Energy use, tracking, and feedback

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

Lane Community College Energy Use, Tracking, & Feedback – Year Reported: 2006/2007

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

TABLE OF 2006/2007 ENERGY DATA

DESCRIPTION	DATA
Total energy use for heating, cooling, and electricity in 2006/2007. (Millions of British Thermal Units. Please see the following page for Unit Conversions.)	102,998 MMBTU
Total LCC Building Square footage for 2006/2007	1,121,908 ft²
Total energy use per building square foot per year for 2006/2007 in Btu per square foot.	91,806 Btu/ft² or 0.0914 MMBTU/ft²
Total energy per campus user per year (MMBtu)	9.02 MMBTU
Total energy use per building square foot per year for 2006/2007 in kwh per square foot.	27 kwh/ft²
How many average Lane County residential houses* the college's total energy use for heating, cooling, and electricity in 2006/2007 would have powered.	**Approximately 1920 houses**
Total energy cost for 2006/2007	**$1,273,884**
Total energy cost per building square foot per year	$1.14/ft²
Energy Carbon Dioxide emissions for LCC Facilities	**3,767tons CO2**
Total CO2 emissions per building square foot per year. (Please see 2006/2007 Energy use, tracking, and feedback).	Approximately 6.7 lbs/ft²
Total energy increase for 2006/2007 over the baseline year of 2004/2005. (Please see table below for baseline data.)	1,181 MMBTU or 1%

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

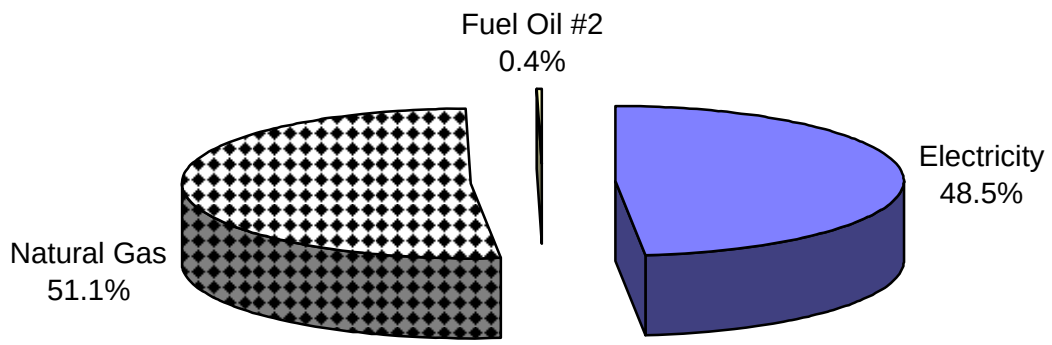
TABLE OF 2004/2005 BASELINE ENERGY DATA

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 energy per campus user per year (MMBtu)	9.38 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.	90,882 Btu/ft² or 0.0909 MMBTU/ft²

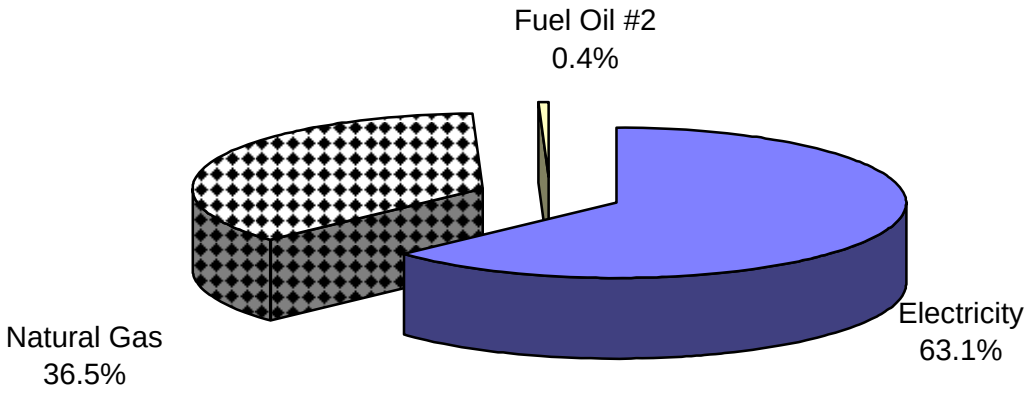
Our goal for 2008/2009 is a 10% reduction over 2006/2007's total energy use at Lane's facilities. Reducing energy use by 10%would result in:

- Total energy use per building square foot for heating, cooling, and electricity that does not exceed 82,626 BTU/ft².
- Saving the energy equivalent to power *192* average residential houses a year in Lane County.
- A *377* ton reduction in CO2 emissions from energy use at the LCC Eugene facilities.

2006/2007 Fuel Use Split



2006/2007 Fuel Cost Split



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 match stick.
- 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: **9.02 MMBTU.** The total energy use for heating, cooling, and electricity per total student and staff FTE for the baseline year of 2004/2005 was: **9.38 MMBTU.**

In comparison to the baseline year of 2004/2005, the total number of total student and staff FTE for 2006/2007 increased by 567 people.

The total energy use for heating, cooling, and electricity (Btu per building square foot) for this indicator year is: **91,806 Btu/ft².** The total energy use for heating, cooling, and electricity (Btu per building square foot) for the baseline year of 2004/2005 was: **90,882 Btu/ft².**

Lane **increased** total energy usage in 2006/2007 over the baseline year of 2004/2005 by 1%, (**924 Btu/ft²**).

