

Getting the Most Out of ENERGY STAR[®] on Campus and the SUNY Fredonia Approach

18th National Energy Services Conference

**Session 2A. Program Design and Implementation
2:00-3:30 PM**

**Presented by: Carol Sabo, PA Consulting Group
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Topics

Why is Plug-Load Energy Efficiency Important?

Plug-Load Energy-Efficiency Measures

ENERGY STAR Equipment Savings on Campus

NYSERDA's Energy \$mart Offices Program

Barriers and Solutions to Plug-Load Efficiency

The SUNY Fredonia Case Study

Plug-Load Usage Is Growing Rapidly

PCs and non-PC office equipment are estimated to be the fastest growing energy uses for the commercial sector through 2030 according to the Energy Information Administration—Annual Energy Outlook 2006 Report



- Energy consumption for PCs is estimated to grow 3 percent annually—offices are the most computer-intensive followed by educational facilities
- Energy consumption for other office equipment is estimated to grow 4.1 percent annually
- In comparison, energy consumption for other end-uses such as space heating is estimated to grow about 1 percent

A Significant % of Campus Electric Use

Plug-Load Equipment Usually Accounts for More Than 20 Percent of the Electric Use in Staff Offices (900 kWh per staff) Annually and More Than 10 Percent of Total Campus Electric Use

Computers & monitors

Small power supplies

Speakers

Printers

Copiers and MFDs

Faxes

Scanners and multi-function devices (MFDs)



Vending machines

Task lighting

Large coffee machines

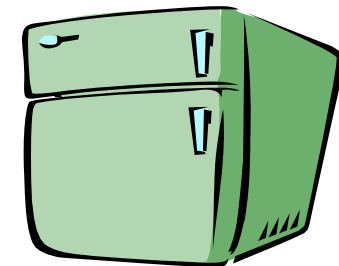
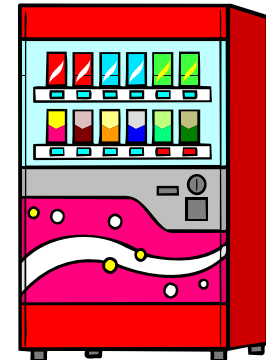
Water coolers

Refrigerators

Clothes Washers

Space heaters

Other Electronics



Plug-Load Efficiency Measures

Power management: ensure that all applicable ENERGY STAR® office equipment such as PC monitors (and computers where applicable), printers, and copiers are enabled to go into “low power” or “sleep mode” when not in use.

Power off: educate staff to turn off plug-load business equipment (PCs, monitors, printers, copiers, speakers, task lights) after hours and when not being used for several hours. Use timers to control the operating hours of other inefficient equipment such as large coffee makers that heat water 24 hours a day, water coolers that have hot and cold water taps, and other plug load equipment.

Purchase “best” ENERGY STAR equipment: develop and enforce purchasing/leasing standards that specify the most efficient ENERGY STAR office equipment including copiers, printers, task lighting, vending machines, water coolers, clothes washers, and other plug-load equipment.

ENERGY STAR Computers

On July 20, 2007, ENERGY STAR's new specifications for computers went into effect.

Qualified products must now meet energy use guidelines in three distinct operating modes: standby, sleep mode, and while computers are being used.

Newly qualified computers must also include a more efficient internal power supply.



ENERGY STAR Copiers/Large MFDs

Comparisons of Two ENERGY STAR Models

Power Consumption	WorkCentre Pro 55	WorkCentre Pro 255
Running	<1247 watts	≤1230 watts
Standby	<284 watts	≤290 watts
Low Power Mode	<223 watts	≤125 watts
Auto Off/Sleep Mode	<75 watts (sleep)	≤9 watts
Warm up to Copy Ready to Print	105 seconds (max.)	≤28 seconds
Low Power Recovery	30 seconds (max.)	≤20 seconds



ENERGY STAR CFLs

If 3,000 incandescent lights were replaced with a CFL in residence halls, the savings would be \$21,000 annually

Estimated annual savings is \$700 if 100 CFLs were replaced with incandescent light bulbs in faculty and staff offices



SHE CAN CHANGE IT NEXT TIME.

