Energy use, tracking, and feedback

Lane Community College Energy Use, Tracking & Feedback – Year Reported: 2004/2005

INTENT:
Encourage energy efficiency. Facilitate action by ensuring that Lane collects and reports information on its own energy use practices.

EXECUTIVE SUMMARY – Please see the following page for Unit Conversions.

2004/2005 ENERGY DATA

DESCRIPTION	DATA
Total energy use for heating, cooling, and electricity in 2004/2005. (Millions of British Thermal Units. Please see the following page for Unit Conversions.)	101,817 MMBTU
Total LCC Building Square footage for 2004/2005	1,120,326 ft²
Total energy use per building square foot per year for 2004/2005 in Btu's per square foot.	90,882 Btu/ft² or 0.0909 MMBTU/ft²
Total energy use for heating, cooling, and electricity in 2004/2005. (Measured in kilowatts per hour)	29,840,858 kwh
Total energy use per building square foot per year for 2004/2005 in kwh per square foot.	26.6 kwh/ft²
How many average Lane County residential houses* LCC's total energy use for heating, cooling, and electricity in 2004/2005 would have powered.	Approximately 1900
Total energy dollar costs for 2004/2005	$1,226,766
Total energy use per building square foot per year	$1.10/ft^2
Energy Carbon Dioxide emissions for LCC Facilities	2,950 tons CO2
Total CO2 emissions per building square foot per year. (Please see 2004/2005 Energy use, tracking, and feedback).	Approximately 5 lbs/ft^2
Total energy reduction for 2004/2005 over the baseline year of 2003/2004. (Please see table below for baseline data.)	808 MMBTU or 0.8%

2003/2004 BASELINE ENERGY DATA

DESCRIPTION	DATA
Total energy use for heating, cooling, and electricity in 2003/2004. (Millions of British Thermal Units. Please see the following page for Unit Conversions.)	102,625 MMBTU
Total LCC Building Square footage for 2003/2004	1,122,078 ft²
Total energy use per building square foot per year for 2003/2004.	91,460 Btu/ft² or 0.0914 MMBTU/ft²

Our goal for 2006/2007 is a 10% reduction over 2004/2005's total energy use at LCC facilities. Reducing energy use by 10%would result in:

- **Total energy use for heating, cooling, and electricity that does not exceed 81,794 BTU/ft².**
- **Saving the energy equivalent to power *190* average residential houses a year in Lane County.***
- **A *295*-ton reduction in CO2 emissions from energy use at the LCC Eugene facilities.**

* Based on the EPUD average customer's monthly electricity usage of 1310 kwh per month or 15,720 kwh per year.

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INDICATOR DATA:

(1) Use

In order to equally compare energy usage this indicator report converts units of electrical power (kilowatt hours) and gas volumes (measured in therms) into millions of British thermal units (MMBTU). The following is a description of these conversions.

Unit conversions:

- One Btu is equivalent to the energy expended by burning one matchstick.
- One kilowatt hour = 3412 Btu
- One therm = 100,000 Btu
- One MMBTU = 1,000,000 Btu

The total energy use for heating, cooling, and electricity per total student and staff FTE for this indicator year is **9.38 MMBTU.** The total number of total student and staff FTE for 2004/2005 was reduced by 1,197 people compared to 2003/2004.

The total energy use for heating, cooling, and electricity (Btu per building square foot) for this indicator year is: **90,882 Btu/ft².** Lane **reduced** total energy usage in 2004/2005 over 2003/2004 by 0.6%, (**578 Btu/ft^2**).

(2) Tracking. Provide a description of <u>how</u> Lane tracks energy use and cost data.

Utility personnel read the gas and electric meters once a month.

11 Natural Gas meters: Lane's Energy Analyst receives daily usage data about the main campus central boiler by e-mail and monthly data about other building usage from the billing information.

15 Electrical meters 8 sub-meters on 30th St campus: Lane's Energy Analyst has access to daily usage data for the 8 sub meters on the 30th St. campus and monthly data about other building electrical usage from the billing information.

Both fuel sources: The Energy Analyst checks the Facilities archives for past costs and usage before approving monthly bill payment.

Please refer to the Supplementary Material for graphs and charts of this year's Energy usage.

(3) Feedback. Provide a description of how Lane provides feedback to campus users about energy use.

In June of 2005 Lane Community College hired a full time Energy Analyst. A part of this position's essential functions is to help promote awareness about energy conservation among staff and students. The Energy Analyst has been introducing herself to staff and students while doing physical inspections of the college facilities. At the same time, she has been discussing her energy saving mission with staff and students.

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BENCHMARK:

(1) *Use*: Total energy use for heating, cooling, and electricity that does not exceed 79,300 Btu/ft^2. *This number represents best practices from a survey of a wide variety of colleges and universities. The number was provided by Good Company, a local sustainability-consulting firm.*

(2) *Tracking*: The campus has a comprehensive archive of its energy use records. There exists an on-going reporting process for all energy use and cost data to relevant decision makers.