Energy Use Index

Source or Action	Description	Value
Utility Data	Electricity (kwh)[1]	14,628,384
Convert to MMBtu	Electricity (MMBtu)	49,912
Utility Data	Natural gas and (therms)[1]	526,801
Convert to MMBtu	Natural gas (MMBtu)	52,680
Utility Data	Diesel No. 2 fuel (gallons)1	2,900
Convert to MMBtu	Diesel No. 2 fuel (MMBtu)	406
Convert to MMBtu	Total energy (MMBtu)	102,998
Convert to Btu	Total energy (Btu)	102,998,146,208
Convert to kwh	Total energy (kwh)	30,187,029.96
LCC Data	FTE students [2]	10,778
LCC Data	FTE budgeted staff [2]	644
LCC Data	Total FTE students + FTE staff[2]	11,422
LCC Data	Building square footage[3]	1,121,908
	Total energy per student FTE per year (MMBtu)	**9.56**
Energy Use Index	**Total energy per campus user per year (MMBtu)**	**9.02**
Energy Use Index	**Total energy use per building square foot per year (MMBtu/ft2)**	**0.0914**
Energy Use Index	**Total energy use per building square foot per year (Btu/ft2)**	**91,806.23**
Energy Use Index	**Total energy use per building square foot per year (kwh/ft2)**	**26.91**

1 Information on the Facilities Management and Planning server in the folder Office on 'Fmp1\Data'(J:)\group\Utilities.

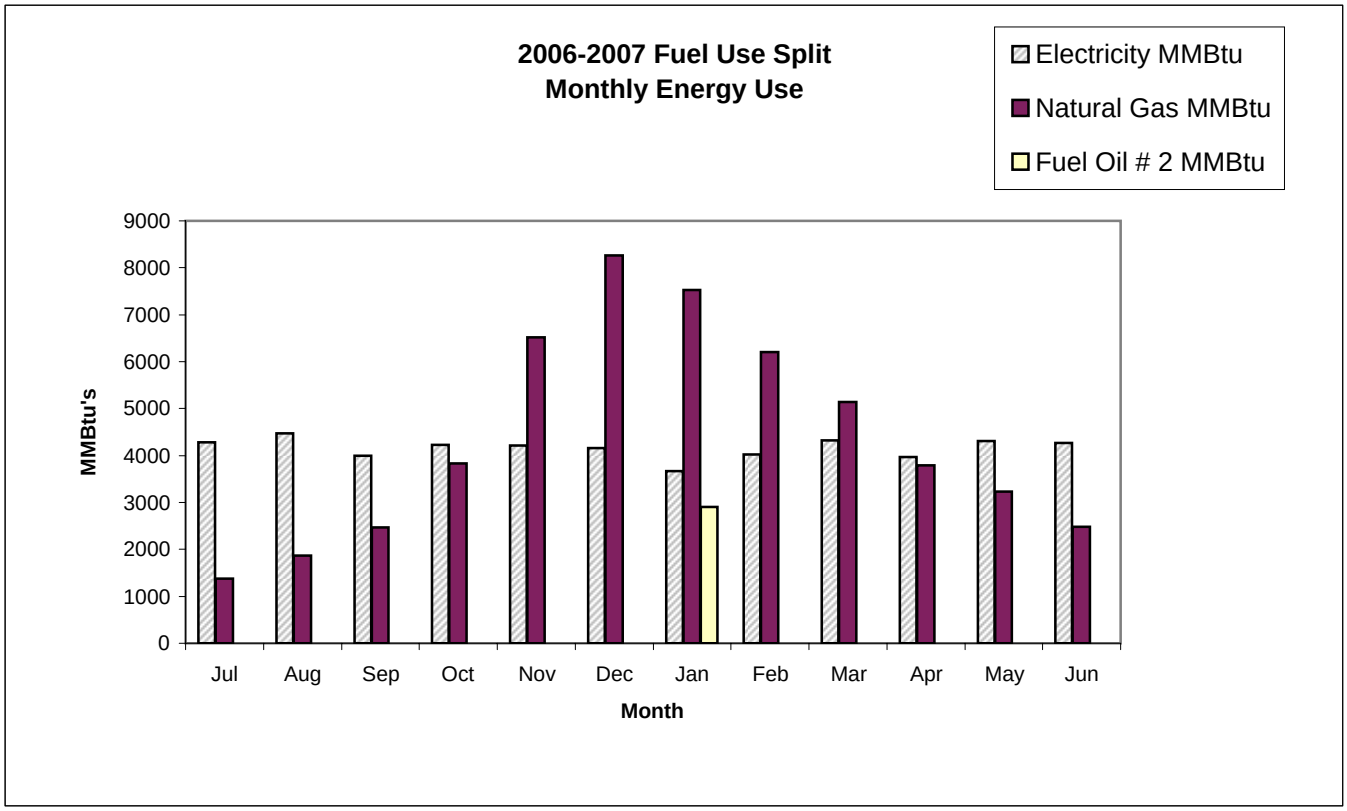
2 Information from Institutional Research, Assessment and Planning, Craig Taylor. Funding FTE used for students. Budgeted FTE used for Staff.

