Energy use, tracking, and feedback

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

DESCRIPTION	DATA	
Total energy use for heating, cooling, and electricity in 2005/2006.	85,332 MMBTU	
(Millions of British Thermal Units. Please see the following page for Unit		
Conversions.)		
Total LCC Building Square footage for 2005/2006	1,116,122 ft ²	
Total energy use per building square foot per year for 2005/2006 in Btu per	76,454 Btu/ft ² or	
square foot.	0.0764 MMBTU/ft ²	
Total energy use for heating, cooling, and electricity in 2005/2006.	25,009,240 kwh	
(Measured in kilowatt hours)		
Total energy use per building square foot per year for 2005/2006 in kwh	22.4 kwh/ft ²	
per square foot.		
How many average Lane County residential houses* the	Approximately	
college's total energy use for heating, cooling, and electricity	1591 houses	
in 2005/2006 would have powered.		
Total energy cost for 2005/2006	\$1,458,809	
Total energy cost per building square foot per year	\$1.31/ft ²	
Energy Carbon Dioxide emissions for LCC Facilities	2,707 tons CO2	
Total CO2 emissions per building square foot per year. (Please see	Approximately	
2005/2006 Energy use, tracking, and feedback).	4.9 lbs/ft ²	
Total energy reduction for 2005/2006 over the baseline year of 2004/2005.	16,485 MMBTU or	
(Please see table below for baseline data.)	16%	

TABLE OF 2005/2006 ENERGY DATA

* 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.	101,817 MMBTU
(Millions of British Thermal Units. Please see the following page for Unit	
Conversions.)	
Total LCC Building Square footage for 2004/2005	1,120,326 ft ²
Total energy use per building square foot per year for 2004/2005.	90,882 Btu/ft ² or
	0.0909 MMBTU/ft ²

In 2005/2006 we exceeded our goal for 2006/2007, (a 10% reduction over 2004/2005's total energy use at LCC facilities), by 6 % for a total energy reduction of 16%.

Our goal for 2007/2008 is a 10 % reduction over 2005/2006'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 68,551 BTU/ft².
- Saving the energy equivalent to power 159 average residential houses a year in Lane County.*
- A 270 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.

INTENT:

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

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: **7.46 MMBTU.**

In comparison to the baseline year of 2004/2005, the total number of total student and staff FTE for 2005/2006 increased by 578 people.

The total energy use for heating, cooling, and electricity (Btu per building square foot) for this indicator year is: **76,454 Btu/ft²**.

Lane **reduced** total energy usage in 2005/2006 over the baseline year of 2004/2005 by 16%, (**16,485 Btu/ft²**).

(2) **Tracking.** Provide a description of \underline{how} Lane tracks energy use and cost data.

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

- <u>12 Natural Gas meters:</u> 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.
- <u>14 Electrical meters 8 sub-meters on 30th Ave. campus</u>: 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.
- <u>Diesel No. 2 fuel for the 30th Ave. boiler:</u> 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.

Please refer to the Supplementary Material for graphs and charts of this years Energy usage.

- (3) Feedback. Provide a description of how Lane provides feedback to campus users about energy use.
 - The energy analyst was interviewed by the student paper, the Torch, three times about energy costs and the college's purchase of 10% wind power. The EWEB "Fresh Air Journal" spring 2006 issue featured Lane Community College as it largest wind power customer to date.
 - 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 2004/2005 Energy Indicator report was published on the sustainability website and sent via e-mail to the college's managers.
 - The energy analyst gave staff presentations about energy savings rebate programs offered by the local utility company that their departments could take advantage of when buying energy efficient office equipment.

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

- The Energy Analyst is continuing to refine the process and technology for scheduling HVAC and lighting equipment.
- In spring 2006 a solar electric array was connected to provide renewable power generation directly to the Science Building 16. The Energy Analyst is facilitating work by the faculty, students, and Facilities staff to accomplish the addition of more solar panels to the array for spring 2007.
- 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.
- The college's staff is in the process of following a consultants firm's recommendations to recommission lighting systems in BLD 1 and 16

BENCHMARK:

- (1) Use: Total energy use for heating, cooling, and electricity that does not exceed 79,300 Btu/ft². This number represents the best practices from a wide variety of colleges and universities and 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? Yes.

Why or why not?

Lane exceeded the benchmark achievement of 79,300 Btu/ft² by 2,846 Btu/ft². We achieved a 16% reduction in total energy use in 2005/06 primarily through efforts to schedule building lighting and heating, ventilation and air conditioning (HVAC) equipment to run when people are occupying the spaces.

Continued on the next page.

Recommended strategies for improving performance in this area?

The following strategies are recommended.

Operations and Maintenance

- 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.
- Sub meter all buildings so that the college can have more detailed energy use tracking.
- 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.
- Turn off hot water circulation system at night.

Policy

- Develop guidelines for consolidating classes and events so that additional building shut downs may occur.
- Develop policy that directs staff to use energy efficiently while not sacrificing productivity.
- Develop lighting and HVAC controls timer reset schedule guidelines to reflect power outages and daylight savings time changes.
- Finalize the draft and adopt a solar energy Master Plan.

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.
- 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.

