



# ***Energy Conservation Project***

**February 28, 2007**

# Environmental Climate and Culture

- ▶ **Cooperative Effort to Achieve Environmental Goals: Faculty, Staff, Administration, Students, Trustees, EPMC, SEAL, and W&L contractors.**
- ▶ **Success through change in culture, commitment, education, and cooperation.**
- ▶ **Entrepreneurial efforts and innovative approaches.**
- ▶ **Virginia Environmental Excellence Award (E-2); Talloires Declaration; LEED Certification; and others.**

# Environmental Initiatives

- ▶ Talloires Declaration
- ▶ Recycling
- ▶ 30% recycle paper
- ▶ Composting
- ▶ Bio-Diesel Fuel
- ▶ Environmental Audit
- ▶ Education
- ▶ Energy Performance Contract
- ▶ Campus Master Plan
- ▶ Historic Preservation
- ▶ LEED Certifications and Training of Staff
- ▶ Carbon Footprint

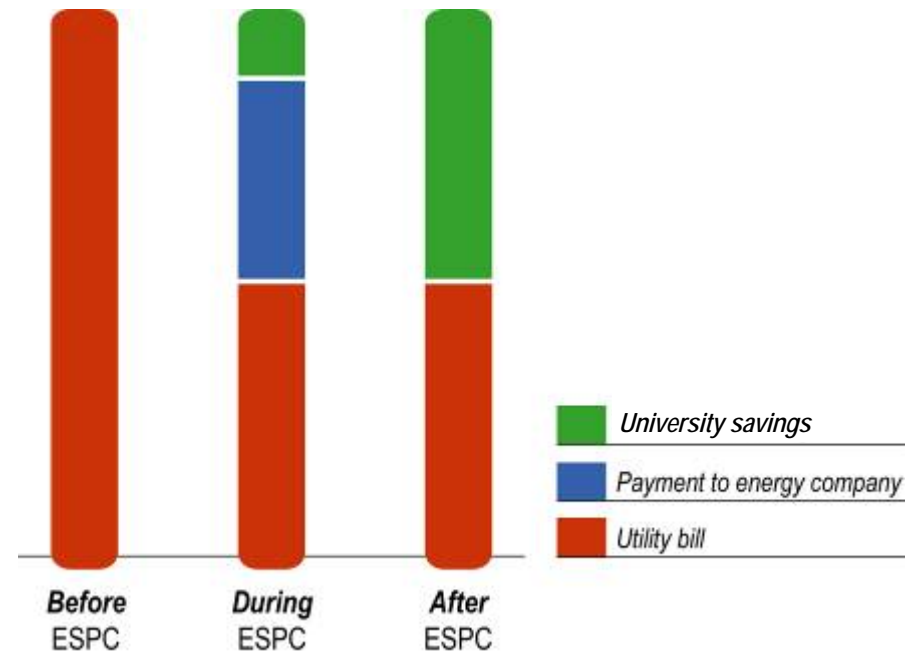
# Goals and Results of the Project

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- ▶ **SAVE ENERGY**
- ▶ **SAVE MONEY**
- ▶ **IMPROVE COMFORT/QUALITY OF CAMPUS LIFE FOR STUDENTS AND STAFF**
- ▶ **REDUCE GREENHOUSE GAS EMISSIONS**