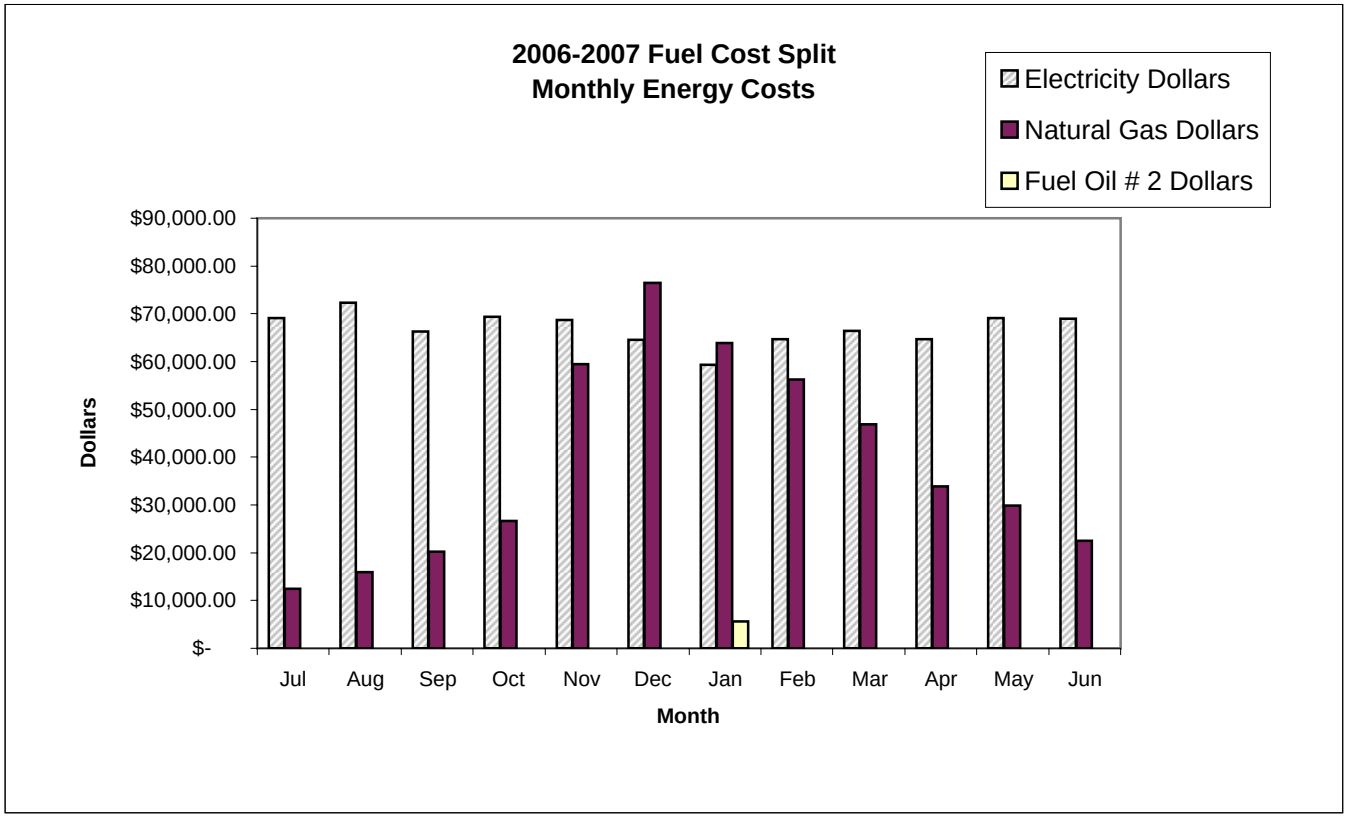
3 See Attachment " Lane Community College Building Square Footage"

(2) Tracking. Provide a description of how Lane tracks energy use and cost data.
Utility personnel read the gas and electric meters once a month.

- 12 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.
- 14 Electrical meters 8 sub-meters on 30th Ave. campus: Lane's Energy Analyst has access to daily usage data for the 8 sub meters on the 30th Ave. campus and monthly data about other campus building electrical usage from the billing information.
- Diesel No. 2 fuel for the 30th Ave. boiler: Lane's Energy Analyst receives an annual summary and copies of invoices from facilities administrative support staff about boiler fuel usage.

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


2006-2007 Fuel Use Split
Monthly Energy Use
Electricity MMBtu
Natural Gas MMBtu
Fuel Oil # 2 MMBtu
MMBtu's
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Month


