**Tactics from CEST working groups, campus input, and student input**

**Academics & Research**

1. **Develop the scholarship, including the courses, curricula, and research needed for students to become literate about energy, environment, and sustainability.**

* Sustainability classes
* Freshmen, required class
* Integrated into all disciplines
* Sustainability course required for all majors

1. **Explore the concepts underlying sustainability in courses and curricula to build the case for sustainable practices.**
2. **Engage in the discussions for advancing sustainability, to optimize the use of energy, water, buildings, land , transportation, and existing space through participation in the CEST working groups.**
3. **Use the physical campus as a classroom and research facility to demonstrate and explore sustainability principles and practices. *(Join with community & culture group)***

* Integrate sustainability teaching, research & extension expertise into physical campus projects
* Eco village or dorm concept
* Define Living and Learning Village (everyone uses term differently)
* Encourage the matching of student and faculty member projects to NC State’s physical campus and establishing roles for volunteers
* Develop a procedure for integrating sustainability teaching, research and extension expertise into physical campus projects
* Internship opportunities

1. **Promote research to advance sustainability including discovery new technologies that advance sustainability, securing patents, and employing new workers that align with a new energy economy.**
2. **Engage faculty researchers in sustainable practices to increase the resource use efficiency of research equipment and spaces needed to conduct state-of-the-art research. *(Join with select land use members/space utilization)***

* See tactics under Green Development, G

1. **Provide opportunities for service learning that bridge education, research, and the practical application of sustainability. (*Join with communications and culture group)***

**Engaging the Community** (Community & Culture Working Group)

1. **Adopt, promote, and adhere to a sustainability policy.** ***(Join with chair of each working group)***
2. **Report sustainability information on a national scale towards becoming a national leader in sustainability.** ***(CEST Co-Chairs and Sustainability Office)***

* Create a communications and marketing plan that sends a cohesive, campus wide message regarding sustainability

1. **Support opportunities to obtain funding for sustainability including grants, university campaigns, a student fee, and seed money. *(CEST Co-Chairs and Sustainability Office)***

* Develop a student sustainability fee to provide seed money for student sustainability projects.
* Work with Advancement Office to align messaging of next university-wide campaign around energy and the environment and the needs in the classroom, buildings, infrastructure, and programming
* Organize a system for seeking and responding to sustainability-related grant opportunities
* Encourage granting agencies to include sustainability in funding
* Investigate alternative financing means
* Monitor what are funding mechanism opportunities
* Include leveraging tax credits in design contract
* Work with NCSU foundation to look at donor model to help fund renewables and other technologies
* Evaluate the overhead rate and where it is allocated
* Green tax on every project (similar to stormwater, utility/centennial fund, buying into piece of building envelope)
* Integrate sustainability into NC State branding and advancement campaigns
* Finance working group of CEST
* Joint grant proposals between Sustainability and Solar Center
* Climate Core Fellowships
* Operation and maintenance budgets need to include room to maintain newer technologies (see integration/total cost of ownership)
* Work on accounting model of who maintains what (where shared, savings not always going into best bucket). Example of retention ponds. (see integration/total cost of ownership)
* Training, education, and funding to get buy in of new technology use, operation, and maintenance. (see integration/total cost of ownership)
* Get legislation to support these efforts (see integration/legislature)

1. **Implement a comprehensive sustainability education and awareness program that utilizes peer-to-peer networks.**

* Launch campus-wide campaign utilizing community-based social marketing techniques
* Align sustainability-related outreach programs (sustainability, waste reduction and recycling, energy, alternative transportation) using a multifaceted approach
* Educate the campus community utilizing a multifaceted approach that will encourage personal responsibility toward waste diversion goals and provide information and updates regarding programs, services and diversion opportunities campus
* Create a communications and marketing plan that sends a cohesive, campus wide message regarding sustainability
* Integrate into new student/employee orientation
* RA’s and Teachers need to be leaders in sustainability
* Eco-reps
* Service projects for dorms
* Tell students how actions impact other areas on campus
* Competitions between dorms, with other schools, sponsored by corporations
* How-tos on sustainability (example – rent from Wolfwheels)
* More on campus reminders and sustainable imagery
* Make it easy to make a sustainable decision

1. **Create a network among the local sustainability community that includes universities, governments, corporations, and non-profits.**

* Maintain regular informal and formal networking and educational opportunities

1. **Grow the Campus Environmental Sustainability Team as a cross-campus team of faculty, staff, student, and community members engaged in campus sustainability.** ***(CEST Co-Chairs and Sustainability Office)***

