greenhouse gas inventory

2000 – 2007

The University of Montana

American College & University Presidents Climate Commitment

- Universities must act as leaders in the fight against climate change
- Universities function as "living laboratories"
- Universities should be models to other institutions in the US in the world

greenhouse gas inventory

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Commitment Guidelines

•Complete an emissions inventory

•Within two years, set a target date and interim milestones for becoming climate neutral.

•Take immediate steps to reduce greenhouse gas emissions by choosing from a list of short-term actions.

•Integrate sustainability into the curriculum and making it part of the educational experience.

•Make the action plan, inventory and progress reports publicly available.

"It provides the accounting framework for nearly every GHG standard and program in the world - from the International Standards Organization to The Climate Registry - as well as hundreds of GHG inventories prepared by individual companies."

CLEAN AIR COOL PLANET

- The most widely used emissions calculator designed for colleges and universities
- Calculations based on the workbooks provided by the IPCC for national-level inventories

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Gas	Formula	Global Warming Potential over 100 yrs	Current Atmospheric Concentration
Carbon Dioxide	(CO2)	1	379 ppm
Methane	(CH4)	25	1774 ppb
Nitrous oxide	(N2O)	298	319 ppb
Hydrofluorocarbons	(HFCs)	14,800	17.5 ppt
Perfluorocarbons	(PFCs)	12,200	3 ppt
Sulphur hexafluoride	(SF6)	22,800	4.2 ppt

Measured in Metric Tons of Carbon Dioxide Equivalents:
MTeCO2

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inventory findings

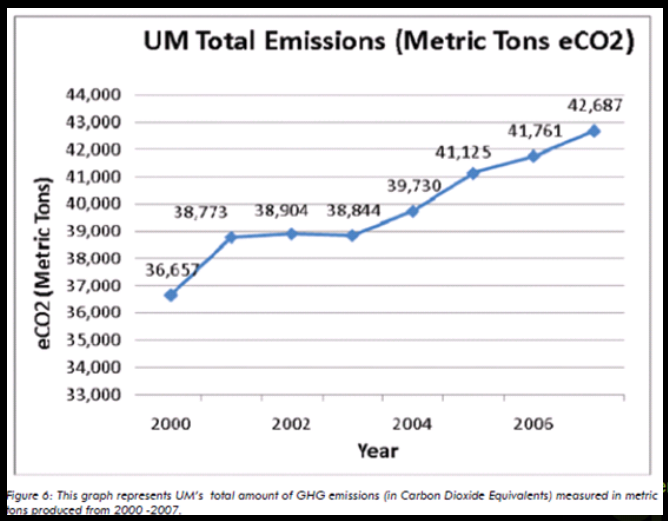

Figure 6: This graph represents UM's total amount of GHG emissions (in Carbon Dioxide Equivalents) measured in metric tons produced from 2000 -2007.

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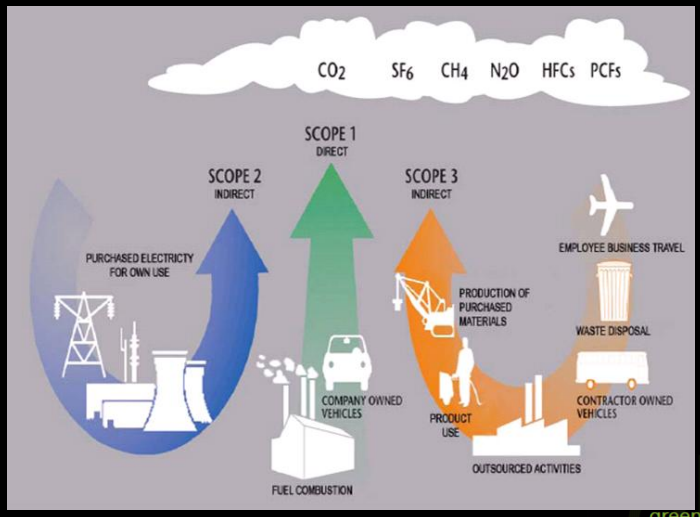
emissions by scope



