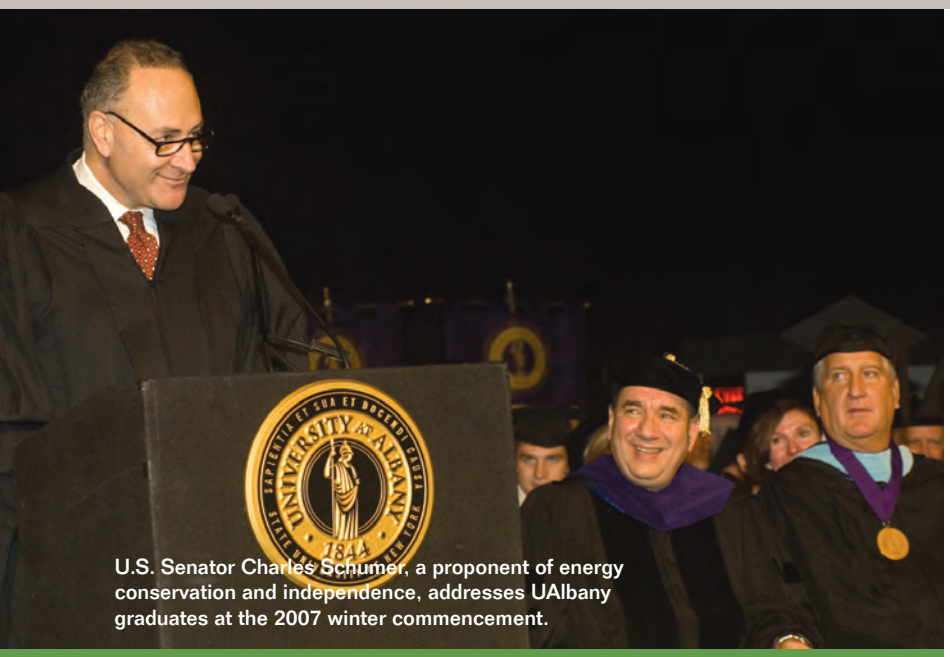
ENSURING A GREENER FUTURE

THE STATE UNIVERSITY of NEW YORK

SUNY College of Environmental Science and Forestry

As one of the state's largest energy users, SUNY has a special responsibility—and unique opportunity—to reduce energy consumption, increase its use of renewable energy resources and leverage its abundant intellectual resources to address the country's energy challenges. SUNY is poised to take a national leadership role in energy sustainability, education, technology, economics and public policy through the transformational integration of practice, teaching and research. In fact, SUNY's goal is to become the greenest public university system in the United States.

SUNY researchers are leading the way to a smarter, more secure, cleaner—and greener—energy future through innovative approaches to renewable and alternative fuels, energy production and energy conservation. Using leading edge facilities and working with strategic partners, researchers are exploring novel ways to decrease emissions and improve the environment, reduce dependence on foreign fuel, increase energy security and boost economic development in New York state and across the country.



U.S. Senator Charles Schumer, a proponent of energy conservation and independence, addresses UAlbany graduates at the 2007 winter commencement.

ENSURING A GREENER FUTURE

The SUNY Energy Task Force in March 2007 released a series of recommendations that are a road map for the university's leadership role in the energy future. Goals for conservation and sustainability include:

- Establish campus targets for reduction of energy use by 2010, so total SUNY energy use is 37 percent lower than 1989-90 use.
- Cap green house gas emissions at current levels and decrease emissions 20 percent by 2014.
- Increase the use of renewable energy purchased or generated on campus to 30 percent by 2014.
- Develop five new combined heat and power projects by 2010.
- Design and construct new buildings or rehabilitate existing buildings using Leadership in Energy and Environmental Design (LEED) criteria and life-cycle-cost analysis.

FYI

- SUNY has reduced it energy use per square foot by more than 38 percent compared with 1973-74.
- Cumulative cost-avoidance through 2005-06 exceeded $1 billion.
- More than $100 million has been invested in energy conservation since 1992.
- Currently $80 million in energy conservation projects are in design or construction phases.

GREEN AND LEAN

Fredonia has initiated the drilling of three natural gas wells on campus. The first well was drilled in August 2007 and two additional wells will be drilled in 2008. The savings to the campus are expected exceed $500,000 over the next five years.

Alfred State has recycled electronic materials for many years. While in past years a vendor was paid to provide this service for the college, this year a new program was implemented that has a vendor now paying the college to recycle electronic material, such as computers, monitors, TVs and lab equipment. This new program changes electronic recycling from expenses to revenues.