* Establish communications methods that make interactions among the CEST working groups and other diverse sustainability stakeholders easier and more consistent
* Finance working group of CEST
* Maintain regular informal and formal networking and educational opportunities

1. **Establish annual campus events to imbed sustainability as a part of the campus culture.**

* Increase participation of students, faculty members, and staff in sustainability-related activities and events
* Themed parties and events
* Competitions

1. **Create incentives and provide recognitions and rewards to promote sustainability across campus.**

* Develop campus wide recognition mechanisms for participating in sustainable behavior
* Make students accountable for energy consumption
* Competitions
* Reduce tuition for reducing energy

Other conversation about institutionalizing sustainability into the culture:

* Develop a mission and vision for NC State sustainability
* Include sustainability into University strategic planning efforts
* Develop and communicate the business case for campus sustainability
* Create a coordinated local media campaign to share NC State success stories
* Cultivate a sense of urgency to address sustainability
* Define sustainability terminology specific to NC State
* Develop brand book to ensure all communicators maintain a consistent image and messaging
* Encourage units and individuals through programs such 10% Local
* Utilize Dining locations via info tables and awareness opportunities
* Promote campus walk/bike safety
* Decrease vehicle usage through campus
* Show/promote living and eating on campus is more sustainable
* Culture such that students are demanding green living, etc…
* Improve sustainability literacy campus-wide
* Encourage "friendly" energy competition between buildings (offices as well as dorms)
* Get word out w/social media - Twitter, Facebook, Wolfbytes, signage, etc..
* Target students more visually
* Target faculty & staff with emails, newsletters & incentives
* Announce item to tackle at first of the month & carry through for 6 weeks, ie: Brake for Transit
* Use buildings as educational opportunity/tool
* Promote student and staff carpools

**Energy & Water Conservation**

1. **Achieve a 30% reduction in building energy consumption by 2015 against the 2003 baseline.**

* Build a natural gas combined heat and power plant to increase power and thermal efficiencies.
* Conduct energy conservation performance contracts to achieve energy reductions in main campus buildings.
* Install Combined Heat & Power Plant at Cates and new boilers at Yarbrough central plants.
* Execute Building Performance Contracting for 13 buildings
* Solicit new Performance Contract for 6 to 8 more buildings
* Install a comprehensive campus energy dashboard
* Modernize existing and install new data centers
* Develop a comprehensive campus energy charge.
* Reduce emergency lighting
* Turn off unneeded lights (baseball and football fields)
* More LED, energy efficient
* Sensors
* Allow manipulation of AC/Heaters in dorms
* Fans instead of AC
* Make students accountable for energy consumption
* Alternative Energy
* Electricity-producing workout equipment
* Plant more trees around and within parking lots to reduce the heating of the air by the dark-colored parking lot. This could ultimately reduce A/C use in nearby buildings.
* Solar panels on Centennial Campus

1. **Achieve a 50% reduction in building water consumption by 2015 against the 2002 baseline.**

* Continue to install low flow fixtures in campus buildings.
* Capture rain water for reuse in building HVAC processes.
* Utilize reclaimed waste water on Centennial Campus and Lonnie Poole Golf Course.
* Develop a comprehensive campus water use dashboard
* Execute Building Performance Contracting for 13 buildings
* Solicit new Performance Contract for 6 to 8 more buildings
* Install City of Raleigh reuse water service on Centennial Campus
* Install rainwater and condensate water collection systems at central plants
* Execute campus stormwater master plan
* Rain barrels at all buildings – use it to clean dishes in dining halls
* Reusable water bottles, filling stations
* Water bottle design competition
* Educate quality of tap water versus bottled water

1. **Improve energy data management capability and make data-driven decisions utilizing enhanced energy data.**

* Develop a comprehensive campus automation master plan that includes district thermal plants and buildings with real-time dashboard interface.
* Implement a metering long range plan that applies smart grid technology.
* Execute trend reporting and track energy conservation improvements.
* Energy meters available to see
* Communicate exact dollar amounts that students and faculty are spending or can save by changing behaviors
* Bills should include each students energy consumption
* Utilize Solar Center expertise in performing renewable energy building audits on campus buildings

1. **Train and educate staff and building end-users to properly operate and maintain building systems in an energy efficient manner.**

* Perform life cycle costing analysis to achieve lowest long-term cost of ownership.
* Develop energy minded operations and maintenance best practices.
* Provide energy rebates for selecting energy efficient equipment.
* Develop a comprehensive campus energy and water use dashboard
* Employees attend Solar Center courses

1. **Ensure a cost-effective and reliable energy supply by developing business scenarios and strategies for diversifying fuel sources.**