2006-2007 Fuel Cost Split
Monthly Energy Costs
Electricity Dollars
Natural Gas Dollars
Fuel Oil # 2 Dollars
Dollars
$90,000.00
$80,000.00
$70,000.00
$60,000.00
$50,000.00
$40,000.00
$30,000.00
$20,000.00
$10,000.00
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Jul
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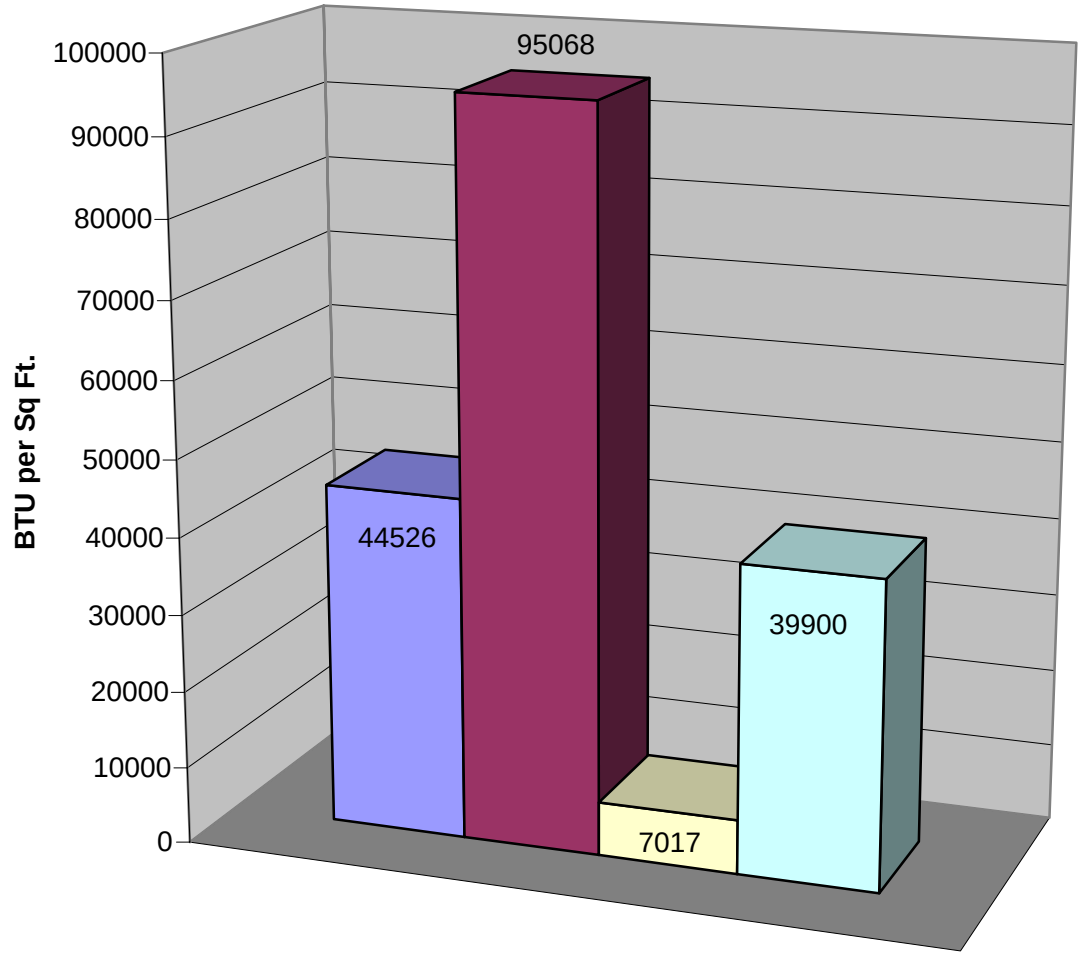
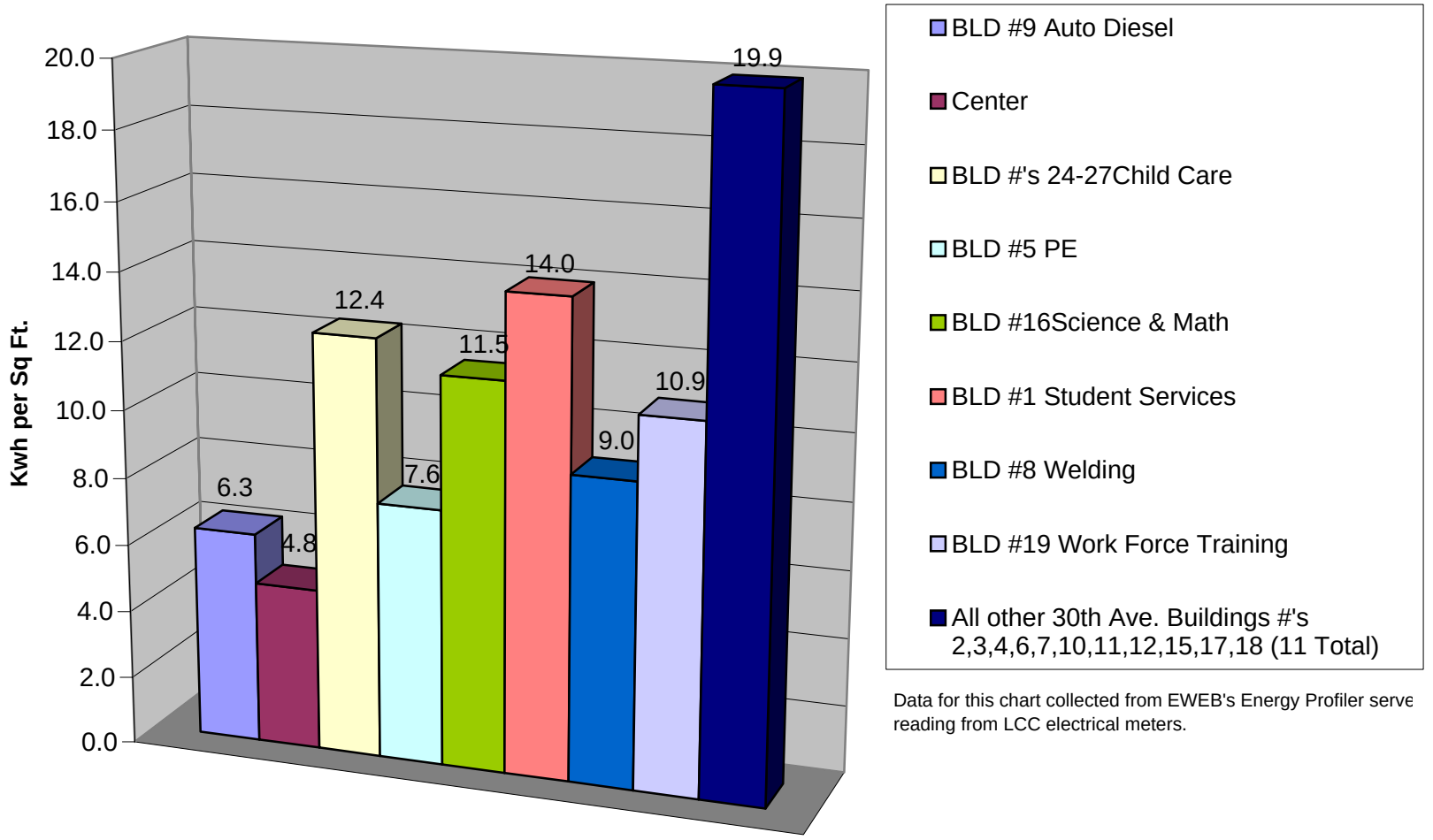
Apr
May
Jun
Month