Oneonta is conserving water with an aggressive water leak detection program. Cumulative savings of about 10,000 gallons per day have been achieved through this ongoing program. In addition, the replacement of all residential laundry equipment with energy-saving front load washers contributes to both water and electrical savings. The college has generated substantial savings in both dollars and gallons in the water/sewer system over the last several years. Estimated recurring reduced consumption is about 35.6 million gallons annually, or 34 percent, as compared to base year usage in 2002-03. This reduced consumption generates an estimated 30 percent annual savings on water and sewer bills.

SULLIVAN CCC SCIENCE CENTER TO FOCUS ON "GREEN" SOLUTIONS

Sullivan County Community College has unveiled plans for a new Center for Advanced Sciences and Technology (CAST) building, which will be located adjacent to a planned Green Technology Commercial Park. These projects – sponsored by SCCC in conjunction with the County of Sullivan, the Town of Fallsburg and the Sullivan County Partnership for Economic Development – will serve as educational and economic models for sustainability.

What makes this collaboration even more meaningful for SCCC is the involvement of alumnus Marc Baez `85, president/CEO of the Sullivan County Partnership for Economic Development. He is a key partner with the college on these "green" projects, including the design phase of the CAST building, which began this fall.

MORRISVILLE EXPLORES ALTERNATIVE ENERGY SOURCES

Alternative energy projects combine two of Morrisville's traditional strengths: agriculture and technology. The college is developing leaders, experts and professionals for this fast-growing, high-demand industry.

Several projects and initiatives that already been completed on campus are providing educational benefits to students in several programs of study while also serving as energy sources.

The New York State Senate awarded $4 million for the creation of the New York Center for Liquid Biofuels at Morrisville. The grant for the center will help fund a biodiesel infrastructure in the state through the construction of an oilseed crushing and biodiesel processing plant and extensive research in the use of biofuels and byproducts.

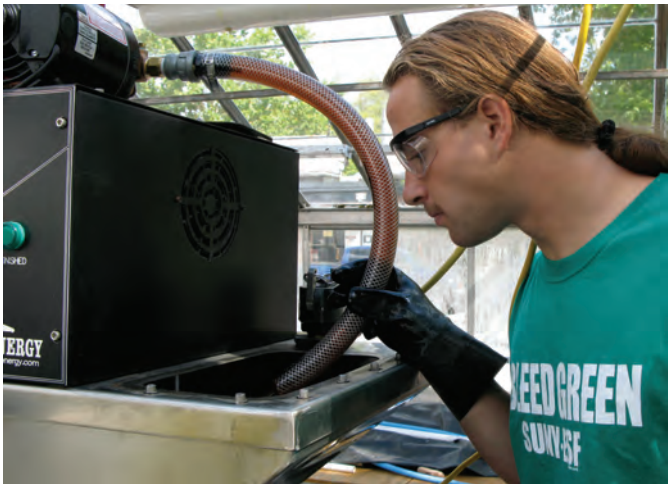
The first phase of the liquid biofuels project will directly create 20 jobs. It is also expected to create approximately 130 jobs in the agriculture sector.

Morrisville and its research partner, Empire AgriFuel, LLC, will construct an oilseed crushing and "green" biofuel blending facility on Route 11 in Cortlandville. The crushing plant will initially be capable of handling up to 200 tons per day, or approximately 2.4 million bushels of soy and or canola per year, and produce 5 million gallons of clean, "green" biodiesel.

Groundbreaking research in the use of biofuels in locomotive transportation will be conducted in biodiesel use and production, including emissions, stability, performance and options for by-products. Through collaboration with the New York Susquehanna and Western Railroad, the center also plans to establish a research facility in Binghamton.

Based on a model developed by Morrisville State College, the project creates regional economic gains at every step of the process – from feedstock growth, to oil seed and biofuel production, to the end user. The total economic impact, both direct and associated, is projected to be more than $47 million, through anticipated increased soybean value, output of the crushing and blending plants, wages construction and ancillary revenue.

Morrisville researchers also are examining the effects on gas production with various animal and food waste input, particularly the quality of the methane as a fuel and its potential for use in an internal combustion engine.