(3) *Feedback*: The campus Facilities Department provides information to campus users about energy use in ways that raise awareness and facilitate action.

ANALYSIS:

Has Lane met the benchmark? **No.**

Current efforts to conserve energy include:

- The staff is starting to participate in a utility rebate program when purchasing Energy Star LCD monitors to replace CRT computer monitors.
- Some departments are participating in energy performance trials where operation of office equipment or doors to unconditioned space is shut off automatically.
- Ground source heat pumps are renewable energy resources used to heat and cool the Child Care Buildings (#'s 24-27) and the Downtown Center.
- The Energy Management Program faculty and students are working with Facilities staff to connect a solar electric array to provide renewable power generation at the college's 30th St campus.
- The college's staff is in the process of following a consulting engineering firm recommendations and implementing domestic hot water improvements.

Recommended strategies for improving performance in this area:

Operations and Maintenance

- Sub-meter all buildings so that the college can have more detailed energy use tracking.
- Maximize use of lighting controls by scheduling according to building occupancy.
- Continue to schedule HVAC controls based on information from Institutional Research Assessment and Planning.
- Review buildings for nighttime shutdown taking scheduled evening events into consideration.
- Improve security of thermostats so that staff that is not approved to operate thermostats cannot change thermostat settings.
- Develop lighting and HVAC controls timer reset schedule to reflect power outages and daylight savings time changes.
- Increase installation and use of motion sensors for lighting.
- Turn off hot water circulation system at night.
- Clean duct supply and return grills on a regular basis.
- Clean lighting fixtures on a regular basis.

Policy

- Develop policy that directs staff to use energy efficiently while not sacrificing productivity.
- Develop policy that classes shall be consolidated so that building shutdowns may occur during non-peak periods.
- Develop policy that ensures removal of electric resistance space heaters from campus and replaces them with radiant panel space heaters, if needed.

Lane Community College Energy Use, Tracking & Feedback – Year Reported: 2004/2005

Education

- Develop a competition between buildings to reduce energy consumption.
- Utilize the Sustainability Marketing Committee and Sustainability website to develop an energy awareness campaign that will motivate staff and students to conserve energy, water, and other commonly used resources.
- Educate building managers in HVAC override procedures.

Performance Improvements Tracking

- Continue analysis of appropriate lighting retrofits and/or improvements.
- Complete system checks (commissioning) for the 2002/03 installation of direct digital control equipment and control sequences in 29 mechanical units (for heating and cooling) at the E. 30th Ave campus. Started August 2005.
- Continue developing a utilities database, which will increase the accuracy of utility bill data entry and allow for future direct electronic data transfer from the utility company records to Lane's utility database. Design reports to improve and enhance the on-going reporting process for all energy use and cost data.

Report created by: Anna E. Scott and Amanda Poston

Date: 11/05

Energy Use Index

Source or Action	Description	Value
Utility Data	Electricity (kwh)[1]	15,080,371
Convert to MMBtu	Electricity (MMBtu)	51,454
Utility Data	Natural gas (therms)[1]	503,628
Convert to MMBtu	Natural gas (MMBtu)	50,363
Convert to MMBtu	Total energy (MMBtu)	101,817
Convert to Btu	Total energy (Btu)	101,817,005,852
Convert to kwh	Total energy (kwh)	29,840,857.52
LCC Data	FTE students [2]	10,174
LCC Data	FTE budgeted staff[2]	681
LCC Data	Total FTE students + FTE staff[2]	10,855
LCC Data	Building square footage[3]	1,120,326
	Total energy per student FTE per year (MMBtu)	**10.01**
Energy Use Index	**Total energy per campus user per year (MMBtu)**	**9.38**
Energy Use Index	**Total energy use per building square foot per year (MMBtu/ft2)**	**0.0909**
Energy Use Index	**Total energy use per building square foot per year (Btu/ft2)**	**90,881.59**
Energy Use Index	**Total energy use per building square foot per year (kwh/ft2)**	**26.64**

1 Information on the Facilities Management and Planning server in the folder Office on 'Fmp1\Data'(J:)\group\Utilities and in a three ring binder labeled "Utilities Summary" located in Building 7, Facilities RM 203a.

2 Information from Institutional Research, Assessment and Planning, Craig Taylor. Funding FTE used for students. Budgeted FTE used for Staff.

