

The University of Tennessee at Chattanooga

Management Principles

November 13, 2018

*“Maintaining an Optimum Learning Environment, while
Maximizing Energy Efficiency and Sustainability”*

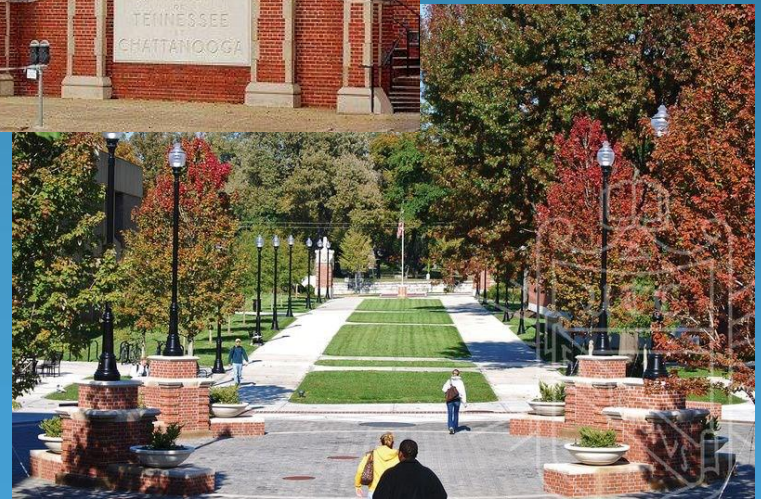
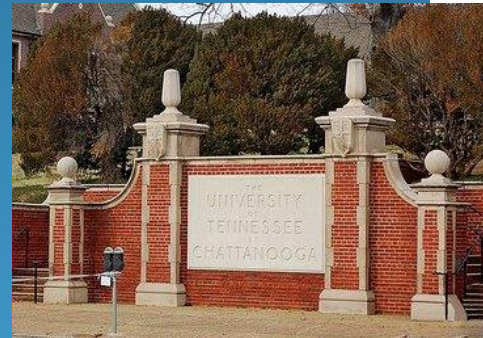
<http://www.stumbleupon.com/su/2TQYpV/www.globalcommunity.org/flash/wombat.shtml>



UTC Sustainability - Overview

- What is Sustainability?
- Why Sustainability?
- UTC Sustainable Goals
- UTC Climate Action Plan
- Built Environment
- Campus Green Spaces
- Alternative Transportation
- Landfill Waste
- Grassroots Conservation

UTC Sustainability



What Is Sustainability?

Meeting the Needs of the Present
Without Compromising Our
Future

Why Sustainability?

Good Stewardship of Natural Resources:

- The natural environment provides life-sustaining resources;
- Non-renewable resources such as fossil fuels must be used wisely;
- We are **CONNECTED** to our environment
- **Pollution** negatively impacts air and water quality and overall health.

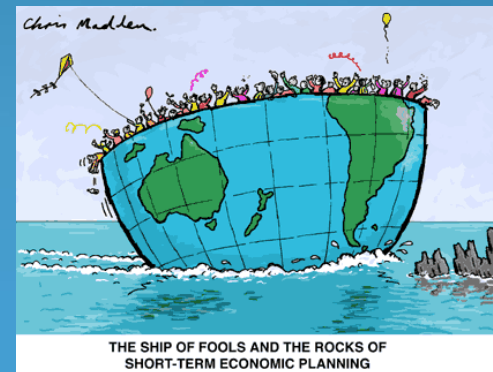
"Ignore the environment. It'll go away."
~ Bumper Sticker



Why Sustainability?

Good Stewardship of Financial Resources:

- UTC has a **\$5 million+** annual energy budget (electricity, natural gas, and water);
- Every dollar **NOT** spent on utilities can be redirected to support student academics and other institutional priorities;
- We have a responsibility to manage our dollars wisely.



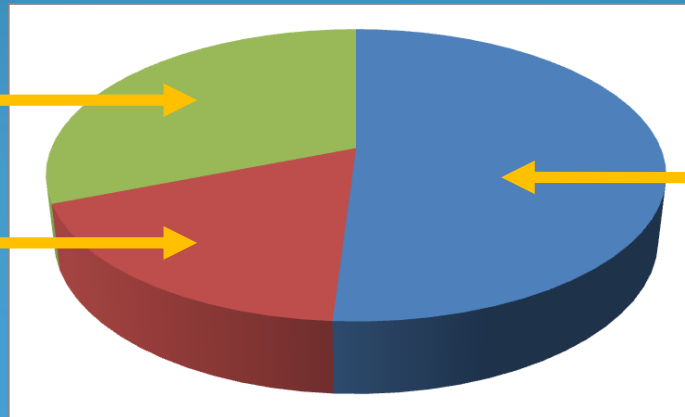
UTC Climate Action Plan

Completed initial comprehensive Greenhouse Gas Inventory in 2010; updated in 2015 and 2017.