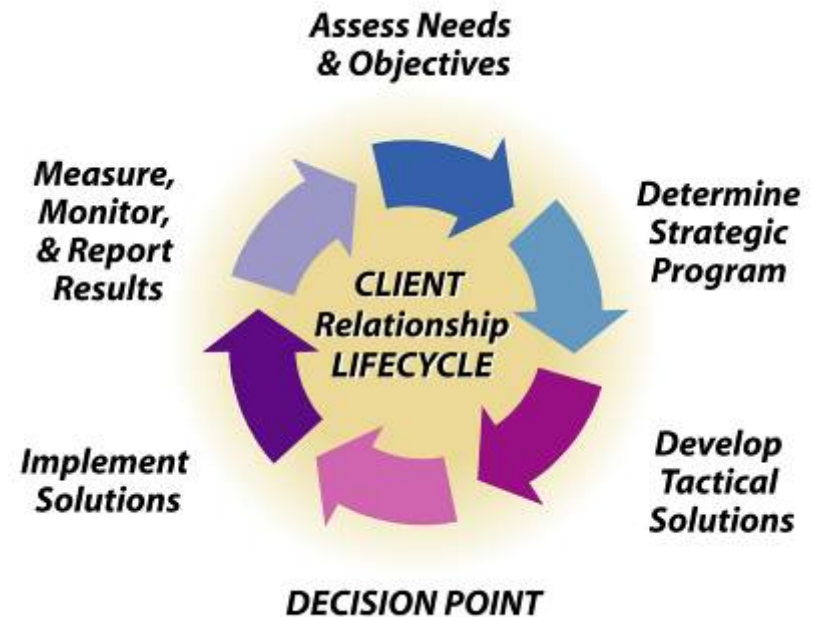
# Energy Services Performance Contracting

**ESPC** - A method of construction in which a reduction in energy / utility costs funds the cost of installing new energy efficient equipment or systems.