3 See Attachment 1 "Building Square Footage"

Greenhouse Gas Emission Inventory

Source or Action	Description	Value
Utility Data	Electricity (kwh) (Includes Electricity from EWEB Only at the Eugene Facilities■)	14,760,814.00
NWPPC[o]	Electricity Line loss correction	16,492,529.61
EFS Guidelines[1]	12% of EWEB's power comes from conservation (carbon free)▲4	-
	3% of EWEB's power comes from wind (carbon free)▲4	-
Convert to CO2 using DOE's VRGGP[2] emission coefficient.	71% of EWEB's power comes from hydro electric dams (lbs of CO2)	-
	7% of EWEB's power comes from nuclear (lbs of CO2)	-
EIA[3] Annual Energy Use Review	7% of EWEB's power comes from natural gas (lbs of CO2)	1,549,308.23
Utility Data	Natural gas form all LCC facilities.(See footnote 1 on previous page) (MMBtu)	50,363
Convert to CO2 using DOE's VRGGP[2] emission coefficient.	Carbon Dioxide, CO2, emissions from natural gas. (lbs)	5,896,474.28
Convert to N2O using EIA[3] figures	Nitrous Oxide, N2O, emissions from natural gas (lbs)	11.73
Convert N2O to CO2 using WRI conversion factor	Nitrous Oxide, N2O, emissions from natural gas converted to Carbon Dioxide, CO2, emissions(lbs)	246.43
Convert to CH4 using EIA[3] figures	Methane, CH4, emissions from natural gas (lbs)	14.45
Convert CH4 to CO2 using WRI conversion factor	Methane, CH4, emissions from natural gas converted to Carbon Dioxide, CO2, emissions(lbs)	4480.78
	Total energy Carbon Dioxide, CO2, emissions (lbs)	**5,901,201.48**
	Total energy Carbon Dioxide, CO2, emissions (tons)	**2,950.60**
LCC Data	FTE students (Actual. See footnote 2 on previous page)	10,174
LCC Data	FTE budgeted staff (See footnote 2 on previous page)	681
	Total FTE students + FTE staff (See footnote 2 on previous page)	10,855
LCC Data	Building square footage(See footnote 3 on previous page)	1,120,326
Carbon Emissions Index	**Total CO2 emissions per student FTE per year (lbs)**	**580.03**
Carbon Emissions Index	**Total CO2 emissions per per FTE students + FTE staff (lbs)**	**543.66**
Carbon Emissions Index	**Total CO2 emissions per building square foot per year (lbs/ft2)**	**5.27**

■ 30th Street Campus, Downtown Center, Wildish Building, KLCC transmitter, Airport Building #'s 42-46

[o] NWPPC = Northwest Power Planning Council

[1] EFS = West Coast EFS Network Guidelines for College Level Greenhouse Gas Emissions Inventories - v.1 By Juilian Dautremont-Smith. 2002.

▲ Green Power reflected in Utility fuel mix and therefore not subtracted from total kwh consumption.