- Direct emissions (onsite fossil fuel combustion, fleet fuel usage and synthetic chemical use);
- Purchased electricity;
- Indirect emissions (commuting, travel, wastewater, and waste disposal).

31% Indirect Emissions

18% Direct Emissions



51% Purchased Electricity

UTC Climate Action Plan

First Climate Action Plan published July 2011

- Findings:

- UTC has a **lower than average** emission ratio per student
- **Energy Conservation** = Highest Priority
- Recycling, Water Conservation, Sustainable Food Options
- Communication is Critical

- Next Steps Identified:

- Reaffirm commitment
- Realistic **GHG reduction targets**
- Sustainability Outreach Coordinator



Sustainable Goals

- Incorporate energy efficiency and sustainability in **construction, renovation and green space projects**, operations and maintenance;
- Minimize use of non-renewable energy sources and greenhouse gas emissions through **green power**;
- Incorporate **alternative means of transportation**;
- Reduce **landfill waste**;
- Support **academic research** to explore energy efficient alternatives;
- Communicate and support **grassroots conservation**.

Partnerships



green l light Certification – green l spaces/Honors College

- Achieved campus-wide certification. Categories include environmental literacy, built environment, grounds, energy efficiency, water conservation, transportation, waste management and recycling, and green cleaning.

GIS Applications – EMCS/Environmental Science

- Mapped 1,600 external lights, utility and telecommunication conduits, bike racks, recycle/waste containers, and more using interactive GIS technology
- Public GIS Story Map for State-certified Arboretum

Student/Community Events - SGA/EDGE

- Host annual Earth Day, National Campus Sustainability Week, and America Recycles Day events
- Provide support for students projects and initiatives

Partnerships

USEPA Better Buildings Challenge – City of Chattanooga

- Commitment to reduce Energy Use Index by 20% by the year 2025.
- Tracking electricity, natural gas, domestic water, and chilled/hot water
- Energy data is available to students and faculty via USEPA's Portfolio Manager.

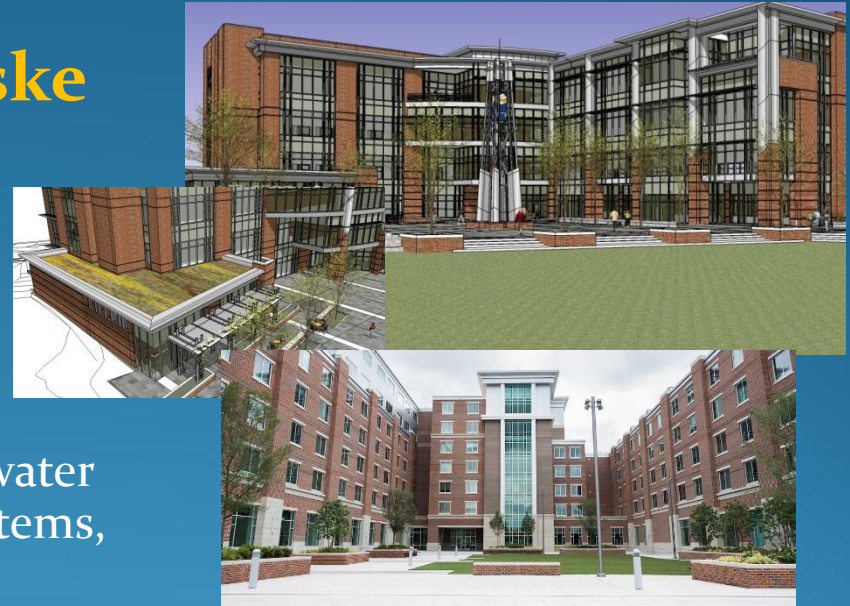
Tennessee Department of Environment & Conservation

- Automatic bill scan technology to establish state-wide utility database
- First campus to track building-level electric data via submeters
- Submetered live data accessible publicly through EnergyID at interactive kiosks

Construction

LEED Silver Library/Bretske

- Local building materials
- Construction waste recycling
- Daylighting and occupancy sensor
- Low-flow toilets and faucets
- Energy efficient HVAC control
- Water retention tanks to collect rainwater and condensate from mechanical systems, reducing stormwater runoff.