* Execute natural gas hedge strategies to ensure lowest commodity pricing.
* Develop a renewable portfolio as applications and financing allow.
* Ensure the optimal electric rate structure is applied to all utility accounts.
* Renewables/solar across campus

1. **Evaluate utility financial structures that create incentives for saving energy.**

* Implement Wolf Energy enterprise billing program.
* Develop a comprehensive campus energy and water use dashboard

1. **Implement green standards and practices for information technology and computing. *(Identify and work with subgroup of campus IT group)***

* Migrate to virtual computing and energy efficient server farms.
* Workday – 10 hour/4 day work weeks
* Promote telecommuting, video conferencing
* Data centers
* Energy savings for personal/individual computers/laptops

**Green Development** (Buildings & Land Use Working Groups)

1. **Update the Campus Physical Master Plan to integrate and coordinate transportation, land use, utilities, buildings, and storm water planning.** ***(Join with key Transportation working group members and utility planning staff).***

* Update university guiding documents such as the master plan and design and construction guidelines to include sustainability principles
* Create new guidelines to support sustainability activities.
* Develop low impact site principles for new building and infrastructure projects that consider building site selection, utility corridor selections, building footprint, existing topography, etc.
* Create new guidelines to support sustainability activities
* Tie LEED standards to design and construction guidelines (update). This could include baseline/prototype credit work.
* Create new landscape design guidelines to ensure low maintenance landscapes are implemented

1. **Adopt a sustainability vision statement and include it as part of the scope statement for all major building projects.**
2. **Integrate sustainable strategies for all new construction and renovation projects including publicly owned, privately owned, and leased or partnership properties.**

* Professional oversight for life of building-comprehensive commissioning
* Think about other/different models for more comprehensive goals (Star Community)
* Space Utilization in existing space (vs. new space)
* Productivity- human component
* Encourage granting agencies to include sustainability in funding (see integration/investigate funding opportunities)
* Investigate alternative financing means (see integration/investigate funding opportunities)
* Monitor what are funding mechanism opportunities (see integration/investigate funding opportunities)
* Include leveraging tax credits in design contract (see integration/investigate funding opportunities)
* Work with NCSU foundation to look at donor model to help fund renewables and other technologies (see integration/investigate funding opportunities and outreach/advancement campaigns)
* Operation and maintenance budgets need to include room to maintain these newer technologies (see integration/total cost of ownership)
* Work on accounting model of who maintains what (where shared, savings not always going into best bucket). Example of retention ponds. (see integration/total cost of ownership)
* Training, education, and funding to get buy in of new technology use, operation, and maintenance. (see integration/total cost of ownership)
* Tie sustainability to quality (see integration/total cost of ownership)
* Get legislation to support these efforts (see integration/legislature)
* Tie standards to design and construction guidelines (update) (See integration/university guiding documents)
* Passive design strategies (orientation, daylight) as part of master planning process. Land use that favors passive solar orientation. (see land use/tactics discussed)
* Develop low impact site principles for new building and infrastructure projects that consider building site selection, utility corridor selections, building footprint, existing topography, etc.

1. **Exceed NC State’s established minimum commitment to achieve LEED silver certification.**

* LEED projects in the Solar Center's green building database
* Create standard templates for common points
* Pursue the Block program

1. **Give priority to holistic building and property modifications that maximize efficient and effective resource use.**
2. **Design new buildings and utilize existing facilities as long-term resources through adherence to life cycle cost evaluations and total cost of ownership analysis.**
3. **Enhance utilization and management of campus and building space to increase efficiency and to reduce the need for new construction.** ***(Join with key Academics and Research Working Group members)***

* Develop a tool/metrics to use in managing space and space utilization to reduce future space needs
* Optimize extended hours and weekly building usage and operation to reduce the need for new building space.
* Evaluate options for providing buildings with the smallest physical building footprint.
* Improve capacity to adjust classroom size to enrollments
* Maximize campus existing building spaces to reduce the need for new buildings
* Embrace adaptive reuse of existing structures
* Consolidate building use, better use of space
* Cost and revenue should be identified with the use of resources.

1. **Create pedestrian-friendly, mixed-use neighborhoods to reduce the distance between necessary services and to avoid single occupant vehicle use.** **(*Join with Transportation working group)***
2. **Increase the acreage of campus open spaces.**
3. **Increase the percentage of undergraduate students living on campus to reduce transportation needs and to enhance retention. *(Join with key Transportation working group members and University Housing)***

* from 33% to 40% so fewer students driving to campus

1. **Create and administer a Storm Water Master Plan for campus in conjunction with the NC State Storm Water Programs and the comprehensive Campus Master Plan**

* Establish that 20% of storm water is diverted to best management practices that promote water reuse, water quality improvement, and enhancement of natural systems.

