

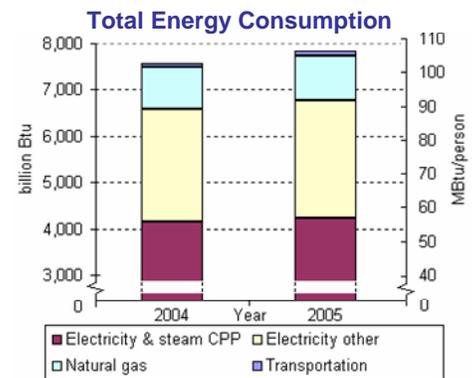


University of Michigan 2005 Environmental Performance

As a world-class academic institution with more than 34,300 faculty & staff and 39,500 students,¹ the University of Michigan consumes significant amounts of natural resources. Having a long history of leadership and innovation in environmental issues, the UM Environmental Task Force, led by President Mary Sue Coleman, found it essential to identify measures to track and report the environmental performance of the University of Michigan – Ann Arbor campus (UM-AA) over time in order to provide a foundation for a more sustainable future. The Environmental Data Repository (EDR) was developed in 2005 by the co-operative efforts of students and staff from the Center for Sustainable Systems and various operations departments. The EDR is a centralized database that computes environmental data and reports them in terms of 8 key performance indicators and over 50 operational metrics, in the categories of energy, emissions, water, land use, waste, and cross-cutting & emerging issues.² Some of the metrics are highlighted below.

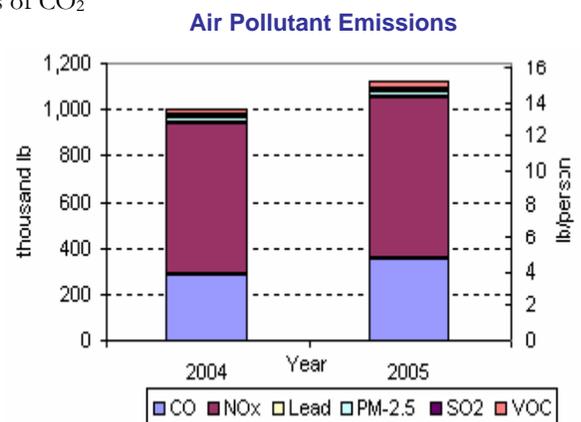
Energy

- In 2005, UM consumed over 7.8 trillion Btu of total energy³ for electricity, natural gas, and vehicle fuels. This is equivalent to more than 18 barrels of oil per person or enough to power 42,000 Midwest households. While there was a 3% increase in energy consumption due in part to the opening of new buildings such as the Life Sciences Institute, the UM-AA population grew by only 1.6%.
- 538 UM buildings consumed 99% of the total energy, corresponding to 278,216 Btu/sq ft in 2005—up from 270,768 Btu/sq ft in 2004. At the same time, conditioned building spaces increased from 45% to 62% (12.5 to 17 million sq ft). Transportation consumed the remaining 1%. The cost for energy-related utilities in 2005 was \$76,109,014.
- Renewable energy sources supplied 0.3% of total energy consumption in 2004 and 2005, including the electricity generated by wind and solar energy for the Dana Building,⁴ and the use of bio-diesel and E85 ethanol fuel by the University's fleet.
- Ridership of M-bus increased 10%, providing over 5.19 million passenger-trips. Launched in fall 2004, the M-Ride program attracted over 1.6 million UM passenger-trips on Ann Arbor Transportation Authority (AATA) buses in 2005.
- The Energy Star Buildings Program has saved more than 25 million kWh of electricity per year. (More information in *UM Energy factsheet*)⁵
- The electricity and heat generation of the Central Power Plant is approximately twice as fuel efficient as most private utility plants. As a result, CPP uses 18% less fuel than comparable on-site thermal generation and purchased electricity.⁶



Emissions

- UM operations contributed greenhouse gas (GHG) emissions of 489,000 tonnes of CO₂ equivalents (CO₂Eq), or 6.62 tonnes CO₂Eq per person, in 2005, a 3% increase compared with 2004.
- 1% of GHG emissions resulted from fuel combustion by the University's fleet. The use of bio-diesel and ethanol fuels by the University's fleet avoids GHG emissions of 1,100 tonnes CO₂Eq per year. (More information in *UM Emissions fact sheet*)⁷
- In 2005, 355,000 lb of CO, 700,000 lb of NO_x, 3 lb of lead, 28,000 lb of PM_{2.5}, 3,100 lb of SO₂ and 35,000 lb of VOC were emitted from stationary sources (e.g., Central Power Plant). SO₂ emissions were reduced by half, while emissions of other pollutants increased by 0-20%.



¹ FY2005 data obtained from Office of Budget and Planning (http://sitemaker.umich.edu/obpinfo/facts___figures)

² More info about the development of EDR project can be viewed at http://css.snre.umich.edu/css_doc/CSS05-11.pdf

³ Total energy includes site use, plus losses for electricity grid transmission and distribution.

⁴ 33kW photovoltaic panels are installed on the rooftop of Dana Building. Also, U of M has contracted with Renewable Choice Energy to provide wind energy for Dana Building (http://www.umich.edu/~urecord/0405/Jan10_05/21.shtml)

⁵ Chan, W.C., B. Willcox and G.A. Keoleian. "CSS Factsheets, University of Michigan Energy Consumption and Conservation." University of Michigan: Ann Arbor (2006): 1-2.