2006-2007 30th Street Campus Natural Gas Use per Total Building Square Footage



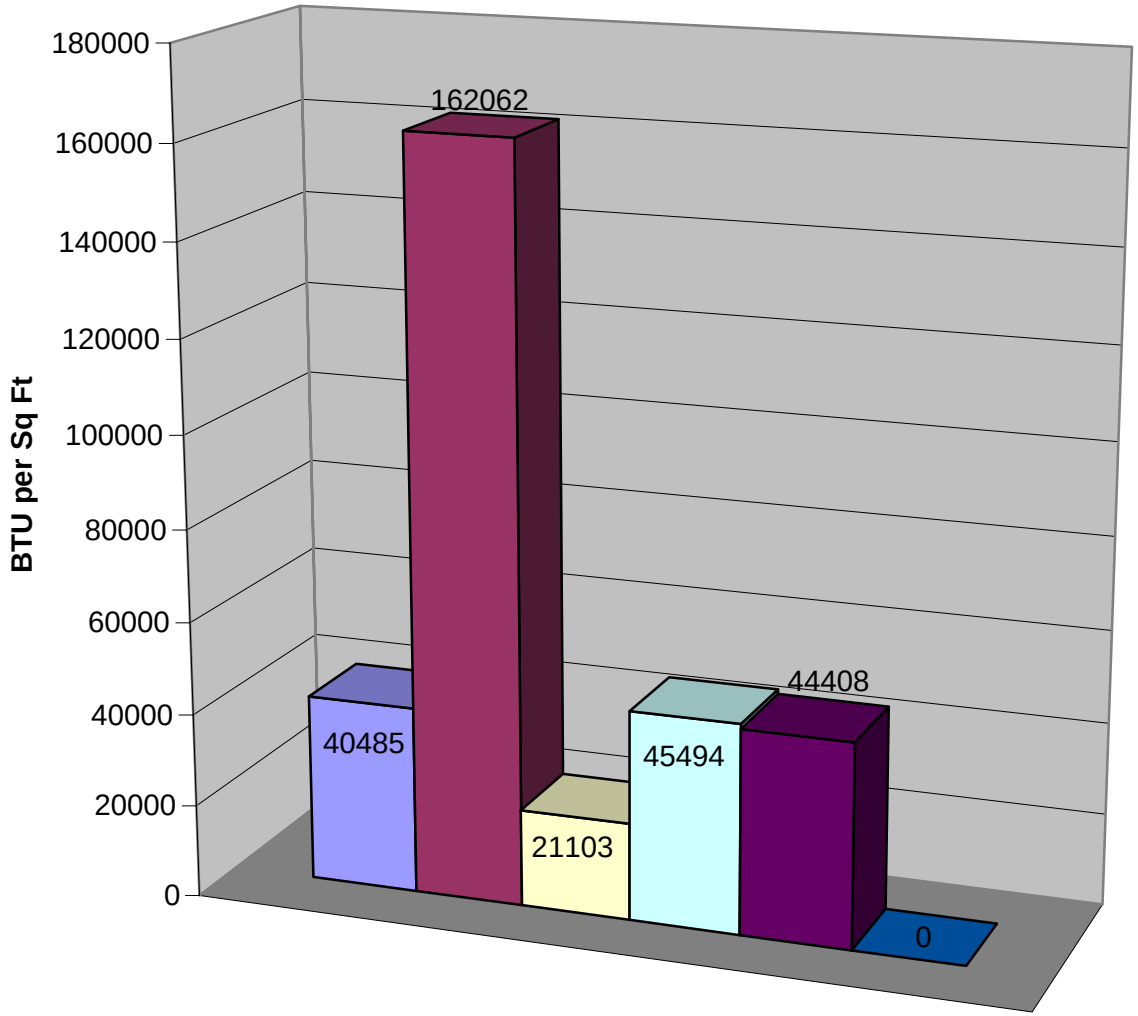
Data for this chart from Facilities Management and Planning server in the folder Office on 'Fmp\group\Energy Analysis\Energy Reports & Data' and in a three ring binder labeled Utility Summaries located in BLD 7 RM 203.