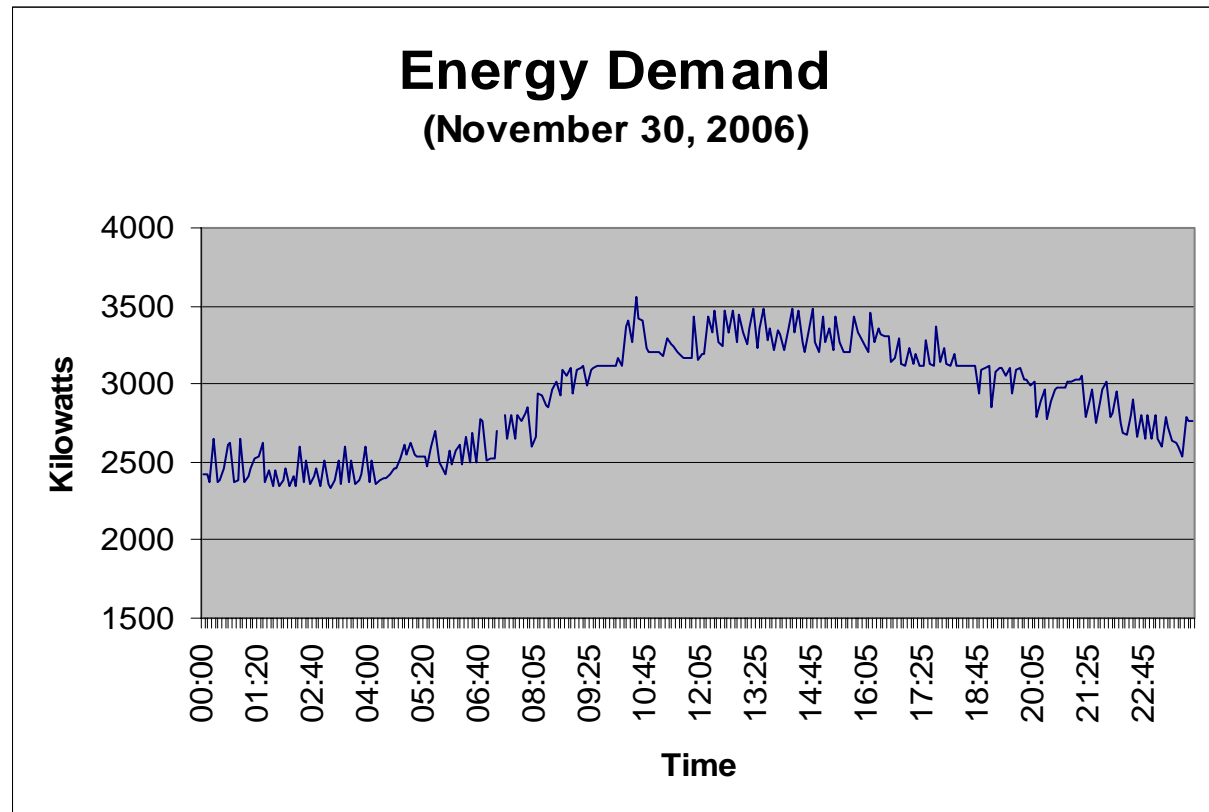
# Performance Contract Process

1. Request for Quotes (RFQ) phase
2. Preliminary Energy Audit phase
3. Detailed Energy Audit- 14 Potential Energy Conservation Measures (ECMs) Identified
4. Final Agreement: Measures / Scope
5. Implementation phase - Comprised of 7 ECMs
6. Construction Complete – 2nd Qtr 2007



