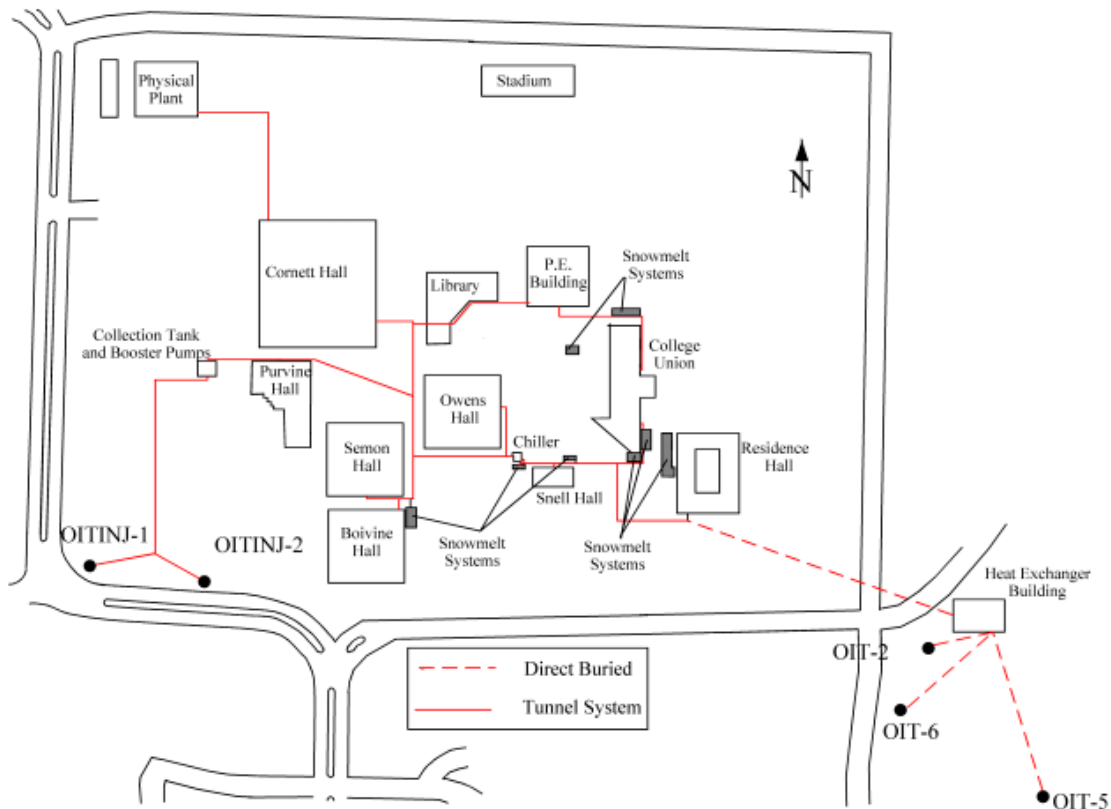


# "CHILL OUT" - OREGON INSTITUTE OF TECHNOLOGY IS A WINNER

John W. Lund and Toni Boyd, Geo-Heat Center, Oregon Institute of Technology



OIT's geothermally heated fountain.

The National Wildlife Federation (NWF) hosted the first annual national competition called "Chill Out! Campus Solutions to Global Warming" with their partners, the Earth Day Network, Campus Climate Challenge and the Society for College and University Planning. The nation-wide contest was held throughout the fall and winter of the 2006-2007 school year. The "Chill Out" competition seeks to advance and celebrate the innovators of global warming solutions on college and university campuses all across the country. The purpose of the contest was to spotlight solutions to global warming on campuses and to share these with a national audience. Students, faculty or staff could either submit a short

written blurb on the contest entry website or a short video segment on the linked YouTube site. Details on the contest can be found at [www.nwf.org/chillout](http://www.nwf.org/chillout) (you can also access the contest through NWF's Campus Ecology website at [www.nwf.org/campusecology](http://www.nwf.org/campusecology)).

The following is what John Lund submitted to the contest:

**"CHILL OUT!  
CAMPUS SOLUTIONS TO GLOBAL WARMING"  
OREGON INSTITUTE OF TECHNOLOGY  
3201 CAMPUS DR.  
KLAMATH FALLS, OR 97601**

*Oregon Institute of Technology, a state college of the Oregon University System, was founded in 1947. Due to high energy costs on the original campus, a new campus was constructed to take advantage of geothermal energy that was known to exist in the community. In the early 1960s, three deep wells were drilled tapping geothermal hot water at 192°F (89°C). This hot water now heats the entire campus of about 650,000 sq. ft. (60,000 sq. m) saving about \$1,000,000 annually in heating and domestic hot water costs. No other source of energy is available for heating thus; the campus is entirely energy independent of fossil fuel sources. The campus also uses the geothermal energy for melting snow on stairs and handicap ramps. The installed capacity of this system is 6.2 MWt and the annual energy use is about 47 billion Btus (14 GWh), saving 10,000 tonnes of CO<sub>2</sub> emissions annually (compared to producing it from petroleum).*