Lasts 7 years!

BUY 5, SAVE \$150 IN ENERGY COSTS

ENERGY STAR is a government-backed program that promotes energy efficiency by certifying products that meet strict energy efficiency guidelines.

PA

ENERGY STAR Vending Machines

Potential savings for each cold vending machines if not currently ENERGY STAR and replaced with Tier II model (1,300 kWh) is about \$130 each annually



ENERGY STAR Washing Machines

A university can save an estimated \$14,100 annually by installing ENERGY STAR front-loading washing machines for 2,000 students in residence halls

- The majority of the savings (\$10,000) are from water savings
- The remaining savings are primarily from gas water heating savings



ENERGY STAR Refrigerators

Replacing 1,000 compact refrigerators (50% old and 50% new) in student rooms with ENERGY STAR MicroFridges would save an estimated \$14,500 annually

Estimated savings for replacing 40 old compact units in staff and faculty offices with new ENERGY STAR units is \$680 or more annually

Estimated savings for removing 40 old units in offices without replacement is \$1,800 annually



NYSERDA Energy \$mart Offices Program

Funded through NYSERDA's **New York Energy \$martSM** program

The goal of the Energy \$mart Offices project is to assess and help implement energy-savings potential from low-cost/no-cost measures targeting business and non-business plug-load equipment

NYSERDA pays for the data collection and analysis, technical support, and outreach and education at no cost to participants—estimated program cost is about 1 cent per kWh of estimated implemented savings

PA Consulting's team designed and has implemented the program for the past 6 years



Computer and Other Plug-Load Energy Use/Savings

Plug-Load Savings Opportunities 2006-2007 Campus Projects (n=13)	High	Avg.	Low
Average Annual kWh Use per Computer for all Computers	758	484	337
Average Annual Potential kWh Savings per Computer for Computers	417	221	117
Potential kWh Savings for Computers as a % of Total Computer kWh Use	68%	46%	34%
Average Annual Potential kWh Savings per Computer for Other Plug-Loads	176	95	71

Sample Project: 3,300 Students Enrolled with 1,750 Living on Campus—Annual Savings

Equipment (2007 Study)	Staff/Gen.	Labs	Res. Halls
Computers	\$13,000	\$36,000	\$35,000
Copiers/Printers	\$6,500		
Vending (48)	\$9,000		
Clothes Washers			\$1,300
Refrigerators	\$1,500		\$19,000
Task Lights	\$500		\$15,000
Total Est. Annual Savings	\$30,500	\$36,000	\$70,300

BARRIERS TO ACHIEVING PLUG-LOAD SAVINGS—
NYSERDA ENERGY \$SMART OFFICES SOLUTIONS

Barrier: Lack of Awareness of Savings

SITUATION:

- Limited familiarity with ENERGY STAR equipment savings opportunities
- Procurement staff are not tuned into ENERGY STAR equipment specifications and procurement language
- Often don't know if they have ENERGY STAR equipment
- Rely on vendors that may or may not promote ENERGY STAR
- Don't use ENERGY STAR calculators—don't know the significant savings potential

SOLUTIONS:

- NYSERDA projects include group information sessions with all key decision-makers—facilities, IT, CAS, procurement, administration, etc.
- IT and facilities staff typically participate in the on-site daytime and after hours equipment surveys
- The project team estimates energy savings potential using ENERGY STAR calculators and other calculators developed for NYSERDA

Barrier: Myths and Technical Realities of Computer Power Management (CPM)

SITUATION:

- IT staff are reluctant to make changes
- Some IT staff have tried computer/monitor power management and experienced problems with older computers
- Occasionally, there are software compatibility issues
- ENERGY STAR has considerable basic technical information but one-on-one support is limited to largest facilities

SOLUTIONS:

- Project team includes an IT expert on its team that can answer all of the technical questions
- Project team groups small universities within a geographic area and schedules data collection to ensure those with less than 5,000 computers can still participate and receive individual attention
- Project team does not promote any one software product to enable computer power management –IT staff can often use their existing network tools

