Committee Chairman will be responsible for innovation and human input about energy recommendations. The major focus will be on new ways to conserve energy and getting faculty and staff to adhere to the procedures set forth.

9. Innovation

- .1 The Facility Service Division Staff will be responsible for a master plan for the all campus locations regarding energy management.
- .2 The master plan will be updated on a yearly basis and approved by the Facility Engineer Officer.
- .3 The Facility Service Division Staff will be responsible to ensure all new buildings and renovations adhere to this procedure.

10. New Construction

- .1 Special attention will be paid during new construction to install energy efficient heating, cooling, and lighting systems and grouping spaces with similar heating and cooling needs together.
- .2 New construction of buildings will be connected to the central energy management and control system and to the regional chilled water plants.
- .3 All North Carolina State regulations and energy codes will be followed.
- .4 All planning for new construction of buildings and equipment purchases/ installation will include energy life cycle costing.

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- .5 All alternative energy sources such as passive solar heating and heat recovery systems will be utilized, whenever economically feasible.
- .6 All planning for new constructions of buildings and equipment upgrades will also be required for LEEDS certification and meet the Energy Star Guidelines.

11. Renovations

- .1 Upgrades of older building chillers will be more energy efficient models or be connected to a regional water chiller plant when possible.
- .2 Energy management system devices and strategies will continue to be added and used fully in buildings not connected to central energy management control system.
- .3 Stand alone HVAC system units will be installed in selected locations to facilitate night and weekend setbacks.
- .4 Renovations will receive an upgrade of old building control systems and be connected to the central energy management control system.
- .5 Buildings will receive occupancy sensors where feasible and replace incandescent and older fluorescent fixtures with energy efficient models.

12. Building Maintenance

- .1 Building maintenance will focus on those activities with significant energy savings impact and will improve the function and efficiency of the energy system already in place.
- .2 Maintain building heating and cooling (HVAC) equipment in good working order in which promotes energy efficient operations through an effective preventive maintenance and repair program. The program will consist of the following but not limited to:
  - Keep air handling units clean and change filters regularly.
  - Replace damaged HVAC insulation.

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- Replace failed motors with energy efficient models.
- Replace leaking steam condensate piping.
- Inspect and clean ducts and coils as required.
- Improve boiler efficiency and heating.
- Improve chiller equipment. (overhaul chillers, clean evaporator and condenser tubes, perform eddy current tube analysis, rebuild cooling towers, repair air cooled condensers).
- The Facility Engineer Officer will be responsible to assign a designee to participate in the Environmental Protection Agency's Green Lights Program by annually reporting lighting efficiency improvements.

13. Operations

- .1 Energy operating plans for all buildings are prepared and implemented.
- .2 Temperature setbacks during off schedule hours are instituted as practical.
- .3 These policies and procedures will be developed into the Facilities Policies and Procedures Manual.
- .4 The Facility Engineer Officer will assign a designee to track energy cost, peak time, and rate structures and coordinate all bills with the local energy company.

14. Human Input

- .1 The Facility Engineer Officer will be responsible to assign a designee to be the Energy Conservation Committee Chairman.
- .2 The Energy Conservation Chairman will be responsible to create an Energy Conservation Committee Board. This board will meet on a monthly or/quarterly basis.
- .3 The Energy Chairman will be responsible for all policies and procedures pertaining to energy management.

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This energy mandate is implemented on this the \_\_\_\_th day of \_\_\_\_\_, 2006.

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President

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VP of Operations & Finance

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VP of Student Affairs

\_\_\_\_\_  
VP of Instruction

\_\_\_\_\_  
VP of Information Technology

\_\_\_\_\_  
VP Community and Economic  
Development

\_\_\_\_\_  
VP of Institutional Advancement

**APPENDIX 1**

<p><b>SUSTAINABLE ENERGY PLAN</b> <b>PERFORMANCE SCORECARD</b></p>
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<b>Level</b>	<b>Energy Data Management</b>	<b>Energy Supply Management</b>	<b>Energy Use in Facilities</b>	<b>Equipment Efficiency</b>	<b>Organization Integration</b>
<b>I Basic</b>	<ul style="list-style-type: none"> <li>• Accessibility</li> <li>• Monthly bills</li> <li>• KPI</li> <li>• Reporting</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Error resolution</i></li> <li>• <i>Rate organization</i></li> <li>• <i>Account management</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Facility walkthrough</i></li> <li>• Benchmarking &amp; ranking</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Corrective maintenance program</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Awareness</i></li> </ul>
<b>II Intermediate</b>	<ul style="list-style-type: none"> <li>• Interval data</li> </ul>	<ul style="list-style-type: none"> <li>• Supplier choice</li> </ul>	<ul style="list-style-type: none"> <li>• Diagnostic audit</li> <li>• Operating procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Preventive maintenance program</li> <li>• Lighting upgrades</li> <li>• Alternate fuels</li> </ul>	<ul style="list-style-type: none"> <li>• Planning</li> <li>• Performance &amp; training</li> <li>• Resource management</li> <li>• Budget preparation</li> </ul>
<b>III Aggressive</b>	<ul style="list-style-type: none"> <li>• Sub metered data</li> </ul>	<ul style="list-style-type: none"> <li>• Demand-supply optimization</li> </ul>	<ul style="list-style-type: none"> <li>• Investment grade audits</li> <li>• Commissioning</li> <li>• On-going monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• System upgrades</li> <li>• Standards</li> <li>• New technology</li> <li>• System cost tracking</li> </ul>	<ul style="list-style-type: none"> <li>• Project approval</li> <li>• Results auditing</li> <li>• Financial incentives</li> <li>• Accountability &amp; review</li> </ul>

Italicized efforts indicate currently achieved performance measures at Wake Technical Community College.

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**APPENDIX 2**

Track by meter and building report for total energy cost.

	Electricity	Propane	Fuel Oil	Water&Sewer	Location Total
	Building Address/ Name	Building Address/ Name	Building Address/ Name	Building Address/ Name	
Jan					
Feb					
Mar					
Apr					
May					
Jun					
Jul					
Aug					
Sept					
Oct					
Nov					
Dec					
Total					
/sq.ft./yr					
/sq.ft./mo					

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**APPENDIX 3**

Track by kwh used during summer and non summer times to include on and off peak times.

	Summer				Non-summer			
	kwh		kw		kwh		kw	
	on peak	off peak	on peak	off peak	on peak	off peak	on peak	off peak
Jan								
Feb								
Mar								
Apr								
May								
Jun								
Jul								
Aug								
Sept								
Oct								
Nov								
Dec								
Total Usage								
Cost								