This year, the campus administration is proposing to drill a well (5,000 to 6,000 ft – 1,500 to 1,800 m) deep into a fault that is known to have a geothermal resource around 300°F (150°C), to generate electricity. If this is successful, a one megawatt (MWe) geothermal power plant of either a flash steam or binary type will be installed to provide all the electricity needs on campus. This will provide an additional savings of around \$500,000 and reduce CO<sub>2</sub> emissions by about 16,000 tonnes annually (compared to producing it from petroleum). The campus would then be 100% “green” by producing all of its energy needs from geothermal resources.

In addition, the campus will construct a geothermally heated greenhouse and aquaculture facility to train interested students and potential developers in the use of geothermal energy for agricultural purposes.



Snow melted stairs.

The Geo-Heat Center was established on campus in 1974 to provide information dissemination and technical assistance for persons and organizations nation-wide and internationally to develop and utilization geothermal energy (website: <http://geoheat.oit.edu>). The Center staff also provides tours of the campus and community geothermal uses to educate students and interested investors in the benefits of geothermal energy, as well as assisting in the development of the geothermal uses. The proposed power plants, greenhouse and aquaculture facilities will also be used as a training facility and showcase to help transfer geothermal use to other locations throughout the country. Even though, high temperature geothermal energy is generally only available in the western states, the Geo-Heat Center also provides information and training in geothermal (ground-source) heat pumps that can be installed anywhere in the country as they only require normal ground and ground-water temperature to be utilized for both heating and cooling. Our staff of four people has provided technical assistance on geothermal energy use to every state in the Union and well as over 50 countries.

In March 2007, the winning campuses of the contest were notified. In addition to grants and other prizes, winning campuses were to be featured in a national broadcast on the week of Earth Day (on April 18, 2007 at 3:00 eastern). Oregon Institute of Technology was one of the eight winners, and was requested to participate in a live webcast in Washington, D.C. on April 18, 2007. The other winning campus were California State University, Chico; Mount

Wachusett Community College, Gardner, Massachusetts; Monmouth, West Long Branch, New Jersey; Richard Stockton College, Somers Point, New Jersey; University of California at Santa Barbara; Oberlin College, Oberlin, Ohio; and Lawrence School, Lawrence, New Jersey.

The National Wildlife Federation video team visited campus in March and filmed an interview with President Martha Anne Dow, Geo-Heat Center Director, John Lund, and Geo-Heat Center Engineer and OIT graduate Toni Boyd. They also filmed various geothermal uses on campus. This short video can be viewed on the National Wildlife Federation website: [www.nsf.org/chillout](http://www.nsf.org/chillout).

The live “Chill Out” webcast which was broadcast to over 160 college campuses throughout the country brought together thousands of college students, faculty and staff to celebrate real and practical solutions to global warming taking places on colleges today. It featured a special message from Al Gore to colleges and universities, the winning campuses and an interactive panel of sustainability heroes.

Toni Boyd, of the Geo-Heat Center, represented the campus at the live webcast in Washington, D.C. on April 18. She participated in one of two panel discussions during the live webcast with the other seven winners.

According to NWF, the nation’s over 4,000 colleges and universities manage over 5 billion ft<sup>2</sup> of space and spend approximately \$18 billion annually on energy costs and emit more than 19 million metric tons of CO<sub>2</sub> annually. The NWF estimated that the winning schools saved approximately \$6 million annually along with eliminating over 20,000 tons (40 million pounds) of CO<sub>2</sub> from the atmosphere. Table 1 shows the conservative estimate made by NFW of CO<sub>2</sub> and cost savings.

Table 1. NWF Estimated CO<sub>2</sub> and Cost Savings

Campus	CO <sub>2</sub> Reduction Annual Tons	Annual Savings
California State University - Chico	100	\$100,000
Mt. Wachusett CC	1,909	\$500,000
Monmouth University	166	\$150,000
Richard Stockton College		\$433,500
Oregon Institute of Tech	11,000	\$1,000,000
University of California - SB	8,150	\$3,700,000
Oberlin College	140	\$66,000
Lawrenceville School (HS)	199	
Totals	21,664	\$5,949,500

The eight winners and a brief explanation of their written blurb, from NWF website, follow:

**California State University—Chico, CA:** Chico State has committed to focusing on institutionalizing sustainability into the education of students. Two buildings are registered

with LEED, and all new buildings constructed will meet LEED silver requirements. A 300 kW solar array was installed on two campus rooftops. Students have taken the lead to promote sustainability on campus, through projects such as: creating a student fee to fund sustainability projects, retrofitting a residence hall, networking with the Chico community to create sustainability service learning programs, and installing energy saving software on computers.