ESF student Greg Boyd fills the bioprocessor with waste cooking oil collected from a dining hall. He makes biodiesel fuel in a former greenhouse on the ESF campus

RUNNING ON BIODIESEL AT ESF

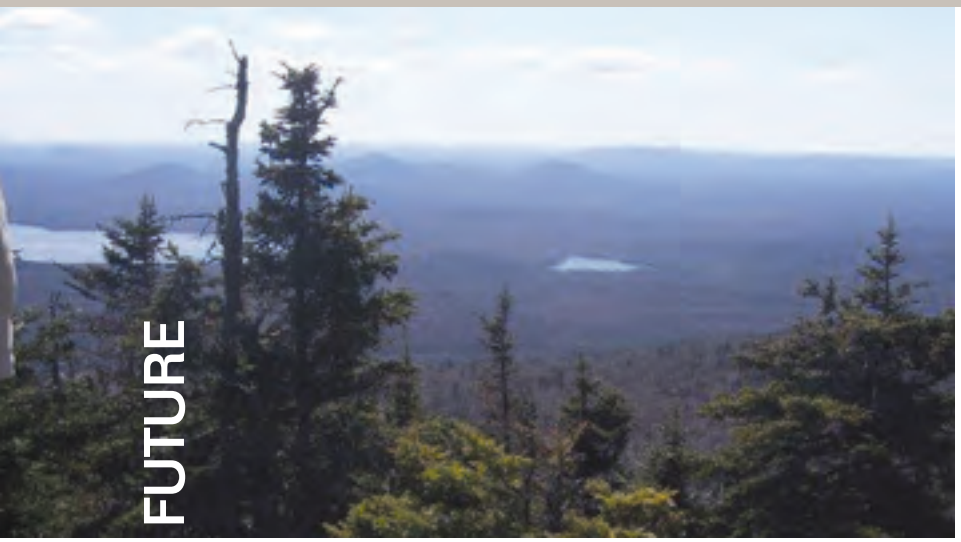
At the College of Environmental Science and Foresty, 17 percent of the vehicles now operate on biodiesel, including buses, trucks and bulldozers. A third of the ESF fleet runs on some form of alternative fuel (for example, electric, hybrid electric, compressed natural gas, and flex fuel, which is 85 percent ethanol and 15 percent unleaded gas).

Senior Greg Boyd works with a processor installed in former greenhouse on the campus. He uses waste vegetable oil (fryer oil) from a dining hall at neighboring Syracuse University, strains it and then pumps it into the bioprocessor. Methanol is added to produce biodiesel. Sodium hydroxide is added as a catalyst for the methanol.

After 24 hours, the glycerol settles to the bottom and is siphoned off. ESF researchers are using the glycerol to make biodegradable plastic. Glycerol is already used in the manufacture of soap and a variety of make-up products.

The biodiesel is washed with water to remove any impurities and it is then ready for use in any modified diesel engine. Boyd says it produces 70 percent less emissions than petroleum diesel.

Boyd, who started making biodiesel when he was in high school, has modified the fuel lines in his 1989 Mercedes Benz so the car runs on biodiesel.



POTSDAM STUDENTS LEARN BY SERVING THE ENVIRONMENT

"Is that smoke?"

In June, on his first day perched in a 90-year-old Pokomoonshine steel-framed fire tower, high above New York's highly prized Adirondack Park, that is exactly the question that went through Potsdam student Kevin Chlad's head. Chlad's immediate alert to state agencies resulted in the avoidance of a potentially devastating forest fire in the nation's largest publicly protected park.

Chlad is one of many Potsdam students occupying the fire towers to fulfill their capstone requirements for the college's interdisciplinary Environmental Studies major. The internship weaves together a unique three-way partnership between the New York State Department of Environmental Conservation, Potsdam and non-profit environmental organizations. The students spend several weeks serving as the de facto interpreter for the mountains where more than 100,000 visitors hike and climb annually.

Chlad explains to visitors that a series of devastating fires in the early 1900s took a heavy toll on the Adirondacks. Farmers scorched the land to encourage blueberries and raspberries to grow, and sparks from trains caused many fires. The state built the steel towers in 1918 as part of a program to detect fires across the Adirondacks.

Since aerial reconnaissance rendered the use of fire towers obsolete for decades, the state has either dismantled or abandoned dozens of the structures — some of which date back nearly a century. Local residents and visitors, however, see the fire towers as both a great destination to view the Adirondacks as well as a strong symbol of the region's legacy.

Potsdam student Kevin Chad (top right) explains the devastating effects of fire on the Adirondack forest.