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Fiscal Year	Emissions By Scope: SCOPE 1 Emissions	SCOPE 2 Emissions	SCOPE 3 Emissions	Net: Net Emissions ($MT\ eCO_2$)
2000	13,515	11,033	12,109	36,657
2001	15,340	10,959	12,475	38,773
2002	14,914	11,278	12,712	38,904
2003	14,768	11,416	12,660	38,844
2004	15,099	12,303	12,328	39,730
2005	15,993	12,385	12,747	41,125
2006	16,293	12,928	12,540	41,761
2007	16,664	13,130	12,893	42,687

Table 3: This chart shows the total breakdown of emissions, measured in MTeCO2, by scope. It also shows the annual Net Emissions produced by The University of Montana.

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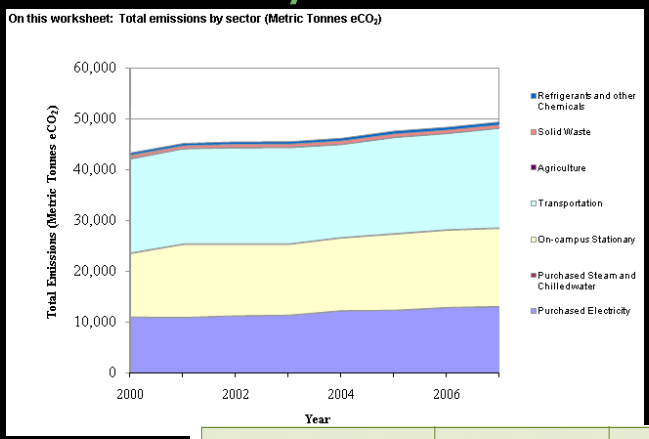
emissions by source



Source	2000 MTeCO2	2007 MTeCO2	% Change
On Campus Steam Heat	12,532	15,394	22.8%
Purchased Electricity	11,032	13,129	19.0%
Transportation	12,424	13,487	8.6%
Agriculture	205	101	-50.6%
Solid Waste	462	573	24.2%

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on-campus stationary sources

Fiscal Year	On-campus Stationary			
	Total	Non Co-Gen	Co-Gen Electric	Co-Gen Steam
2000	12,532	46	726	11,760
2001	14,391	64	927	13,400
2002	14,073	98	801	13,174
2003	13,950	117	823	13,011
2004	14,317	223	767	13,327
2005	15,003	184	918	13,901
2006	15,229	182	968	14,079
2007	15,394	177	980	14,237

ghg greenhouse gas inventory
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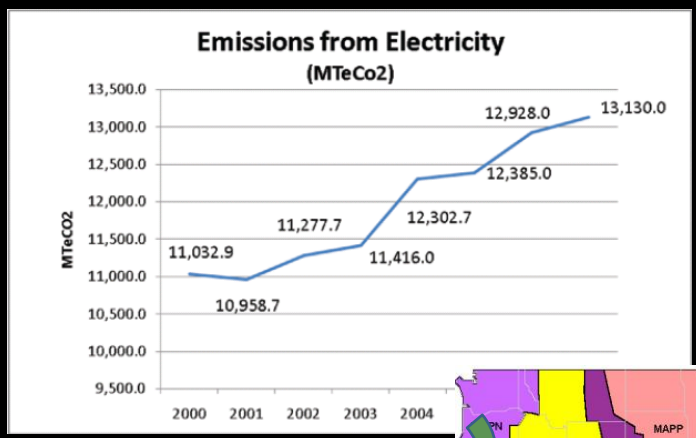
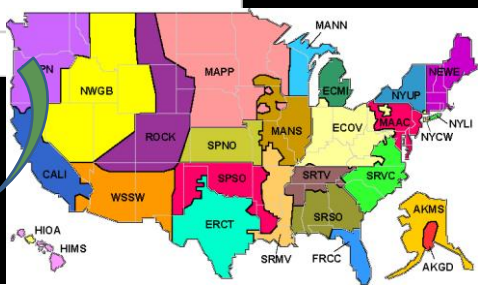
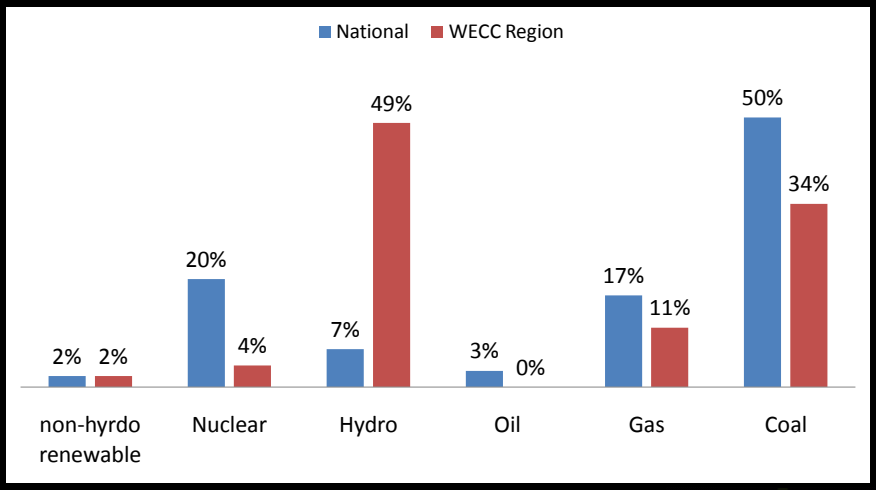
emissions from electricity