**Mount Wachusett Community College, Gardner, MA:**

The college conversion of its all-electrical campus to a bio-mass hydronic district heating system has drastically reduced GHG emissions. This conversion demonstrates the use of a sustainable and locally available feedstock and provided unique educational opportunities for students. This project, along with conservation measures, has resulted in a 24% reduction of GHG over the past four years. MWCC has a cumulative water savings of 12.2 million gallons. By eliminating electricity as a heat source, MWCC has reduced electricity use by 45.97% and saved \$2 million. Four new renewable energy courses are in place. The College is coordinating with 11 states to encourage the use of biobased fuels. The College will soon install a 100kW PV array.

**Monmouth University, West Long Branch, NJ:** The University was just named 2006 New Jersey “Clean Energy School of the Year” after entering a statewide competition. Monmouth completed the largest solar installation east of the Mississippi in summer 2006. The solar panels will save \$150,000 and 468,569 kWh/yr. The solar system covers 33,000 ft<sup>2</sup> on roofs of four campus buildings. To engage students, there is a computer generated station that shows energy conservation data in “real time” from the panels. Students were also involved in installing the solar panels.

**Richard Stockton College, Somers Point, NJ:** Projects include the world’s largest closed-loop geothermal heating and cooling system, solar PV arrays, and a 200 kW fuel cell. The geothermal unit reduces the school’s electric consumption by 25% and natural gas consumption by 70%. The unit has decreased the college’s CO<sub>2</sub> emission by 13% since 1990 and saves the school \$330,000 annually. The fuel cell was installed in 2002, and provides 10% of the total energy for the campus. The fuel cell is centrally located on campus and is covered in explanatory diagrams making it a teaching tool for students, faculty, staff and other professionals. The PV array (18kW) saves the college \$3,500 a year.

**Oregon Institute of Technology, Klamath Falls, OR:** Due to the high energy costs on the original campus, a new campus was constructed to take advantage of geothermal energy that was known to exist in the community. In the early 1960s, three deep wells were drilled tapping geothermal hot water. This hot water now heats the entire campus of 650,000 sq. ft., saving about \$1,000,000 annually in heating and hot water costs. The Geo-Heat Center was established on campus in 1974 to provide information and technical assistance for people and organizations to develop and utilize geother-

mal energy, while also providing tours to the campus and community. The campus administration is proposing to drill a well into a fault to generate 100% of the campus’s electricity and construct a geothermally heated greenhouse and aquaculture facility to train individuals. The proposals will be used as a training facility and showcase. The staff of four people has provided technical assistance on geothermal energy use to every state in the Union as well as over 50 countries.

**University of California, Santa Barbara, CA:** In 2005, students from the Bren School of Environmental Science and Management created a Master’s group project entitled “Campus Climate Neutral” and sought to write their thesis on the feasibility of a carbon-neutral campus. One recommendation of this study was the certification of the campus’s CO<sub>2</sub> emissions through the California Climate Action Registry. As a public university dealing with tightening budgets, Facilities began to implement energy conservation. Campus-wide lighting retrofits, motion sensors, efficient chillers, and variable frequencies, and efficient chillers are several projects that USCB initiated, resulting in a reduction of CO<sub>2</sub> by 8,100 tons per year. To educate the campus, Facilities operates sustainability and energy specific websites. In addition, the Green Campus Program runs the “Energy Conservation Competition” in residence halls, pitting halls against one another to lower energy use.

**Oberlin College, Oberlin, OH:** A group of students and a professor developed the “Campus Resource Monitoring System” (CRMS)—an automated monitoring system and website that gathers, processes and displays data on energy and water use in dormitories. The premise is that real-time data can be used to education, and motivate students to conserve resources. For a two week period in 2005, dorms competed to see who could reduce consumption the most, getting 80% of the student body to participate. During that period, students conserved 68,000 kWh, saving \$5,100, and reducing emissions by 150,000 lbs of CO<sub>2</sub>. A conservative estimate is that CRMS will save Oberlin \$66,000/yr in electricity costs.

**The Lawrenceville School (High School), Lawrence, NJ:** Students for Environmental Leadership Coalition (SELF) is promoted the Green Cup Challenge, an inter-scholastic energy saving competition between 15 Northeastern boarding schools. Last year was the first year of the Green Cup Challenge, where three schools participated saving 398,370 lbs of CO<sub>2</sub>. This year the plans are to increase the program substantially. SELF made a school-wide presentation regarding global warming and events for the month to promote the Challenge. Projects on campus involve a student biodiesel manufacturing group and the beginnings of an organic garden to provide food for a dining hall.

The event and award is certainly an honor for our campus, and was the only submittal featuring direct-use geothermal energy.