2006-2007 30th Street Campus Electrical Use per Building Square Foot



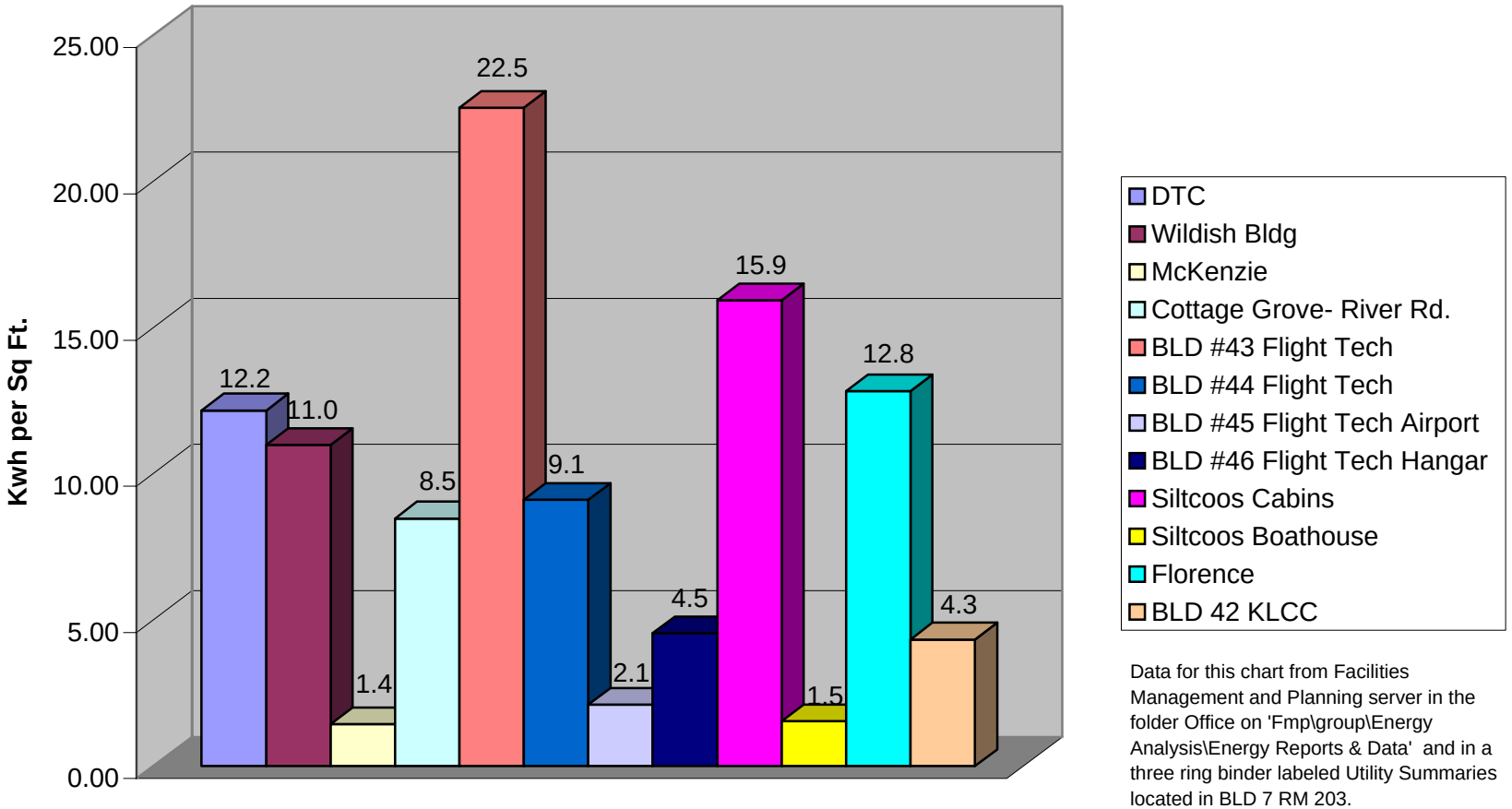
Data for this chart collected from EWEB's Energy Profiler serve reading from LCC electrical meters.

2006-2007 All Other LCC Facilities Natural Gas Use per Building Square Footage



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

2006-2007 All Other LCC Facilities Electrical Use (Kwh) per Building Square Foot



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

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

- The energy analyst gave staff and board level presentations about the college's energy use and greenhouse gas emissions over the last three years.
- The energy analyst was interviewed by the student paper, the Torch, two times about energy efficiency measures and the college's purchase of 10% wind power.
- Energy Watch signs that have information about energy and carbon costs for highly used areas at the 30th Ave. campus were developed. BLD 3/216 the boardroom was the first sign deployed.
- The 2005/2006 Energy Indicator report was published on the sustainability website and sent via e-mail to the college's managers.

What efforts are currently being made to conserve energy by the college?

- The Energy Analyst collaborated with student groups like OSPIRG and the Information Technology staff to help implement a computer power management awareness campaign and energy saving computer settings.
- The Energy Analyst is continuing to refine the process and technology for scheduling HVAC and lighting equipment.
- In spring 2007 The Energy Analyst facilitated work by the faculty, students, and Facilities staff to accomplish the addition of more solar panels to the array that provides a total of over 3 KW of renewable power generation directly to the Science Building 16.
- The staff is continuing to participate in a utility rebate program when purchasing Energy Star equipment like LCD monitors, (to replace CRT computer monitors) and compact fluorescent lamps.
- Other staff is participating in energy performance trials where operation of office equipment is shut off automatically.
- Ground source Heat Pumps are renewable energy resources used to heat and cool the Child Care Buildings, (#'s 24-27), Florence, and Down Town Eugene Centers.
- Continuing the commissioning of our digital HVAC control systems. Following up on mechanical issues identified from the engineering functional testing.
- The college's staff is in the process of following a consultants firm's recommendations to re-commission lighting systems in BLD 1 and 16.

BENCHMARK:

(1) Use: Total energy use for heating, cooling, and electricity that does not exceed 81,794 Btu/ft². *This number represents the goal established in the college's 2004/2005 Energy Indicator Report to reducing energy usage by 10.5%.*

(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.**

Why or why not?

Lane did not meet the goal established in 2004/2005 of 81,794 Btu/ft². **Analysis of the energy utility usage showed an increase in natural gas usage at the 30th Ave. Campus of 8% over the baseline year. This is possibly due to boiler age, deferred maintenance, and controls issues. Natural gas usage at all other college facilities increased by less than one half of one percent (0.3%). The electrical usage for all facilities has *decreased* by 3.5%.**

Lane Community College Energy Use, Tracking, & Feedback – Year Reported: 2006/2007

Recommended strategies for improving performance in this area?

The following strategies are recommended.

Operations and Maintenance

- Implement approved capital project requests to improve 30th Ave. boiler and chiller system controls and campus economizer cycles.
- Continue to schedule HVAC controls based on information from College Instructional Research and the Lane Events Calendar.
- Review buildings for nighttime shutdown taking scheduled evening events into consideration.
- Maximize use of lighting controls by scheduling according to building occupancy.
- Clean duct supply and return grills on a regular basis.
- Clean lighting fixtures on a regular basis.
- Improve security of thermostats so that staff that is not approved to operate thermostats cannot change thermostat settings.
- Increase installation and use of motion sensors for lighting.