[2] VRGGP = Voluntary Reporting of Greenhouse Gases Program

[3] EIA = Energy Information Administration

4 EWEB = Eugene Water and Electric Board - Facts and Figures. 2004.

5 WRI = World Resources Institute - Spreadsheet wri_co2comm_020503_electricity.xls - Conversion Factor Sheet

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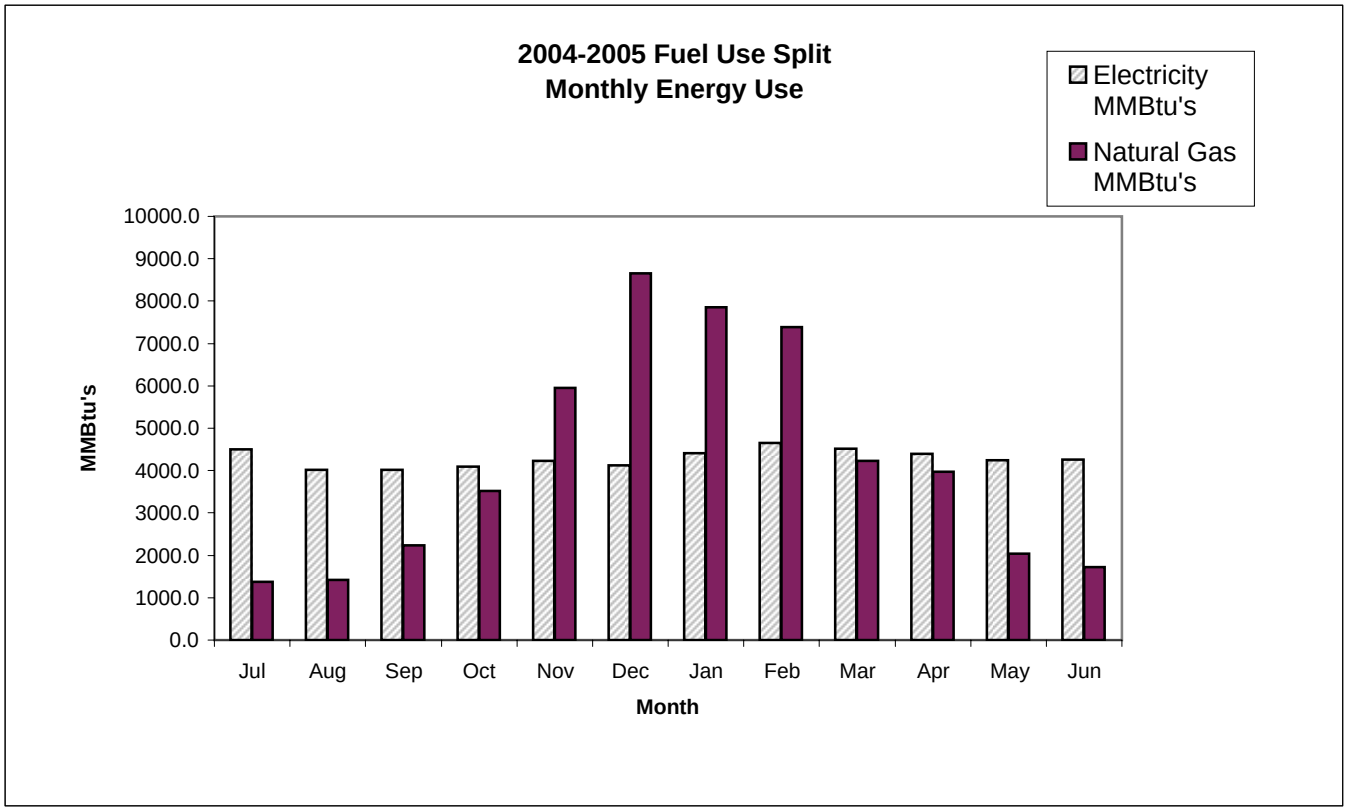
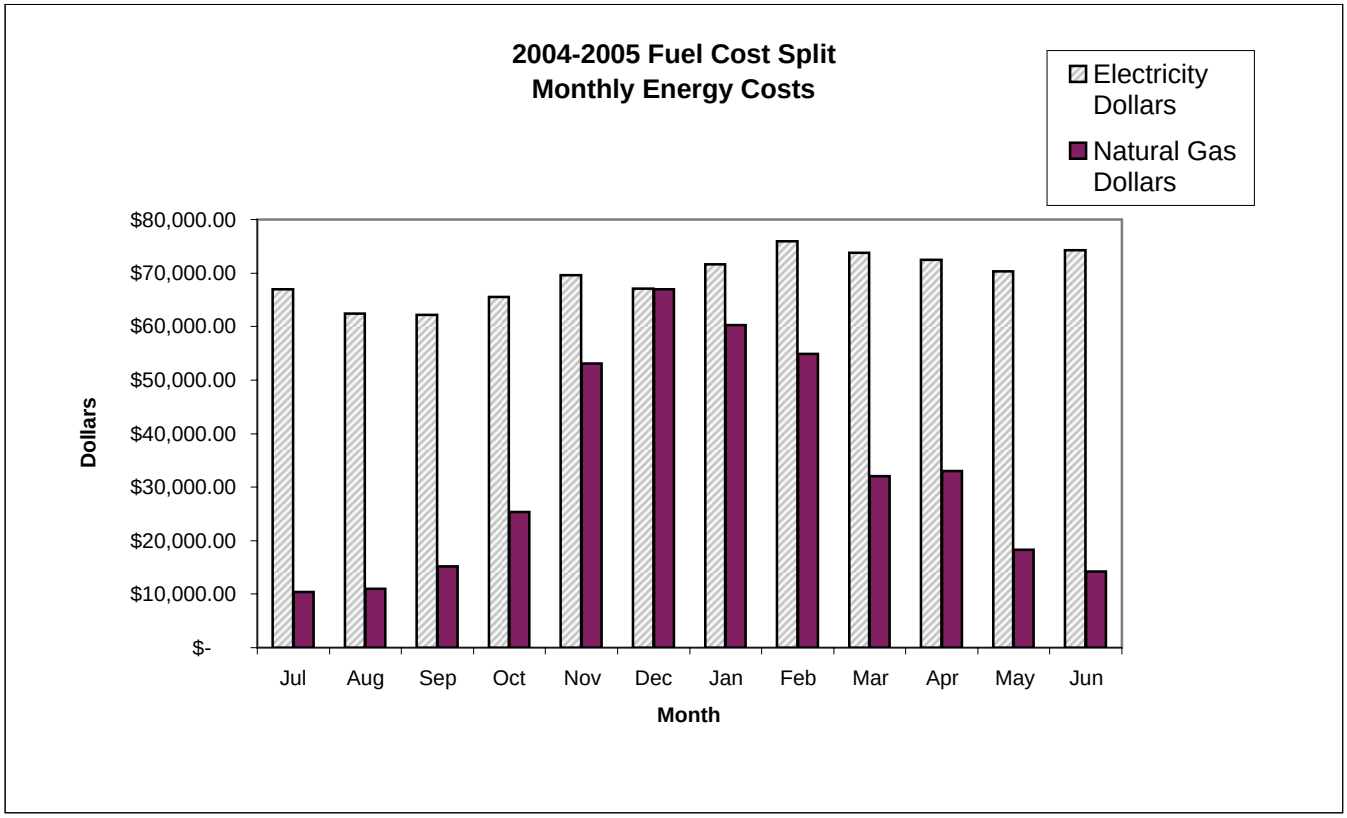
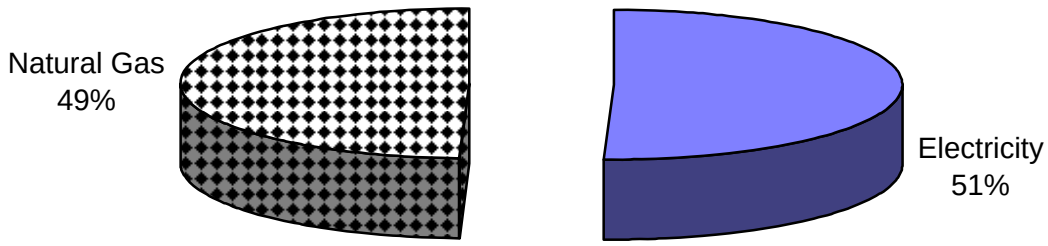
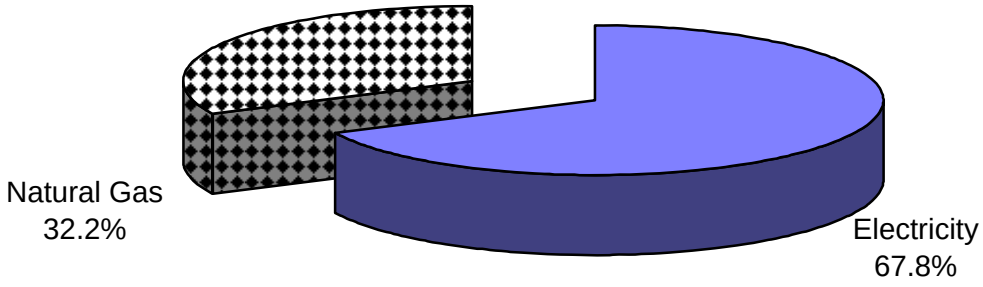