1. **Improve and enhance campus open spaces, natural areas, and habitats.**

* discussion about definition needed for natural areas and habitats)
* Implement a restoration and conservation plan that identifies specific environmentally-sensitive land areas on campus, repairs negatively impacted natural areas, and establishes measures to preserve and protect them
* Enhance corridors for native habitats and wildlife
* Create and implement a tree conservation plan for each campus precincts
* Lisa/Tom/Mike fill in dates/resources. One tactic per precinct
* Pilot management of invasives on North Creek Corridor (Gene , Karen Hall, Tom Wenworth, other)
* More trees should be planted on campus

1. **Create and implement a tree conservation plan for each urban campus precinct.**

* Possible student project
* Establish criteria for what urban forestry is. Many different views on what is urban forestry (carbon sequestration, teaching, heat island, etc). Possible forum to understand what want then establish pilot areas. (Susan Moore, Melissa McHale - find person passionate about this)
* Update/reassess inventory based on criteria
* Create management plan
* More trees should be planted on campus
* Tree Campus USA
* Tie to climate action/carbon abatement planning

1. **Develop a land management plan for Lake Raleigh Woods.**

* Identify oversight committee (include Gary Blank)
* Draft the plan (students may draft plan through several semester)
* Engage to use as teaching area/students (Gary Blank)
* More trees should be planted on campus

1. **Employ best practices for sustainable operation of campus buildings and grounds such as integrated pest management, biodiversity, green cleaning, composting, recycling, and water reuse.**

* Partner with on-campus research units such as the Center for Integrated Pest Management
* evaluate and enhance the NC State’s Integrated Pest Management Program
* Community garden

**Purchasing & Waste Reduction**

1. **Instill the values of total cost of ownership and total life cycle cost in purchasing and decision-making.** ***(CEST co-chairs identify and create a specific subgroup for this strategy)***

* Also see tactics in Engaging the Community, C
* Operation and maintenance budgets need to include room to maintain these newer technologies
* Work on accounting model of who maintains what (where shared, savings not always going into best bucket). Example of retention ponds.
* Training, education, and funding to get buy in of new technology use, operation, and maintenance.
* Tie sustainability to quality

1. **Achieve a 60% landfill diversion rate by 2015.**

* Utensils purchasing
* Branded dining kits to freshmen
* Corn-based products
* Require or provide incentives for reusable utensils and dinnerware
* Eco-friendly, compostable products for take-out
* Eliminate Styrofoam
* Campus-wide reusable cups with discount
* Individual bins in dorms, In dining halls
* Recycle more items
* More frequent pick-up, always full
* Recycling chutes in dorms
* Double-sided printing policy
* No paper towel dispensers – use air hand dryer
* Track/monitor printing behaviors of staff and students
* Incentives for using reusable bags
* Plastic bag ban
* Printed material online –Technician, online classes
* Competitions
* Reusable water bottle, filling stations
* Require that student papers be submitted electronically instead of a hard copy
* Comingling of recyclables

1. **Implement source reduction and environmentally-preferable purchasing initiatives to decrease waste before it occurs.**

* Ban plastic bag use on campus
* Consider paper bags, trays and/or compostable bags as an alternative to plastic
* Change font on e-mails to reduce ink consumption
* Reduce packaging through purchasing practices - less materials & packaging, take-back options
* Reducing phonebooks & Technician left overs
* Repurpose/reclamation clauses for furniture and large purchases
* Encourage electronic communications over print copies where appropriate

1. **Promote the purchase of environmentally-and socially- responsible materials.**

* Provide goals and direction to foster sustainable purchasing.
* Develop a tracking system for sustainable purchases on campus.
* Work with MarketPlace vendors to highlight sustainable items on their electronic ordering sites.
* Create incentives for purchase of more sustainable products and services.