Barrier: Lack of Staff Resources

SITUATION:

- Facilities managers have little time to develop new campus initiatives
- IT staff are time-constrained and have other higher priorities
- Increased electric rates may mask the electric bill savings that could be used to hire an energy manager

SOLUTIONS:

- Project team provides estimates of the significant avoided energy costs from a comprehensive approach to plug-load efficiency with little or no capital investment required
- Programs may want to offer financial incentives that could be used for dedicated staff resources
- Programs may want to include research grants to faculty/students for projects

Barrier: Organizational Hurdles

SITUATION:

- The college campus is a complex management structure
- Plug-load efficiency projects involve many different groups:
 - Facilities
 - Information Technology (IT)
 - Campus Auxiliary Services
 - ResNet
 - Procurement
 - Faculty and Administration
 - Residence Life
 - Students
 - Top-Level Decision-makers

SOLUTIONS:

- The project team encourages representation from all of these groups in the project
- The project team recommends development of a Sustainability Committee if not does not exist
- Multiple trips and considerable “hand holding” are necessary
- Vendors should get more involved in the process

Barrier: Misplaced Incentives

SITUATION:

- A significant portion of the identified plug-load savings will not happen without IT director approval
- There are no direct incentives for IT to implement policies and procedures that save energy on campus

SOLUTIONS:

- “Logically, companies should be driving energy efficiency by targeting those who use the most of it, and making them accountable for it. And by accountable, we mean getting them to stump up for part of the bill.” Danny Bradbury, [BusinessGreen](#) 16 Nov 2007
- In any event, special recognition should be given to the groups who facilitate significant energy savings on campus.

Barrier: Lack of Program Models

SITUATION:

- Facilities managers lack the time, skills, and experience to develop campus programs that target students with outreach and education.
- They are often not aware of ENERGY STAR case studies, outreach materials, and program examples.

SOLUTIONS:

- The project team provides examples of other campus programs that have worked successfully in NYS to reduce plug-loads
- Some still need a packaged set of off-the-shelf toolkits that are tested and easy-to-implement.
- Electronic newsletters could provide more current information on what their peers are doing on other campuses and the results.

SUNY Fredonia Case Study

Recent Estimated Enrollment:

5,400 students

2,600 living on campus

PC's on Campus by Function:

700 Administrative Staff

400 Academic/Faculty

300 Classrooms & Labs

2,675 Residence Halls



Maytum Hall

Estimated Total Number of Computers: 4,000

Gross Square Feet: 2,024,950

Key Findings for SUNY Fredonia

An estimated \$75,000 can be saved annually at SUNY Fredonia by implementing various plug-load energy efficiency measures for administrative staff, faculty, student labs and classrooms, and residence halls

Electric use for computers and monitors on campus was over 14 percent of the total 2004 electric use for the campus

Estimated plug-load electric use per student in residence halls is 1,300 kWh or \$113 each annually—close to half is likely from computers

Potential Est. Total Savings SUNY Fredonia

Equipment	# of Units	Implement Key Energy Efficiency Measures for Plug-Loads	Total Savings @ \$.087
PC/Monitors	2,600	Shut off PCs & Implement Monitor Power Management & CPM	\$68,350
Copiers	10	Replace with "best" ENERGY STAR, optimize "sleep" wait time, power off after hours	\$400
Med-Large r Printers	80	Shut off & Power Management	\$900
Small Inkjet Printers		Power off after hours	
Computer Speakers		Turn off after hours	
Vending Machines (Soda)	54	Replace w/Tier I ENERGY STAR machine	\$6,000
Total Equipment Users		*% Saved Depends on Amount of Active Use	\$75,650

Administrative Staff

SUNY Fredonia's Associate Vice President of IT sent a public announcement via ListServ to "Celebrate Our Earth on Earth Day April 22nd by Implementing Computer Power Savings Tips" that included :

- Instructions on how to implement monitor power management on PCs and Macs.
- Use a black screen saver since studies indicate white and bright colors can use up to 20% more power than black or dark colors.
- Discontinue use of 3-dimentional screen savers since they double the power output of some computers.
- Turn off printers after hours or when not in use.