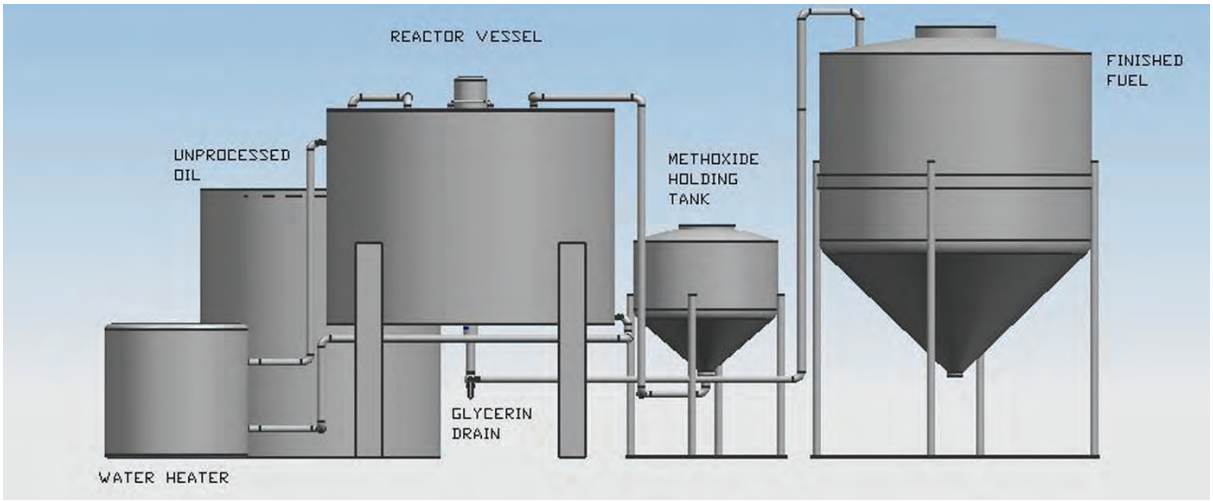
"The fire towers are a symbol of this region's history and the mark people left on the landscape," said Professor Michael Wilson, director of field studies for the program.

With a recent DEC award, Potsdam will launch a new Adirondack Fire Tower Association, a nonprofit educational group organized by Wilson. The awarded funds will be used to support educational programs at 18 fire towers throughout the Adirondacks and benefit the ES capstone program at the towers.

"Most environmental programs place an emphasis on the sciences," said Dr. Wilson. "Our emphasis is on the social sciences and humanities. In addition, the capstone dedicates students to service-learning, giving back vital time and resources to the Adirondack region for very little cost to the state. The program also combines disciplines from 11 different departments at Potsdam. There's no other program like it in the state."

UALBANY RESEARCH DEVELOPING RENEWABLE ENERGY FOR NY

The Energy and Environmental Technology Applications Center at the University at Albany's College of Nanoscale Science and Engineering works with companies in the emerging energy and environmental industries, supporting technology development leading to the integration of nanoscale science and engineering know-how that will drive advancements in a host of alternative energy applications – including fuel cells, solar photovoltaic cells, ultracapacitors and power electronics.



Alfred State College's biodiesel fuel reactor.

ALFRED STUDENTS FUEL THE FUTURE

In a building hidden away on the "back lot" of the Applied Technology campus of Alfred State College, amazing things were happening during the spring 2007 semester.

Four seniors enrolled in the robotics and computerized control technology program in the Department of Electrical/Electronic Service spent the semester researching, building, implementing and testing the theory that used frying grease can be transformed into a viable, "greener" fuel to run diesel engines.

All the effort and hard work paid off: On the final two days of classes, the test batches turned used dining hall grease into fuel that was used successfully to run a diesel engine in the Automotive Trades Department.

The four seniors presented their project to Tom Massara, executive director, Auxiliary Campus Enterprises and Services (ACES), the campus dining and vending corporation, and Leo Lejeune, manager, Lake Lodge, Maintenance and Transportation, ACES, which was the major funding source for the project (as well as supplier, along with the Culinary Arts Department on the Applied Technology campus, of the used fryer grease). In addition, a grant was secured for the project by State Sen. Catharine Young.

The project also included help from students in other disciplines who created the mechanical drawings for the welders to follow in order to create the necessary biodiesel reactor tank. Students in auto body repair painted the tank with special epoxy paint. Chemistry and agricultural science students also contributed their expertise.

"This process of transesterification (converting vegetable oil to fuel) is about 100 years old," said Dennis Conrad, instructor, Automotive Trades, whose Caterpillar 3406 engine was the test for the first batch of fuel. "The first diesel engine was run on peanut oil, but because diesel fuel was so inexpensive at the time, it's taken diesel this long to go back to its roots."