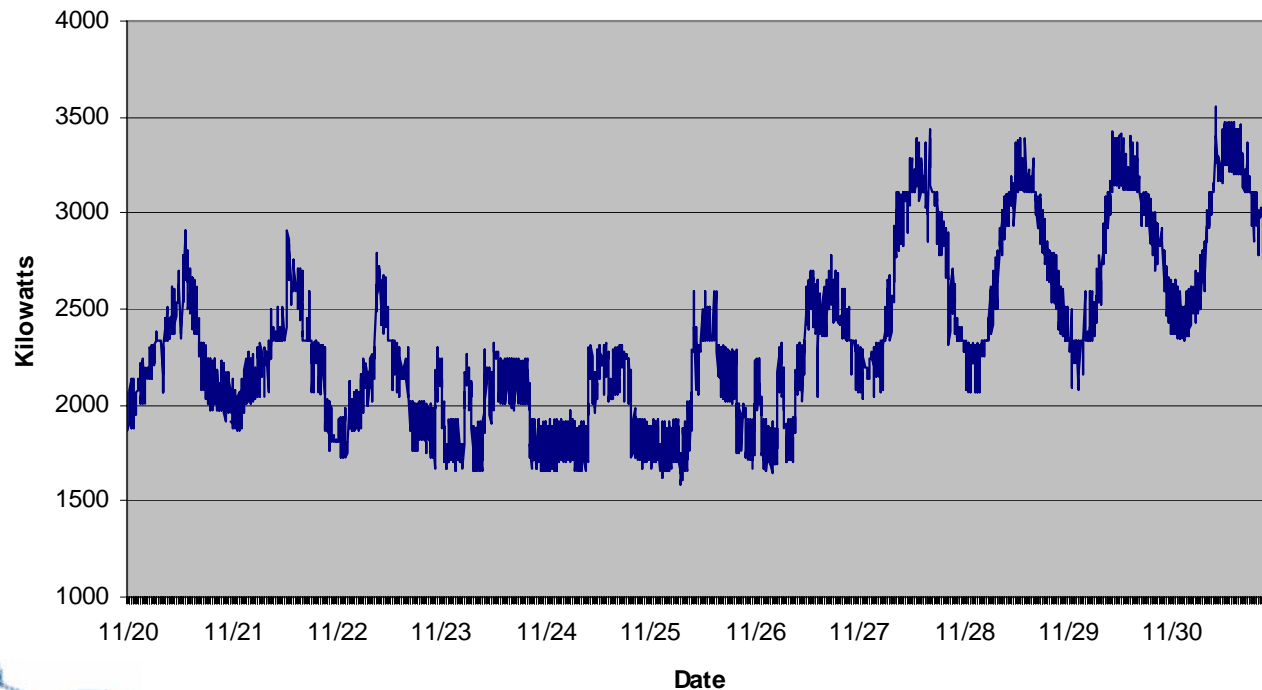
# Campus Main Meter Electric - Demand

**Total Energy Peak (KW) determines energy unit cost (KWH) throughout the year**



# Campus Main Meter Electric - Demand

**Demand Readings**  
**(November 20-31, 2006)**



# Energy Conservation Measures (ECM's) Implemented

ECM#	Description	Electricity Energy Savings Kwh	Demand Savings kW	Nat Gas Savings M M B t u	Water & Sewer Savings lgal	Maint. Savings	Average Annual Savings	Cost	Simple Paybac k (yr)
1	Lighting System Improvements	1,913,386	410	-	-	\$1,356	\$167,939	\$938,932	5.59
2	Domestic Water Conservation	-	-	1,233	6,547	\$1,273	\$100,401	\$523,407	5.21
3	Boiler Blowdown Heat Recovery	-	-	869	39	-	\$9,339	\$76,666	8.21
4	Boiler Controls	-	-	1,270	-	-	\$12,678	\$112,059	8.84
5	Boiler Economizer	-	-	2,390	-	-	\$23,859	\$149,426	6.26
6	Steam Trap Replacements	-	-	14,832	-	\$1,290	\$149,397	\$395,522	2.65
7	VFD Conversion for AHUs	83,637	4	-	-	-	\$6,300	\$161,443	25.63
	TOTALS	1,997,023	414	20,594	6,586	\$3,919	\$469,913	\$2,357,455	5.02

# Lighting and Lighting Controls

- ▶ Convert T12 fluorescents to T8
- ▶ Standardized Light Levels & Color (W&L Choice)
- ▶ All Incandescent replaced with Compact Fluorescent
- ▶ Change Mercury Vapor to Metal Halide Lights
- ▶ Motion & Infrared Occupancy Sensors
- ▶ Retrofit Exit Signs to LED



# Water Conservation

- ▶ Replaced all toilets with 1.6 gpf
- ▶ Replaced flush valves on urinals with 1.0 gpf
- ▶ Shower Heads replaced with Efficient Heads
- ▶ Restrictors / aerators on sinks - 0.5 gpm



# Boiler and Steam Distribution Improvements

- ▶ Replaced Steam Traps
- ▶ Boiler Controls
- ▶ Boiler Blow-down for Heat Recovery
- ▶ Stack Economizers



# Carbon Footprint Reductions

- ▶ **Electricity and heating created from burning fossil fuels**
- ▶ **Reduces climate impact from greenhouse gas emissions**
- ▶ **Improves overall environmental performance**



# What Emissions Are Avoided?

▶ **Emissions Reductions**  
(metric tons of CO<sub>2</sub> equivalent):

- **Electricity: 1,051**

- **Natural Gas: 1,093**

**Total Metric Tons: 2,144**



## What Do Our Reductions Amount to Annually?

- ▶ **464** cars taken off the road
- ▶ **244,191** gallons of gasoline preserved
- ▶ **275** households not using electricity
- ▶ **722** tons of waste recycled instead of land filled

### Equivalent Environmental Benefits

- ▶ **54,974** tree seedlings grown for 10 years
- ▶ **18** acres of forest preserved from deforestation