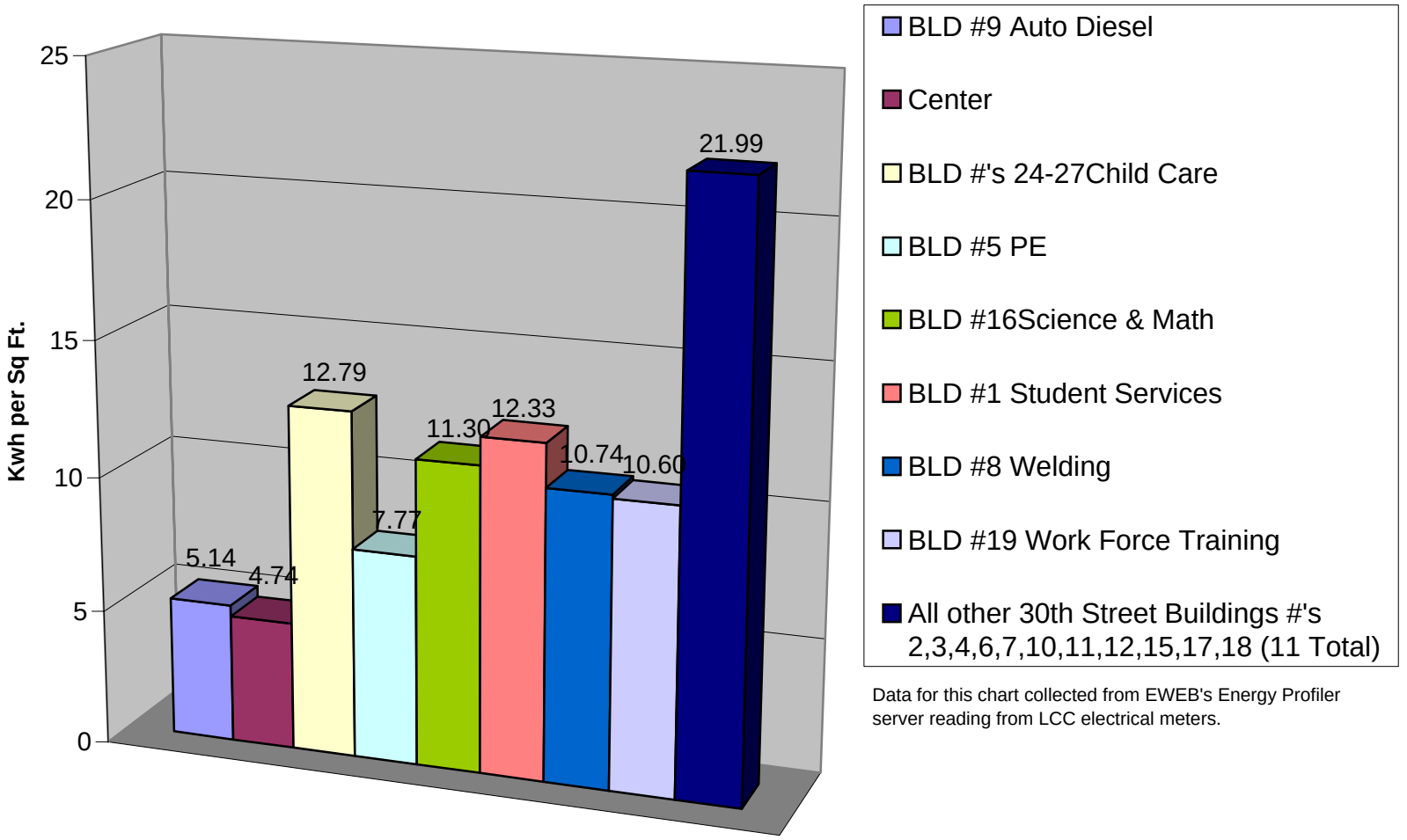
2004/2005 Fuel Use Split



2004/2005 Fuel Cost Split

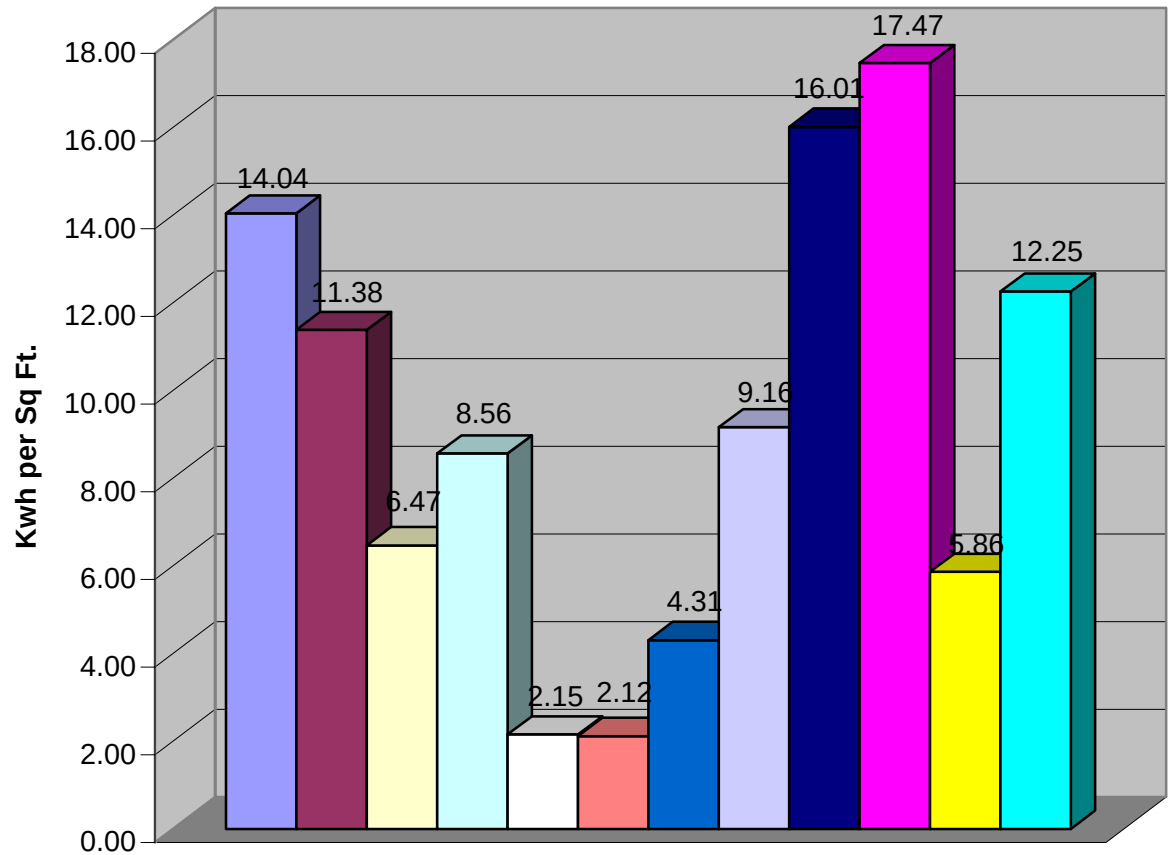


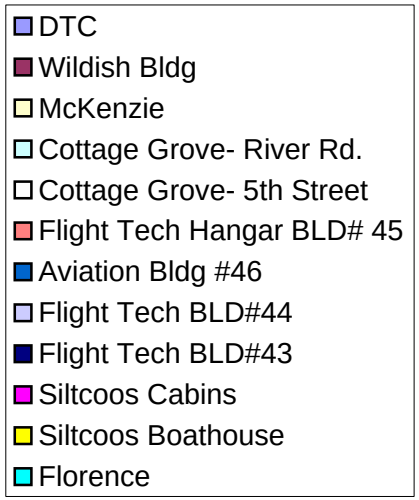