Computer Labs

Monitors in the computer labs are set to go into “sleep” after 5 minutes if no one is logged in to use the computer

Computers in computer labs are set to power off when the lab shuts down at the end of the day

Staff manually shut-off separate CRT monitors used in a graphics lab

Residence Halls: Implemented "I'm Only Sleeping" As a Result of NYSERDA Project

Collaborative effort of Facilities Management, RESNET, and Residence Life using Web:

Qualify to win an iPod Nano!

Just participate in the *"I'm Only Sleeping"* program. It is easy. If you agree to use the Monitor power management settings available in Windows or run the "EZ Wizard" tool, which will take you through a step by step process to put your monitor to sleep when your computer is on but not in use.

To qualify: [Complete and print the certificate \(pdf format\) with your name, residence hall name, room number and Fredonia I.D. number. Take the completed certificate to your RD to be entered in the drawing.](#) Entries must be received by February 14, 2006. Drawing will be held on March 1, 2006

This offer is for current SUNY Fredonia residents only.

"I'm Only Sleeping" Program Results

The initial introduction of the program was 05/06 school year with an estimated 83% participation by student's in residence halls.

The 06/07 school year saw an increase in the estimated number of res. hall computers as University Commons was opened. Student participation for this school year was 89%.

This past year's estimated participation can be translated into the following avoidance of these Emissions gases...all this because SUNY Fredonia's res hall students chose to assure their computer had a sleep function and it was enabled.....

- 777,234 kWh of energy
- 525,158 #'s of carbon dioxide
- 48,577 #'s of sulfur Dioxide
- 5,441 #'s of nitrogen oxide

Plug-Load Efficiency in Residence Halls

SUNY Fredonia's facilities management team organized surveys of computers and plug-load equipment in residence halls to provide good baseline information. Based on the information, they took the following actions:

- Installed CFLs in overhead lights in dorm rooms
- Handed out CFLs to students for desk lamps
- Installed ENERGY STAR washing machines
- Installed ENERGY STAR microfridges in one building
- Recommends ENERGY STAR refrigerators to students coming on campus
- Encouraged the use of power strips with surge protectors to turn off plug-load equipment in residential halls

Everyone Helps Out

Residence Hall staff monitor refrigerators to be sure they are unplugged when school is in break

Custodians check and shut off exhaust fans in bathrooms when not in use

All staff who contribute to energy-efficiency are recognized by name for their efforts in staff meetings