Report created by: Anna E. Scott

Date: 11/06

Energy Use Index

Source or Action	Description	Value
Utility Data	Electricity (kwh) ¹	15,005,008
Convert to MMBtu	Electricity (MMBtu)	51,197
Utility Data	Natural gas and diesel No. 2 fuel(therms) ¹	341,344
Convert to MMBtu	Natural gas and diesel No. 2 fuel(MMBtu)	34,134
Convert to MMBtu	Total energy (MMBtu)	85,332
Convert to Btu	Total energy (Btu)	85,331,527,296
Convert to kwh	Total energy (kwh)	25,009,240.12
LCC Data	FTE students ²	10,738
LCC Data	FTE budgeted staff ²	695
LCC Data	Total FTE students + FTE staff ²	11,433
LCC Data	Building square footage ³	1,116,122
	Total energy per student FTE per year (MMBtu)	7.95
Energy Use Index	Total energy per campus user per year (MMBtu)	7.46
Energy Use Index	Total energy use per building square foot per year (MMBtu/ft2)	0.0765
Energy Use Index	Total energy use per building square foot per year (Btu/ft2)	76,453.58
Energy Use Index	Total energy use per building square foot per year (kwh/ft2)	22.41

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"

Source or Action	Description	Value
	Electricity (kwh) (Includes Electricity from EWEB Only at the Eugene	14.40
l Itility Data	Facilities	14 553 444 00
NWPPC ^o	Electricity Line loss correction (kwh)	16.260.831.28
Utility Data	10 % wind power Electricity (kwh) (carbon free)	1,626,083.13
Subtract	Total 'conventional' utility power (kwh)	14,634,748.16
FFS Guidelines ¹	12% of FWEB's power comes from conservation (carbon free) \blacktriangle^4	
	3% of EWEB's power comes from wind (carbon free) \blacktriangle^4	_
Convert to CO2 using		
DOF's VRGGP ² emission		
coefficient.	71% of FWEB's power comes from hydro electric dams (lbs of CO2)	_
	7% of FWEB's power comes from nuclear (lbs of CO2)	_
FIA ³ Annual Energy Use		
Review	7% of FWFB's power comes from natural gas (lbs of CO2)	1 374,788,24
		1,011,100.2
	Natural gas from all LCC facilities. (See footnote 1 on previous page)	
Utility Data	(MMBtu)	32.080
Convert to CO2 using		,
DOF's VRGGP ² emission		
	Carbon Dioxide, CO2, emissions from natural gas. (lbs)	3.755.870.20
Convert to N2O using EIA ³		0,100,010
figures	Nitrous Oxide N2O, emissions from natural gas (lbs)	7.47
190.00		
Convert N2O to CO2 using	Nitrous Oxide N2O emissions from natural das converted to Carbon	
WRI ⁵ conversion factor	Diovide CO2 emissions (lbs)	156.97
Convert to CH4 using EIA ³		
figures	Methane CH4 emissions from natural gas (lbs)	9.21
ilguico		
Convert CH4 to CO2 using	Mothane CH4 emissions from natural das converted to Carbon	
M/DI ⁵ conversion factor	Diavida CO2 emissions (lbs)	2854 11
Total Nat Gas CO2		2007.11
Emissions (lhs)		3 758 881 28
	<u> </u>	0,100,001.20
	R20 20% Biodiesel 80% Diesel Fuel No. 2 from all LCC facilities.(See	
Litility Data	Ifootnote 1 on previous page) (gallons)	14.678
Convert to CO2 using		••••
DOF's VRGGP ² emission		
coefficient. Adjusted by	Carbon Dioxide, CO2, emissions from B20, 20% Biodiesel 80% Diesel	
NRFI ⁶	Fuel No. 2 (lbs)	279,269,50
Convert to N2O using EIA ³		— , —
figures. Adjusted by	Nitrous Oxide, N2O, emissions from B20, 20% Biodiesel 80% Diesel	
NREL. ⁶	Fuel No. 2 (lbs)	2.82
Convert N2O to CO2 using	Nitrous Oxide. N2O. emissions from B20 converted to Carbon Dioxide,	
WRI conversion factor	CO2. emissions(lbs)	59.27
Convert to CH4 using EIA ³		
figures. Adjusted by	Methane, CH4, emissions from B20, 20% Biodiesel 80% Diesel Fuel	
NREL ⁶	No 2 (lbs)	2.95
		2.00
Convert CH4 to CO2 using	Methane CH4 emissions from B20 converted to Carbon Dioxide, CO2	
WRI conversion factor	emissions(lbs)	915.22
Total B20 CO2 emissions		0.0.22
(lbs)		280.243.99
(

Greenhouse Gas Emission Inventory

Greenhouse Gas Emission Inventory (continued next page)

Source or Action	Description	Value
	Total energy Carbon Dioxide, CO2, emissions (lbs)	5,413,913.51
	Total energy Carbon Dioxide, CO2, emissions (tons)	2,706.96
LCC Data	FTE students (Actual. See footnote 2 on previous page)	10,738
LCC Data	FTE budgeted staff (See footnote 2 on previous page)	695
	Total FTE students + FTE staff (See footnote 2 on previous page)	11,433
LCC Data	Building square footage(See footnote 3 on previous page)	1,116,122
Carbon Emissions		
Index	Total CO2 emissions per student FTE per year (lbs)	504.18
Carbon Emissions	Total CO2 emissions per per FTE students + FTE staff	
Index	(lbs)	473.55
Carbon Emissions	Total CO2 emissions per building square foot per year	
Index	(lbs/ft2)	4.85

Greenhouse Gas Emission Inventory (continued)

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

° 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

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