2004-2005 30th Street Campus Electrical Use per Building Square Footage



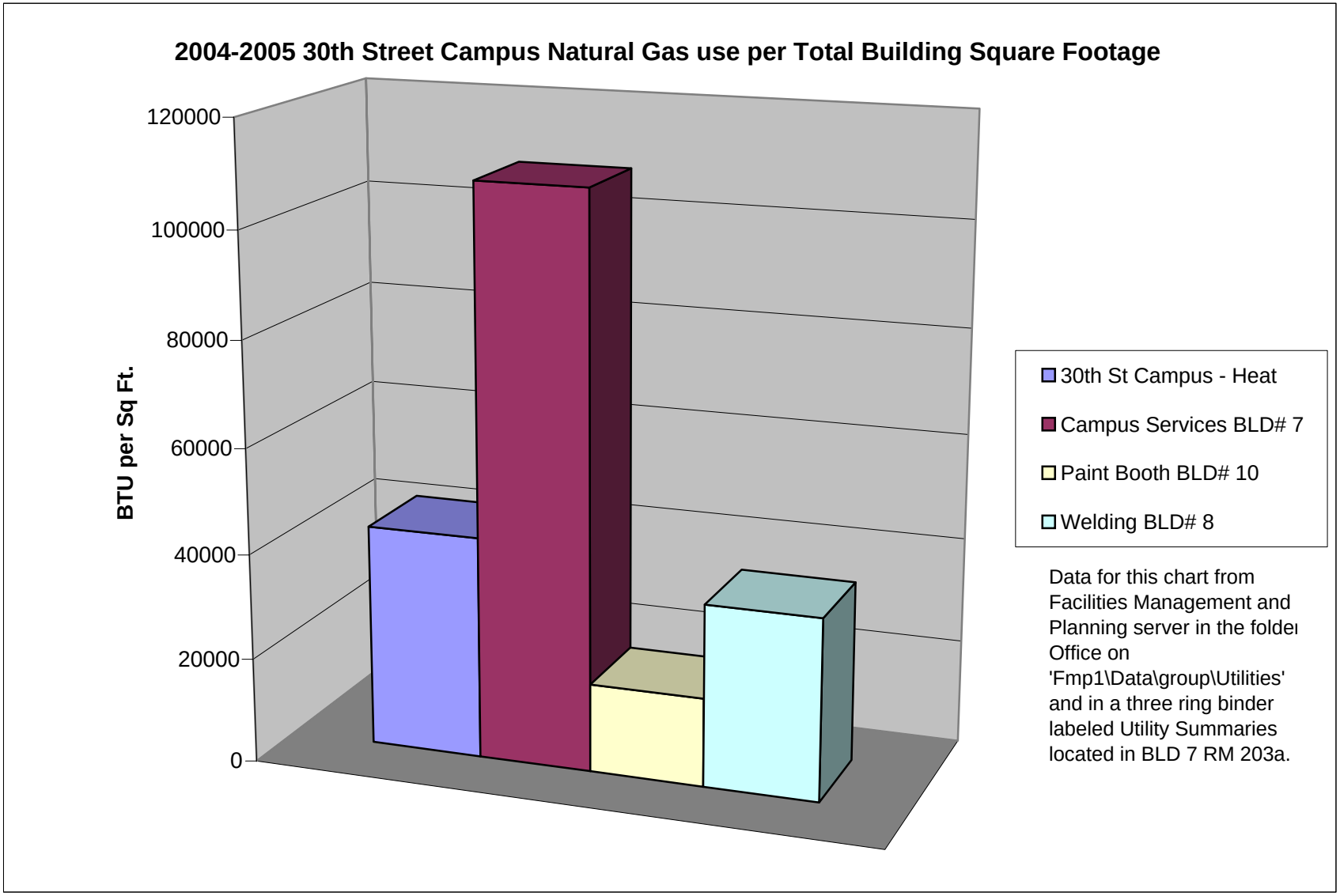
Data for this chart collected from EWEB's Energy Profiler server reading from LCC electrical meters.

