

US EPA ARCHIVE DOCUMENT

# Colleges & Universities

## Sector At-a-Glance

Number of Institutions:	4,000*
Value of Revenues:	\$260 Billion**
Number of Employees:	2.9 Million***

\*Source: U.S. Census Bureau, 2001<sup>1</sup>

\*\*Source: National Center for Education Statistics, 2003<sup>2</sup>

\*\*\*Source: National Center for Education Statistics, 2001<sup>3</sup>

**Profile** The college and university sector<sup>4</sup> includes a wide variety of campuses across the country, from small community colleges to large research universities. Funding sources for the sector include tuition, private donations, government grants, and, for public institutions, state appropriations. In 2002, higher education institutions educated more than 15 million students. Enrollment is expected to increase to more than 18 million students by 2013.<sup>5</sup>

**CAMPUS OPERATIONS** Classroom education is only one of many activities taking place on college campuses. Campuses often maintain other types of facilities, including research laboratories, art studios, utility generation and transmission plants, dormitories, and water distribution systems. Many large research institutions also have specialized facilities, such as medical centers, agricultural centers, nuclear reactors, and high security biomedical laboratories. Improving environmental performance on campuses offers a unique opportunity to raise awareness and instill knowledge about environmental issues in students.

**PARTNERSHIPS** Six organizations have formed a partnership with EPA's Sector Strategies Program to improve the environmental performance of the college and university sector. These organizations are:

- ■ ■ ■ American Council on Education (ACE);
- ■ ■ ■ APPA: Association of Higher Education Facilities Officers;
- ■ ■ ■ Campus Consortium for Environmental Excellence (C2E2);
- ■ ■ ■ Campus Safety, Health and Environmental Management Association (CSHEMA);
- ■ ■ ■ Howard Hughes Medical Institute (HHMI); and
- ■ ■ ■ National Association of College and University Business Officers (NACUBO).<sup>6</sup>

**KEY ENVIRONMENTAL OPPORTUNITIES** In 2003, EPA and the six partner organizations formed a performance measurement workgroup to select key environmental performance indicators, determine appropriate methodologies to measure these indicators, measure these indicators on their campuses, and develop tools to assist other institutions with the measurement process. The college and university sector is working with EPA to improve campus performance by:

- Increasing energy efficiency;
- Reducing air emissions;
- Managing and minimizing waste;
- Conserving water; and
- Promoting environmental management systems.



## Increasing Energy Efficiency

Energy consumption is one of the largest environmental impacts of college campuses. New construction, aging infrastructure, financial constraints, and increasing energy costs are motivating institutions to re-evaluate their energy infrastructure. The U.S. Department of Energy estimates that at least 25% of the \$6 billion colleges and universities spend annually on energy could be saved through better energy management.<sup>7</sup>

In order to reduce the costs and environmental impacts associated with energy use, colleges and universities across the country are undertaking a variety of energy conservation activities.

### *Case Study: Energy Star Partners*

*As EPA Energy Star partners, more than 200 colleges and universities have committed to measure their energy consumption and develop and implement plans to improve their energy performance.<sup>8</sup>*

*In 2002, one Energy Star partner, Dutchess Community College (DCC) in Poughkeepsie, NY, invested in energy efficiency by signing a \$2.4 million performance-based contract that included replacing a 500-ton electric chiller, an industrial-scale water-cooling mechanism used to air condition four buildings on campus, with two new 300-ton gas-engine powered chillers. As a result, the college has already reduced energy use by 13%. Over the next 15 years, DCC expects to save more than 830,000 kilowatt-hours per year in energy, for a total of \$1.2 million savings in energy costs.<sup>9</sup>*

### *Case Study: Energy Efficiency at the University of Florida*

*The University of Florida (UF) in Gainesville, FL, embarked on an energy efficiency campaign in the mid-1990s. With the leadership of the vice-president for finance and administration, UF began a two-year, \$6 million project to improve the scheduling and controlling of the campus' energy demands. The project resulted in over \$2 million net savings. Over five years, UF's total and per capita energy consumption decreased by almost 25%.<sup>10</sup>*

## Reducing Air Emissions

Many colleges and universities are committed to reducing greenhouse gas (GHG) emissions resulting from power plants, electricity use, and fleet vehicles on campus. For example:

- ■ ■ The presidents of all 56 New Jersey colleges and universities have endorsed a Sustainability Greenhouse Gas Action Plan for New Jersey that calls for a 3.5% reduction in the state's GHG emissions by 2005.<sup>11</sup>
- ■ ■ The University of Florida in Gainesville, FL, is pursuing an aggressive goal of becoming "carbon-neutral" by the year 2030 through an effort to offset campus GHG emissions with projects that cut down GHG emissions by an equal amount.<sup>12</sup>

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## Managing and Minimizing Waste

Many colleges and universities are working to reduce generation and increase recycling of hazardous and solid wastes on their campuses.