⁶ Brown, D. 2003. "U-M to receive EPA award at EnergyFest 2003." The University Record Online, September 19, 2003

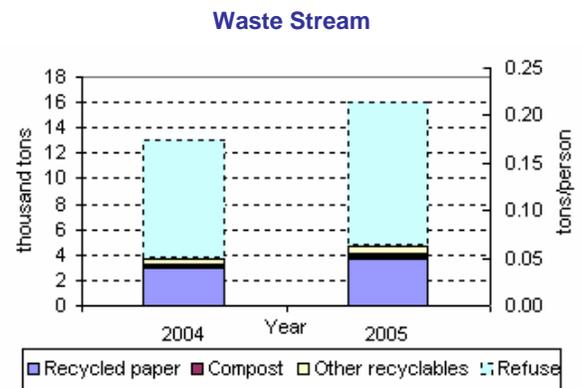
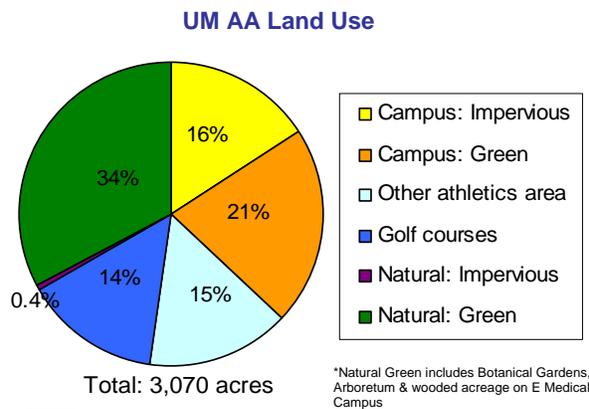
⁷ Chan, W.C., B. Willcox and G.A. Keoleian. "CSS Factsheets, University of Michigan Air and Water Pollutants Emissions." University of Michigan: Ann Arbor (2006): 1-2.

Water

- Water consumption increased 6% to 1.3 billion gallons in 2005, or enough to fill 2000 Olympic-size swimming pools. 97% of water was supplied by municipal utilities and the rest was drawn from groundwater.
- 153 million gallons (or 12%) of water was used to irrigate 540 acres of lawn and 155 acres of golf course turf. Per acre, irrigation water consumption decreased 12%.

Land Use

- As of 2005, the size of UM-AA campus was 3,070 acres.
 - 42% of the 1,200-acre UM-AA campus area (excluding athletic campus and natural preserves) consists of impervious surfaces.
 - More than 27.8 million square feet of building space are situated on 6.5 million sq. feet of land.
 - UM owns and manages over 1,000 acres of natural preserves in Ann Arbor, including Nichols Arboretum, Matthaei Botanical Gardens, Horner's Wood, and Mud Lake Bog. UM possesses another 15,000 acres of natural areas outside Ann Arbor.



Waste



- UM generated 16,000 tons (0.22 tons/person) of waste in 2005, up from 13,000 tons (0.18 tons/person) in 2004.
- Around 29% of waste was recycled and diverted away from the landfill in the past two years.
- UM recycled 4,600 tons of waste in 2005: 3,700 tons of paper, 220 tons of compost, 197 tons of regulated recycling items,⁸ 150 tons of construction in-house waste, and 107 tons of glass containers.

Cross-Cutting and Emerging Issues

- According to the Graham Environmental Sustainability Institute, UM offers 10 undergraduate, 11 masters, 15 doctoral degrees, and 421 courses with a sustainability focus.
- The Dana Building was LEED[®]-certified at the gold rating by the U.S. Green Building Council in 2005.

What you CAN DO to help...

- Commute to UM by public transit. The AATA and UM bus fleet run on bio-diesel and ultra-low sulfur diesel, and rides anywhere in Ann Arbor and Ypsilanti are free.
- Ride a bike. Make use of one of the 3,410 spaces on bike racks which are located throughout the Ann Arbor campus.
- If you live outside Ann Arbor, join the vanpool service to commute to work. In 2005, it served more than 300 UM faculty & staff living in 28 communities and logged over 5.7 million passenger-miles of travel.⁹
- Every ton of virgin-fiber paper consumes 12-24 trees.¹⁰ Buy paper with recycled content and use both sides. Put the waste paper in the appropriate recycling bins.
- Enroll in one of 421 sustainability-related courses at UM: http://provost.umich.edu/gesi/academics/course_listing.php.
- Sell or donate your unwanted items instead of throwing them away when moving. UM provides a free online classified ad service (<http://marketplace.umich.edu>) and has boxes for donating items in the dorms at the end of the winter semester.¹¹

The latest information about UM environmental stewardship programs is available via CSS-published UM Environmental Performance factsheet series (http://css.snrc.umich.edu/makeframe.php?content=4_2_Factsheets) and the following websites:

- Utilities and Plant Engineering (http://www.recycle.umich.edu/utilities/energy_management/conservation_guide.html)
- Waste Management Services (<http://www.recycle.umich.edu>)
- UM Health Service (<http://www.med.umich.edu/envsteward/>)
- Communications (<http://www.umich.edu/~urel/stewardship/>)
- Occupational Safety and Environmental Health, OSEH (<http://www.p2000.umich.edu/>)

⁸ Regulated recycling items include batteries, lamp ballasts, fluorescent light bulbs, and consumer electronics

⁹ UM has sponsored vanpooling services since the 1970s. More info at <http://www.parking.umich.edu/fleet/vanpool.html>

¹⁰ Green Press Initiative. <http://greenpressinitiative.org/postconsumer-recycled.htm>

¹¹ Student Move-out Program is organized annually by the UM Housing and Waste Management Services by the end of winter semester