UM's Electric Region:
WECC Pacific Northwest



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top ten energy users

Building	Kwh Steam	Electric Kwh	Combined gas & elec Kwh	MTeCO2/yr
Library	5,519,717.6	2,573,280.0	8,092,997.6	2,705.2
Lommasson Center	3,432,266.6	2,033,313.0	5,465,579.6	1,827.0
Field House	3,095,105.1	2,356,410.6	5,451,515.7	1,822.3
University Center	2,574,941.0	2,860,640.0	5,435,581.0	1,816.9
Skaggs	3,057,414.7	1,731,107.3	4,788,522.0	1,600.6
Chemistry	2,975,421.5	1,371,880.0	4,347,301.5	1,453.2
Science Complex	1,959,080.2	2,045,400.0	4,004,480.2	1,338.6
Recreation Annex	2,145,416.3	1,067,224.0	3,212,640.3	1,073.9
Jesse	2,465,495.2	614,240.0	3,079,735.2	1,029.5
Miller	2,051,653.1	644,320.0	2,695,973.1	901.2

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- Investigate alternatives to natural gas for the co-gen system
- Improve record keeping at remote facilities
- Continue steam tunnel renovations and improvements to increase efficiency and heat transfer
- Expand groundwater cooling system to all facilities.
- Begin campus-wide HVAC upgrades and individual temperature control monitors
- Improve insulation and roofing

- Conduct professional energy audits on buildings to target energy savings
- Investigate investing in alternative forms of electricity generation: wind, solar
- Inventory individual appliances on campus
- Educational campaigns

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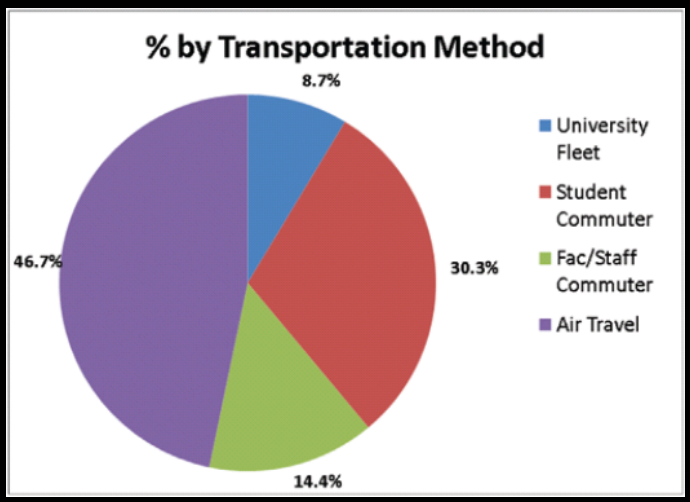
transportation