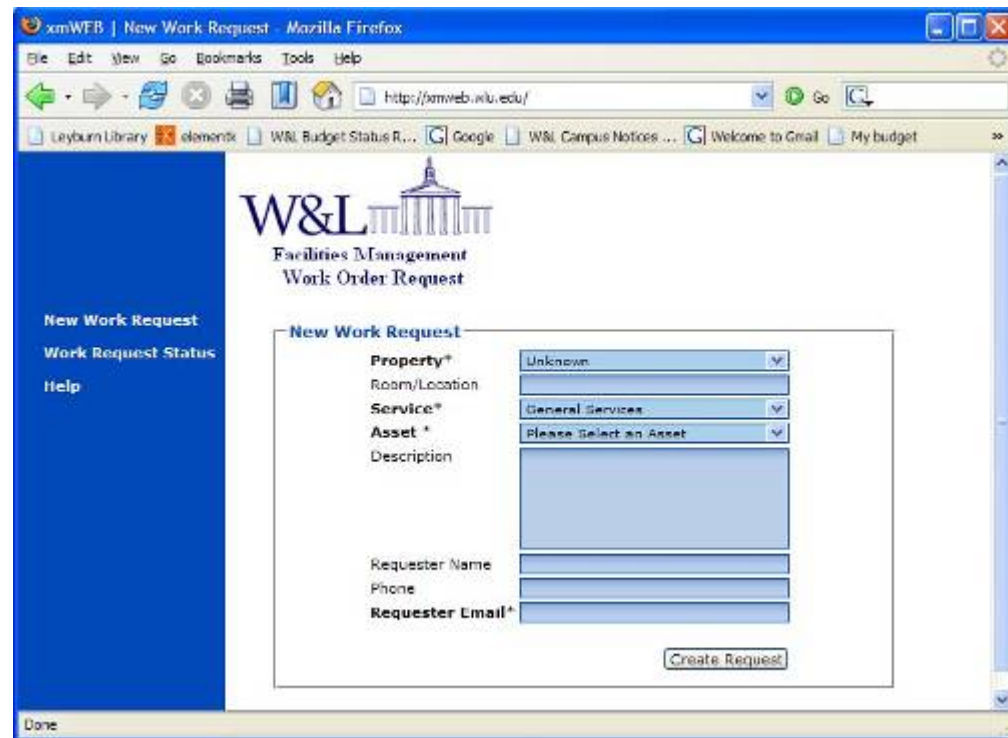
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# How Can You Help?

- ▶ **Ongoing Process**
- ▶ **Your help is needed**
  - **Suggestions**
  - **Reporting**
- ▶ **Utilize New Work Order System**  
(<http://xmweb.wlu.edu>)



The screenshot shows a web browser window titled "xmWEB | New Work Request - Mozilla Firefox". The address bar shows "http://xmweb.wlu.edu/". The browser's toolbar includes navigation buttons (back, forward, home, search), a search engine (Google), and several open tabs: "Layburn Library", "elementx", "W&L Budget Status R...", "Google", "W&L Campus Notices ...", "Welcome to Gmail", and "My budget".

The main content area displays the "W&L Facilities Management Work Order Request" form. The form is titled "New Work Request" and includes the following fields:

- Property\***: A dropdown menu with "Unknown" selected.
- Room/Location**: A text input field.
- Service\***: A dropdown menu with "General Services" selected.
- Asset \***: A dropdown menu with "Please Select an Asset" selected.
- Description**: A large text area for entering details.
- Requester Name**: A text input field.
- Phone**: A text input field.
- Requester Email\***: A text input field.

A "Create Request" button is located at the bottom right of the form. A blue sidebar on the left contains links for "New Work Request", "Work Request Status", and "Help". The status bar at the bottom of the browser window shows "Done".

# Behavior Achieves Higher Reductions

- ▶ **Room lights**
- ▶ **Convert appliances to power strips**
- ▶ **Air conditioners**
- ▶ **Windows and doors**
- ▶ **Shutdown computers every night**

(<http://computing.wlu.edu/policies/pcshutdown.htm>)

*This Thanksgiving Break, go*

**UN<sup>w</sup>PLUGGED**

reduce energy waste by turning off  
lights and unnecessary appliances  
in your office and dorm

# Recycling Conserves Energy

- ▶ **If W&L's paper was of 30% Recycled Content Paper (RCP)**
  - **Saves 2.46 million btu or 31,000 lbs. of CO<sub>2</sub>**
- ▶ **1 Aluminum can recycled = 3 hours of computer time**
- ▶ **Fluorescent bulbs must be recycled**



# Take the extra step!

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- ▶ **Calculate your own carbon footprint**

<http://www.carbonfootprint.com>

- ▶ **Purchase energy efficient appliances and lightbulbs (Energy Star certified)**

<http://www.energystar.gov>

- ▶ **Offset your footprint**

<http://www.terrapass.com>

- ▶ **Homeowners: Virginia Sustainable Building Network**

<http://www.vsbnet.org>



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