Policy

- Develop guidelines for consolidating classes and events so that additional building shut downs may occur.
- Develop lighting and HVAC controls timer reset schedule guidelines to reflect power outages and daylight savings time changes.
- Strengthen Energy Star commitment in the college's Energy policy.

Education

- Utilize the college staff, Sustainability website, and student interest groups to develop an Energy Awareness campaign that will motivate staff and students to conserve energy, water, and other commonly used resources.
- Continue with annual solar equipment installations.
- Develop a program that ensures removal of electric resistance space heaters from campus and replaces them with radiant panel space heaters, if needed.
- Develop a competition between buildings to reduce energy consumption.
- Educate building managers in lighting and 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. A Commissioning Agent was hired October 2006.
- 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.
- Add college buildings to Energy Star Portfolio manager.
- Sub meter all buildings so that the college can have more detailed energy use tracking.

Report created by: Anna E. Scott

Date: 02/08

Greenhouse Gas Emission Inventory

Source or Action	Description	Value
Utility Data	Electricity (kwh) (Includes Electricity from EWEB Only at the Eugene Facilities■)	14,230,620.00
NWPPC[o]	Electricity Line loss correction (kwh)	15,900,134.08
Utility Data	10 % wind power Electricity (kwh) (carbon free)	1,590,013.41
Subtract	Total 'conventional' utility power (kwh)	14,310,120.67
EFS Guidelines[1]	10% of EWEB's power comes from conservation (carbon free) ▲[4]	-
	2% of EWEB's power comes from wind (carbon free) ▲[4]	-
Convert to CO2 using DOE's VRGGP[2] emission coefficient.	72% of EWEB's power comes from hydro electric dams (lbs of CO2)	-
see above	7% of EWEB's power comes from nuclear (lbs of CO2)	-
DOE and NREL.[7]	4% of EWEB's power comes from biomass (lbs of CO2)	-
EIA[3] Annual Energy Use Review	2% of EWEB's power comes from natural gas (lbs of CO2)	384,083.64
see above	3% of EWEB's power comes from coal (lbs of CO2)	921,972.45
Total Electric CO2 Emissions (lbs)		1,306,056.09
Utility Data	Natural gas from all LCC facilities.(See footnote 1 on previous page) (MMBtu)	52680.1
Convert to CO2 using DOE's VRGGP[2] emission coefficient.	Carbon Dioxide, CO2, emissions from natural gas. (lbs)	6,167,786.11
Convert to N2O using EIA[3] figures	Nitrous Oxide, N2O, emissions from natural gas (lbs)	12.27
Convert N2O to CO2 using WRI[5] conversion factor	Nitrous Oxide, N2O, emissions from natural gas converted to Carbon Dioxide, CO2, emissions(lbs)	257.76
Convert to CH4 using EIA[3] figures	Methane, CH4, emissions from natural gas (lbs)	15.12
Convert CH4 to CO2 using WRI[5] conversion factor	Methane, CH4, emissions from natural gas converted to Carbon Dioxide, CO2, emissions(lbs)	4686.95
Total Nat.Gas CO2 Emissions (lbs)		6,172,730.82
Utility Data	B20, 20% Biodiesel 80% Diesel Fuel No. 2, from all LCC facilities.(See footnote 1 on previous page) (gallons)	2,900
Convert to CO2 using DOE's VRGGP[2] emission coefficient. Adjusted by NREL.[6]	Carbon Dioxide, CO2, emissions from B20, 20% Biodiesel 80% Diesel Fuel No. 2. (lbs)	55,176.56
Convert to N2O using EIA[3] figures. Adjusted by NREL.[6]	Nitrous Oxide, N2O, emissions from B20, 20% Biodiesel 80% Diesel Fuel No. 2 (lbs)	0.56
Convert N2O to CO2 using WRI conversion factor	Nitrous Oxide, N2O, emissions from B20 converted to Carbon Dioxide, CO2, emissions(lbs)	11.71
Convert to CH4 using EIA[3] figures. Adjusted by NREL.[6]	Methane, CH4, emissions from B20, 20% Biodiesel 80% Diesel Fuel No. 2. (lbs)	0.58
Convert CH4 to CO2 using WRI conversion factor	Methane, CH4, emissions from B20 converted to Carbon Dioxide, CO2, emissions(lbs)	180.82
Total B20 CO2 emissions (lbs)		55,369.09

Greenhouse Gas Emission Inventory (continued next page)

Greenhouse Gas Emission Inventory (continued)

Source or Action	Description	Value
	Total energy Carbon Dioxide, CO2, emissions (lbs)	**7,534,156.01**
	Total energy Carbon Dioxide, CO2, emissions (tons)	**3,767.08**
LCC Data	FTE students (Actual. See footnote 2 on previous page)	10,778
LCC Data	FTE budgeted staff (See footnote 2 on previous page)	644
	Total FTE students + FTE staff (See footnote 2 on previous page)	11,422
LCC Data	Building square footage(See footnote 3 on previous page)	1,121,908
Carbon Emissions Index	**Total CO2 emissions per student FTE per year (lbs)**	**699.03**
Carbon Emissions Index	**Total CO2 emissions per per FTE students + FTE staff (lbs)**	**659.59**
Carbon Emissions Index	**Total CO2 emissions per building square foot per year (lbs/ft2)**	**6.72**