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biodiesel

Gallons of Diese	MTeCO2
46.3	0.5
600.2	6.1
2,198.9	22.2
2,923.8	29.5
3,723.9	37.5
7,926.5	79.9
27,461.8	276.9
13,606.9	137.2

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air travel

2005 Calculated Total Dollars	$2,043,447.38
Total $ / $.25/mile	8,173,789.54 miles
2006 Total Dollars	$1,949,921.94
Total $ / $.25/mile	7,799,687.76 miles
2007 Calculated Total Dollars	$2,001,911.55
Total $/ $.25/mile	8,007,646.19 miles

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- Continue to promote alternative forms of transportation
- Increase bus fleet for convenience
- Improve pedestrian and bike access on campus and in Missoula
- Improve coding system for travel in order for it to be kept accurately

- Improve tracking system for air travel
- Include information from the Athletic Department
- Investigate purchasing carbon offsets for air travel
- Promote alternatives to air travel such as video web conferencing

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solid waste

Building:	Years counted:	yards emptied per week:	Average fullness of dumpster	tons/yard conversion factor	Weight per week (tons):	Weeks per year:	Weight per year (tons):
Adams Center	18	30.00	0.75	0.055	1.24	47.60	58.91
Law Bldg (north side)	18	9.00	0.75	0.055	0.37	47.60	17.67
Journalism (east side)	18	18.00	0.75	0.055	0.74	47.60	35.34
Science Complex (south side)	18	18.00	0.75	0.055	0.74	47.60	35.34
Social Science (west side)	18	9.00	0.75	0.055	0.37	47.60	17.67
Fine Arts	18	4.50	0.75	0.055	0.19	47.60	8.84

1.3% of total emissions
2007= 574 MTeCO2

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recycling

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agriculture

Fiscal Year	Includes all agricultur			
	Fertilizer Application			
	Synthetic	% Nitrogen	Organic	% Nitrogen
	Pounds	%	Pounds	%
1999				
2000	51,271	100%		
2001	21,124	100%		
2002	39,751	100%		
2003	38,798	100%		
2004	37,195	100%		
2005	32,169	100%		
2006	26,827	100%		
2007	25,335	100%		
2008				
2009				
2010				
2011				

SHEET 1

MTeCO2

Fiscal Year	Agriculture
1996	-
1997	-
1998	-
1999	-
2000	206
2001	85
2002	159
2003	156
2004	149
2005	129
2006	108
2007	102

SHEET 2

.2% of total GHG Inventory
=102 MTeCO2 in 2007

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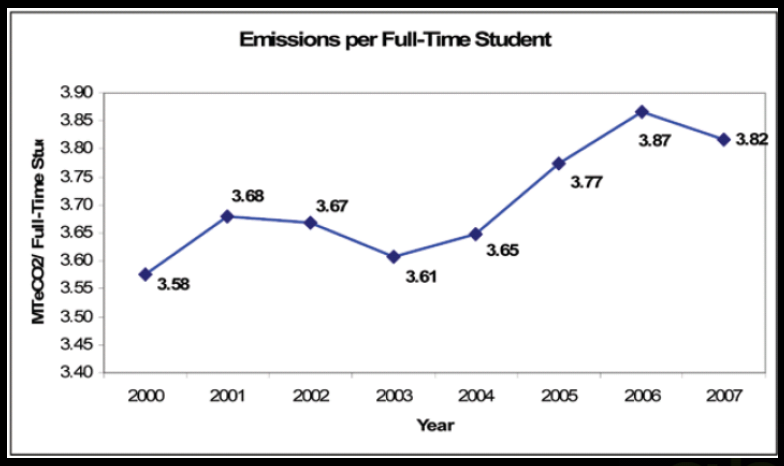
emissions per student



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now what?

We need to decrease our energy demands on campus and seek solutions to our sources of energy:

- Conservation
- efficiency upgrades
- behavioral changes
- Renewable energy

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calculate your own footprint

http://www.ecofoot.org/

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ASUM sustainability center

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