West Campus Housing

- Interior recycle center
- Energy efficient HVAC systems
- LED lighting
- Meets Tennessee Sustainable Building Guidelines

Fletcher Hall

- HVAC Load Reduction System
- Reduces need for heated/cooled air by 30%

Renovation

- Over \$13.5 million in capital, stimulus, local and Student Green Fee funding invested in campus energy reduction projects
- Over 15% reduction in utility usage documented;
- Lighting retrofits and occupancy sensors (\$3.2 million)
- Exterior doors, window and roof replacement
- Central Energy Plan improvements, with 67% reductions in natural gas and water usage.
- Building HVAC improvements



Campus Green Spaces



- TreeCampus USA
- 600+ Tree Plantings
- Landscape Master Plan
- State-certified Arboretum
- Light pollution reduction with upgraded pedestrian lighting
- University Greenway
- Sustainable Garden
- Green Roofing

"Some national parks have long waiting lists for camping reservations. When you have to wait a year to sleep next to a tree, something is wrong."
— **George Carlin**

Energy and Water Efficiency



- Purchase 14.4 million Kwh green Power annually through the TVA Green Power Switch Program = 33% of electric budget
- 9 kw photovoltaic array at the Challenger Center
- Net-Zero building at the Advanced Test Track Facility, which produces more energy than consumed, using geothermal and solar energy
- \$3 million campus-wide LED lighting retrofit underway, with anticipated 70% reduction in energy use, resulting in a 9-year payback
- Conversion from steam boilers to electric at the Central Plant, resulting in 67% decrease in water and natural gas consumption
- Automated irrigation systems
- Bottle-refill stations throughout campus common areas
- Trayless dining (conserved 185,000 gallons of water and an estimated 1667 pounds of chemicals diverted from going into the water chain as well as electricity for hot-water sanitation)
- Biodegradable containers in food services

Alternative Transportation

Traffic and Emission Reduction:

- Campus shuttle with annual ridership of 65,000+
- Bicycle Racks
- BikeShare Chattanooga
- Campus fleet of 24 electric vehicles



Waste Management/Recycle

Recycling

- Single-stream recycling in partnership with WestRock
- Commercial recycling stations in common areas
- Improved event recycling (200+ annual tons)
- RecycleMania participant
- Recycle printer/toner cartridges
- Recycled 100% of waste synthetic and cooking oils
- Instituted TechnoTrash recycling for small electronics
- Collect and properly dispose of hazardous waste
- Waste management audit in planning stages



Grassroots Conservation

Offices, Work Space and On-Campus Housing

Daily:

- **SHUT DOWN** (not unplug) computer hard drives, monitors and speakers;
- **TURN OFF** electronics (CD players, adding machines, chargers, overhead projectors, and other portable devices);
- **TURN OFF** hardwired electronics (televisions, projector systems, and SmartBoards);
- **POWER OFF** all unnecessary lab and office equipment;
- **TURN OUT** the lights !

Holidays:

- **UNPLUG** electronics (CD players, adding machines, chargers, overhead projectors, and other portable devices);
- **UNPLUG** microwaves, coffee makers, and other small appliances;
- **TURN DOWN** thermostats with manual control to at least 65 degrees (heating season) and 76 (cooling season)
- Standard daily tasks

PS – Don't use the handicapped door buttons unless necessary!

Grassroots Conservation

Home Habits, Appliances and Maintenance

- Use unoccupied thermostat settings
- Wash and dry full loads of laundry (don't over dry)
- Use small electric pans, toaster or microwave ovens
- Use cold water to brush your teeth
- Use CFL light bulbs
- Carpool (errands, activities, work)
- Vacuum refrigerator condenser coils annually
- Ensure doors and windows are properly caulked
- Insulate attic areas
- Clean filters regularly
- Check dishwasher (115 degrees) and water heater temperatures (120)
- Maximize use of landscaping for shade and wind protection

<http://www.energysavers.gov/tips/>

Summary

Every small amount adds up!

Fast Fact: When computers and monitors “sleep”, they still pull up to 6 watts of electricity EACH. With a computer inventory over 8,500, that is over 600 million watts at UTC per year! At .10 per Kwh, over

\$65,000 per year

can potentially be saved just by properly shutting OFF computers and monitors when not in use!

Weekdays

8,576 computers X 12 watts X 16 hours per day
= 1,646,592 watts per weekday
X 5 days X 52 weeks = 428,113,920 watts annually

Weekends

8,576 computers X 12 watts X 24 hours per day =
2,469,888 watts per weekend day
X 2 days X 52 weeks = 256,868,352 watts annually

Questions?

You Make a Difference!

"Unless someone like you cares a whole awful lot,
Nothing is going to get better. It's not."
— **Dr. Seuss**, from *The Lorax*



THE UNIVERSITY OF TENNESSEE CHATTANOOGA

OFFICE OF SUSTAINABILITY