■ 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, 1997

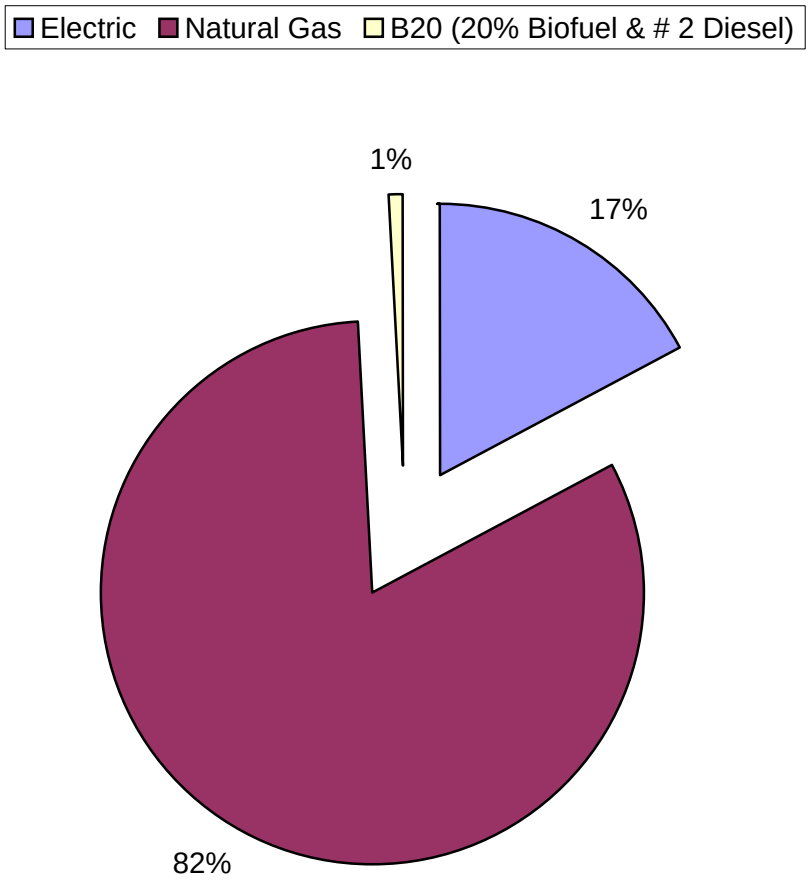
4 EWEB = Eugene Water and Electric Board - Facts and Figures. 2004.

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

6 NREL= Biodiesel-Clean, Green Diesel Fuel.Produced by the National Renewable Energy Laboratory for DOE. DOE/GO-102001-1449. 2005.

7 DOE and NREL= Biomass, Bioenergy, and Carbon Management. By Raymond Costello and Helena Chum. 1998.

2006 - 2007 All Facilities* Emissions in pounds of CO2.



*Includes Electricity from EWEB Only at the Eugene Facilities

FY 07 Building Square Footage

Main Campus

Building #	Building Name	1996	New SqFt by 2002	Change in SqFt	Total SqFt
000	Center	176,664	0		176,664
001	Student Services	0	37,477		37,477
002	Business	21,045	0		21,045
003	Administration	17,907	0		17,907
004	Health Technology	48,482	0		48,482
005	Physical Education	87,992	0		87,992
006	Performing Arts	37,465	10,691		48,156
007	Campus Services	35,481	6,765		42,246
008	Welding Technology	0	20,593		20,593
009	Auto/Diesel Technology	37,529	0		37,529
010	Air Technology	35,014	0		35,014
011	Art/GED	47,636	0		47,636
012	Machine Technology	59,658	0		59,658
013	Electronic Annex	0	6,720		6,720
015	Electronics	18,234	180		18,414
016	Science	31,792	59,863		91,655
017	Forum	24,520	0		24,520
018	Industrial Technology	20,921	0		20,921
019	Work Force Training	38,774	41,114		87,888
020	Apprenticeship Annex*	7,722	-4,290	-1,584	1,848
024	Child Care Center #1	0	2,967		2,967
025	Child Care Center #2	0	3,273		3,273
026	Child Care Center #3	0	6,270		6,270
027	Child Care Center #4	0	4,264		4,264
	Main Campus Sub-Total	**746,836**	**195,887**		**949,139**

* 1/08 audit 6 buidings total in 1996. Three demolished in 2002. 2 sold in FY2006.

Other Main Campus Facilities

Building #	Building Name	1996	New SqFt by 2002	Change in SqFt	Total SqFt
023	FM&P Nursery	0	1500		1500
029	Comminutor Shed	0	660		660
030	Old Day Care Modular	1848	0	-1848	0
031	Old Day Care Modular	1848	0	-1848	0
032	FM&P Storage	0	2240		2240
033	Test Cells	3100	0		3100
034	Cooling Tower	1752	0		1752
035	PA Storage	2890	0		2890
036	PE Storage	1430	0		1430
037	Greenhouse	240	0		240
038	Chemical Storage Facility	297	0		297
n/a	3 Stop Exterior Elevator	0	100		100
n/a	3 Stop Exterior Elevator	0	160		160
n/a	Bus Station	0	1944		1944
	Other Main Campus Facilities Sub-Total	**13405**	**6604**		**16313**

Branch Campuses

Building #	Building Name	1996	New SqFt by 2002	Change in SqFt	Total SqFt
040	Wildish	12,800	150		12,950
041	DTC	56,508	0		56,508
042	KLCC 136 w. 8th Ave.			7,370	7,370
043	Flight Tech Operations	3,680	0		3,680
044	Flight Tech Center	5,049	0		5,049
045	Flight Tech Hanger	3,900	0		3,900
046	Aviation Maintenance Training Fa	23,400	0		23,400
047	AMTF Hangar		0	3,696	3,696
049	Cottage Grove Center (new)	0	18,613		18,613
050	Florence Center	9,299	6,528		15,827
051	Siltcoos Station	2,570	0		2,570
057	McKenzie CLC		2,893		2,893
	Branch Campuses Sub-Total	**117,206**	**28,184**		**156,456**

GRAND TOTAL **1,121,908**