Taking a Holistic Approach to Efficiency

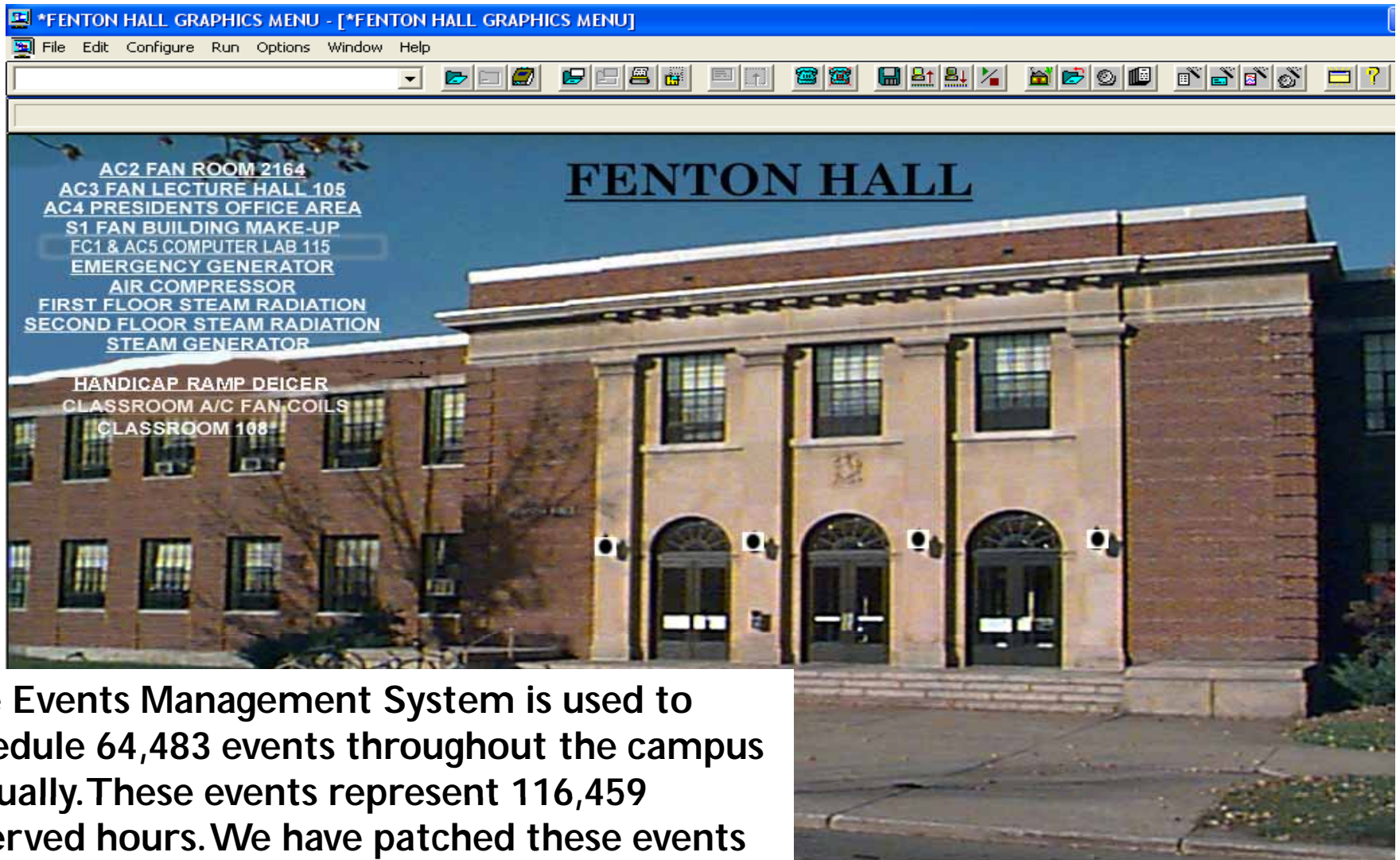
Established a sustainability committee on the campus

Developed a “GoGreen” section on the web-site with “Conservation 101” tips that includes plug-load efficiency ideas for students, staff and faculty, residence halls, and other entities on campus



Facilities management staff update the campus activities schedule on a regular basis and use that information in conjunction with their energy management system to reduce energy use as follows:

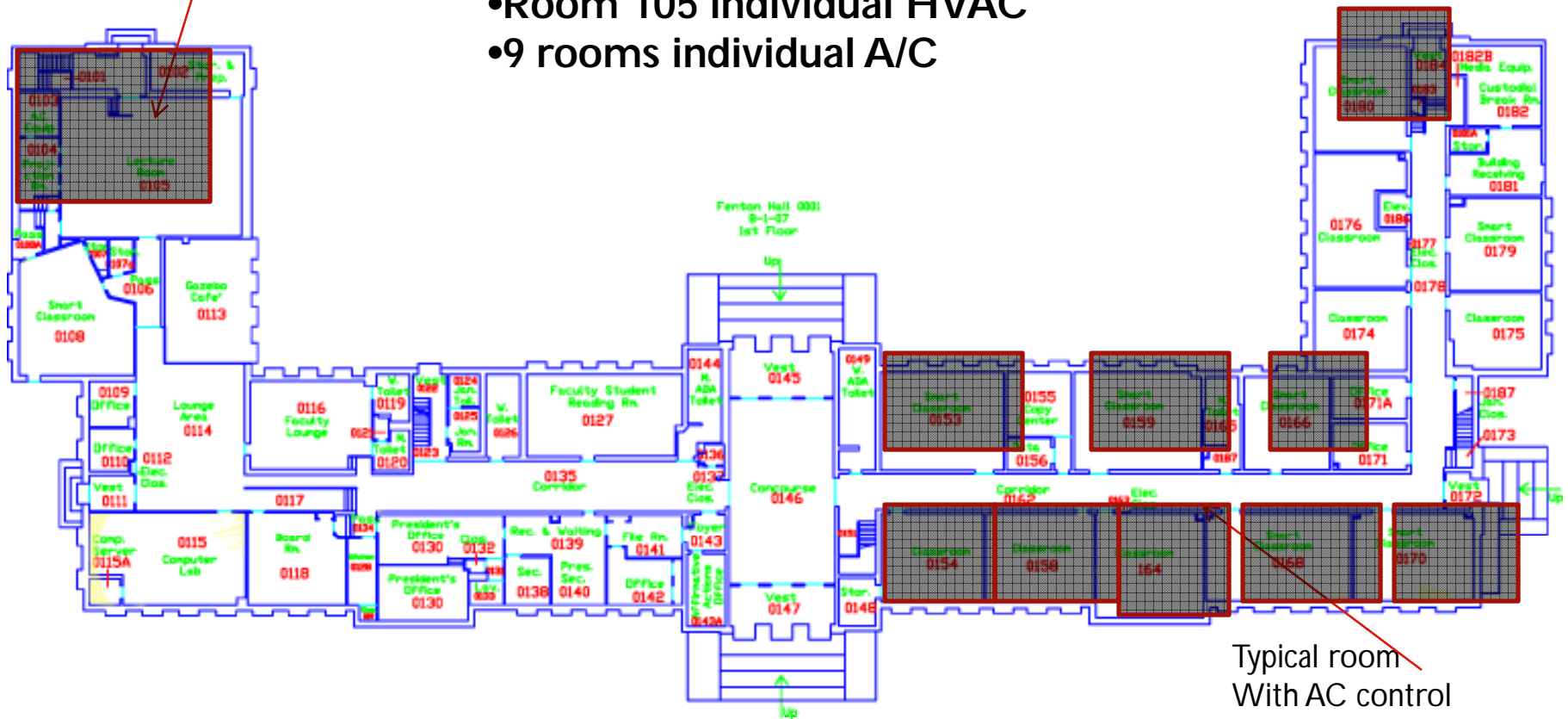
Built in 1953



The Events Management System is used to schedule 64,483 events throughout the campus annually. These events represent 116,459 reserved hours. We have patched these events into usable data files. These data files allow us to look at building usage by:

Typical room
With HVAC
control

- Multi-use mechanical system
- Multiple room heating zones
- Room 105 individual HVAC
- 9 rooms individual A/C



It lists the earliest time the building is used and the latest that the building will be used for each day.

Building Earliest Start Times and Latest End Times

Building	Earliest Start	Latest End	Starting Date: 12/2/2007	Ending Date: 12/7/2007
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12/02/2007 Sunday

Dods Hall Complex	1:00 PM	7:00 PM
Fenton Hall	6:30 PM	9:00 PM
Mason Hall	1:00 AM	11:59 PM
Natatorium	10:00 AM	5:00 PM
Rockefeller Arts Center	9:00 AM	10:00 PM
Steele Hall Complex	7:00 AM	11:30 PM
Thompson Hall	4:00 PM	6:00 PM
Williams Center	2:00 PM	11:00 PM

12/03/2007 Monday

Dods Hall Complex	7:00 AM	11:00 PM
Fenton Hall	8:00 AM	10:45 PM
Gregory Hall	2:00 PM	4:30 PM
Houghton Hall	8:00 AM	7:20 PM
Jewett Hall	8:00 AM	7:50 PM
Mason Hall	12:00 AM	8:00 AM
McEwen Hall	8:00 AM	6:00 PM



It All Adds Up



More Information

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