2004-2005 LCC Facility Electrical Use (Kwh) per Building Square Foot

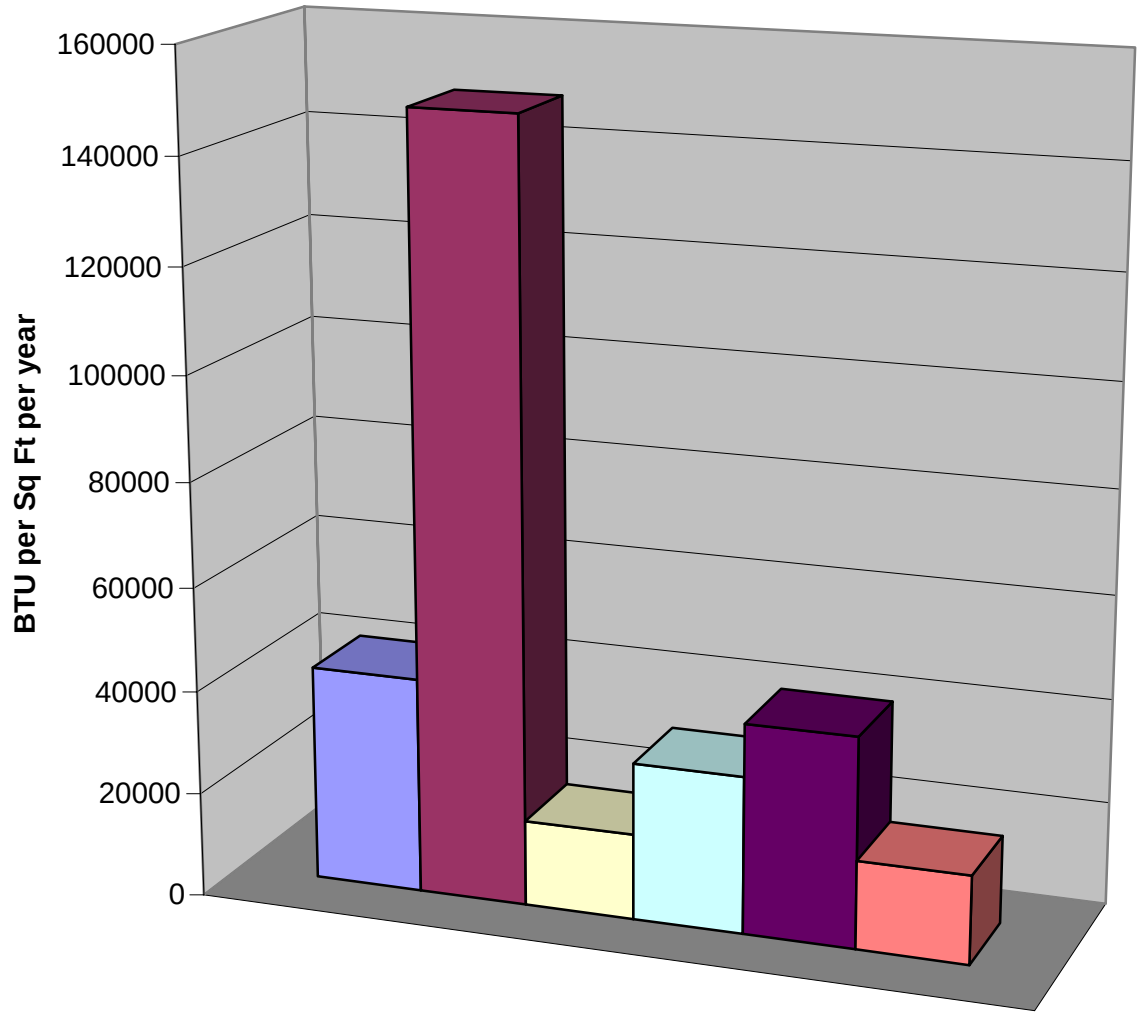




Data for this chart from Facilities Management and Planning server in the folder Office on 'Fmp1\Data\group\Utilities' and in a three ring binder labeled Utility Summaries located in BLD 7 RM 203a.


2004-2005 30th Street Campus Natural Gas use per Total Building Square Footage
BTU per Sq Ft.
120000
100000
80000
60000
40000
20000
0
30th St Campus - Heat
Campus Services BLD# 7
Paint Booth BLD# 10
Welding BLD# 8
Data for this chart from Facilities Management and Planning server in the folder Office on 'Fmp1\Data\group\Utilities' and in a three ring binder labeled Utility Summaries located in BLD 7 RM 203a.

2004-2005 LCC Facility Natural Gas Use per Building Square Footage



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