1. **Implement sustainable purchasing guidelines in line with the sustainability policy. *(combine efforts with overall sustainability policy – see engaging the community strategy)***

* Help individual departments further develop the university’s sustainability policy to focus on specific needs
* Develop bid specifications that require vendors to provide sustainable options for their products
* Require electronic purchasing standards
* Double-sided printing policy

1. **Develop a program to capture, compost, and utilize organic waste.**

* Work with Dining to determine materials and possible contaminants
* Order collection containers based on needs
* Develop and submit RFP for collection/composting of materials
* Train staff and place containers
* Educate campus community
* Vermicomposting - use composted matter back on campus for landscaping & plant beds
* Long Term: Develop our own in-house composting site
* Notes: Work with grounds to develop a market for the final product
* Composting in dining halls

1. **Enhance the outdoor recycling program to capture additional recyclable materials and remove them from the waste stream.**

* Determine bin type and materials to be collected
* Purchase bins/develop educational materials
* Determine bin locations and collection strategies
* Place bins and begin collection
* Notes:
* Brickyard
* McKimmon Center - nicer containers
* Intramural fields
* Classrooms?
* Honors Courtyard
* Fountain, Lee, Sullivan - Outside

1. **Optimize waste and recycling collection concepts and practices to streamline services, improve capacity, and increase operational efficiencies, and improve customer service.**

* Work with University Housekeeping to streamline indoor recycling collections
* Examine necessity of full-size trash cans for deskside recycling
* Commingling recyclables
* Education/marketing - what's recyclable and why
* Add news/bulletin boards at recycling locations, Town Crier
* Add a message to vending machine about recycling (potential partnership with Coke)
* C-Store battery recycling program with a more attractive container

1. **Achieve a 10% increase in local and organic food purchases and track progress against the 2010 baseline. *(Join with University Dining)***

* Determine a baseline for local and organic food purchasing.
* Track and report the percentage of total food budget spent on sustainable food.
* Establish a local, seasonal food data base that identifies recipes that could utilize locally grown products.
* Work with food suppliers to enhance tracking of local and organic foods.
* Work with the franchised foodservice operations to perform a feasibility study on implementing sustainable food service goals.
* Food purchasing
* Agriculture and other students grow and provide organic food
* Support local farmers

**Transportation**

1. **Develop a long-term campus vision addressing alternative transportation, parking, campus connectivity, and congestion in coordination with the comprehensive Campus Master Plan. *(join with Green Development working groups)***

* Campus electric rail system
* Adding infrastructure to parking decks and lots to permit recharging of electric car batteries either from charging from solar collectors standard electric hook-ups or (preferably) trickle

1. **Reduce the consumption of and demand for petroleum products in the university fleet.**

* Reduce vehicle fuel usage

1. **Increase alternative fuel and low-emitting vehicles in the university motor pool and departmental fleets.**

* Compress natural gas, bio-diesel, biofuels, electric vehicles

1. **Reduce single occupancy vehicle trips to, from, and around campus.**

* Leverage parking permit pricing and policies to encourage a "park it and leave it" perimeter parking philosophy
* Increase both student and employee carpooling
* Shift unnecessary daytime single occupancy vehicle trips to Wolfline bus, bicycling, and pedestrian alternatives

1. **Reduce traffic congestion on campus thoroughfares.**

* Institute additional daytime vehicle access restrictions on selected roadway segments
* Enhance Wolfline transit system speeds and schedule reliability
* Promote a safer walking and bicycling atmosphere
* Close main campus to cars

1. **Integrate infrastructure and programs that promote additional bicycling and pedestrian trips between and among campuses.**

* Bike rental program
* Add skateboard to rental program
* Bike shop
* More bike lanes on campus
* Increasing bike ridership and walkers by planting more trees along sidewalks where they already exist and putting in sidewalks (with shade) where they do not (Hillsborough Street between Main Campus and the Vet School and around the Fairgrounds)
* More and better shady paths away from the roads
* Greater safety when crossing at busy intersections could be achieved if the crossings were available at some distance from the road intersections, which would also require sidewalks and bike paths to connect there

1. **Promote and increase use of the Wolfline, Triangle Transit, and Capital Area Transit services to campus, integrating operating schedules and coordinating transfers to and from Wolfline bus routes wherever possible.**

* More CAT stops
* Wolfline – increase routes and frequency
* Park and bike: free off-campus parking
* Compress natural gas, bio-diesel
* Reduce the hours that the Wolfline runs (reduce empty buses)
* Increase bus frequency off campus
* More CAT and Triangle Transit and keep service on Sunday
* More accessible routes on weekend nights to downtown

1. **Develop sustainable parking policies that reduce or limit parking requirements to reduce commuting and single occupancy vehicle trips.**

* Limit parking

1. **Develop and promote free and low-cost campus perimeter parking facilities geared towards commuters.**

* Ensure above average frequency and dependability of transit connections from perimeter lots to core campus destinations
* Limit parking

1. **Evaluate permit pricing and parking space/access incentives for expanding the number of Low Emitting Vehicles (LEV) brought to campus****.**
2. **Develop and promote communications technology such as teleconferencing and video conferencing to reduce the need for travel. *(As noted in the energy and water conservation section, identify and work with campus IT subgroup)***