### Hazardous Waste Minimization

Colleges and universities produce hazardous waste in campus laboratories, medical centers, and art studios, as well as during operations and maintenance of buildings and vehicles, and construction. Many campuses are implementing hazardous waste reduction programs to cost-effectively decrease the amount of hazardous wastes on campuses while supporting a mission of research and education. Measuring reductions of hazardous waste on campuses poses some unique challenges, because the quantities and types of chemicals used are constantly changing in dynamic research environments.



### Case Study: Waste Minimization at the University of Michigan

Over the past decade, research funding at the University of Michigan (UM) in Ann Arbor, MI, has grown 129%. Consequently, research laboratory space has increased by 47%, and waste generation has increased correspondingly.

In an effort to bring waste volumes and cost under control, UM launched a formal waste minimization program in 1995. UM is utilizing many different tools, including:

- Education (including micro-teaching techniques);
- Protocol review;
- Non-hazardous product substitution;
- Solvent distillation systems;
- Chemical tracking systems; and
- Chemical redistribution programs.

Though overall waste generation continued to increase through 2002, a decrease began in 2003 as many of these programs began to take full effect. The table below displays some of the program's successes. The program has proven to be cost-effective, saving more than \$200,000 annually in disposal costs and the need to purchase new chemicals.<sup>13</sup>

### UM's Waste Minimization Initiatives<sup>14</sup>

Chemical Type	Waste Minimization Method	Annual Reduction
Acetone, Xylene, Alcohols	Distillation	5,500 gallons
Ethidium Bromide	Filtration	100 gallons
Photo Processing Waste	Silver Recovery	800 gallons
Acids, Bases, Solvents	Micro-Teaching Techniques	300 gallons
Varied	Chemical Redistribution	400 bottles
Varied	Chemical Tracking/Sharing	210 gallons
Elemental Mercury Equip.	Mercury-Free Replacement	2,200 pounds
Varied	Aqueous-Based Substitution	20 gallons



## Solid Waste Recycling

Solid wastes from colleges and universities include common recyclables, such as cans, glass, cardboard and office paper; and compostables, such as food scraps, animal bedding, landscape refuse, and trash. An increasing number of colleges and universities are reducing their solid waste volumes through recycling.

### *Case Study: College and University Recycling Council*

*The National Recycling Coalition's College and University Recycling Council is a network of campus-based recycling professionals with a mission to organize and support environmental program leaders in managing resources, recycling, and waste issues.*

*The Council created an on-line benchmarking tool so that colleges and universities can compare their performance with other schools and quantify the aggregate benefits of campus resource management and recycling programs. The 100 Council members are encouraged to share their progress with the public. In 2002, 20 schools posted information on-line about the amount of recyclables, compostables, and trash collected on their campuses.<sup>15</sup>*

## Conserving Water

Water conservation efforts on campuses often include simple activities, such as conserving water at the faucet, reusing landscaping water, and implementing more efficient methods of heating and cooling buildings.

### *Case Study: Water Conservation at the University of Colorado*

*In 2001, the University of Colorado, in Boulder, CO, began several water conservation projects, including:*

- *Installing temperature sensor and control valves on two furnaces;*
- *Replacing water-driven aspirators with vacuum pumps in laboratories; and*
- *Decreasing the amount of water used for irrigation.*

*As a result of these and other projects, total annual water usage decreased by 11% between 2001 and 2002, saving the university approximately \$170,000.<sup>16</sup>*

## Promoting Environmental Management Systems

Colleges and universities are increasingly utilizing systematic approaches, such as environmental management systems EMS, to meet environmental challenges. Campus-wide EMS can assist colleges and universities in making measurable progress toward environmental goals.

### *Case Study: Washington State University's Campus-wide EMS*

*In 1999, Washington State University (WSU) in Pullman, WA, implemented one of the first campus-wide EMS. Since that time, WSU has experienced a number of environmental benefits in areas such as recycling and energy. Between 2001 and 2003, WSU experienced a 56% increase in recycling. A number of energy conservation projects have also led to the conservation of 3.6 million kilowatt-hours of energy per year. Through its EMS, WSU has also committed to reduce nitrogen oxide emissions by more than 50% and sulfur dioxide emissions by more than 85% by 2005.<sup>17</sup> In 2003, WSU became the first university to be accepted into EPA's National Environmental Performance Track.<sup>18</sup>*