Next semester, the biodiesel fuel reactor will be moved to the Alfred campus where the greener fuel will gradually be introduced into some of the fleet's diesel vehicles. The college also hopes to obtain a generator that will run on college-produced biodiesel fuel.

TAKING THE LEED

The SUNY Board of Trustees took a significant step toward improving the environment and reducing energy costs by directing that all new buildings, additions and major renovations will meet the Leadership in Energy and Environmental Design (LEED) Silver rating requirements.

The policy follows Governor Eliot Spitzer's comprehensive energy and environmental agenda. In 2007, the Governor unveiled his 15 x 15 plan to reduce energy use by 15 percent from forecasted levels by the year 2015 through new energy efficiency programs intended to reduce energy bills, greenhouse gas emissions and other air pollution.

"Making SUNY's facilities greener is the right thing to do, and it has the benefit of reducing operating expenses," said Board of Trustees Chairman Carl T. Hayden. "Our goal is to use SUNY resources wisely with the knowledge that our actions today will have significant long-term impact on the environment."

The policy follows the recommendations of the SUNY Task Force on Energy and directs that all new buildings, additions and major renovations undertaken by the SUNY and new residence halls and major renovations managed by the Dormitory Authority of the State of New York meet LEED Silver rating requirements. The Board also recommended that each of the 30 community colleges adopt similar policies.

The LEED rating system, developed by the U.S. Green Building Council, is the national benchmark for high performance green buildings.

CLEANER ENERGY FOR DEFENSE

SUNY Cobleskill, through the support of U.S. Rep. Michael McNulty and Senators Hillary Clinton and Charles Schumer, received a $1 million appropriation in the 2007 federal defense spending bill for Phase I of a four-phase project to develop a biowaste-to-bioenergy center that will test a US patent-pending process that creates clean energy through the conversion of animal and municipal solid waste. This process will:

- reduce a producer's reliance on fossil fuel;
- reduce the cost for transportation and disposal of solid biowaste;
- provide dairy and animal producers with a value-added means of disposal of animal waste; and
- reduce the cost of and need for transportation of fuel to military installations, decreasing potential danger to soldiers.

The US patent-pending process to be tested in this project creates a renewable clean fuel and produces a material that can be used as fertilizer in agricultural applications. Successful implementation of this process will have positive affects for the environment such as a reduction of the stream of waste into landfills, of detrimental run-off into waterways and drinking supplies and of dangerous emissions during fuel production and use.

The technology will be deployed on the SUNY Cobleskill campus for refinement and testing and will eventually be transferred to the military for field application.

The college has incorporated sustainable practices into its curricula and business practices, and is developing course work in waste management systems. Students across the disciplines will have opportunities to observe this research and participate in applied research during this project.

The US Army is supporting the project through the participation of Benet Laboratories and the National Automotive Center. Additional support for this project is being sought from New York State Energy Research and Development Authority, the Appalachian Regional Commission and other public and private funding streams.

State University of New York
Comparison of Base Year (1989/90) to Goal for 2010

Campus	Baseline 1989/90 10000 BTUs/OGSF	Current 2005/06 10000 BTUs/OGSF	See Note Below % Difference 05/06 vs. 89/90	Goal to Meet a 37% Reduction by 2010
Albany	246,827	233,453	-5.42%	31.58%
Binghamton	220,981	179,650	-18.70%	18.30%
Buffalo South/Main	207,806	195,882	-5.74%	31.26%
Buffalo North/Amh	345,338	284,220	-17.70%	19.30%
Stony Brook	445,156	228,785	-48.61%	0.00%
Brooklyn HSC	560,124	421,057	-24.83%	12.17%
Syracuse HSC	380,880	434,380	14.05%	51.05%
Brockport	174,218	166,604	-4.37%	32.63%
Buffalo	245,535	189,847	-22.68%	14.32%
Cortland	220,753	167,828	-23.97%	13.03%
Fredonia	235,584	214,761	-8.84%	28.16%
Geneseo	170,978	155,278	-9.18%	27.82%
New Paltz	174,213	186,906	7.29%	44.29%
Old Westbury	199,931	202,661	1.37%	38.37%
Oneonta	179,187	169,470	-5.42%	31.58%
Oswego	181,558	188,306	3.72%	40.72%
Plattsburgh	254,412	263,164	3.44%	40.44%
Potsdam	184,098	202,275	9.87%	46.87%
Purchase	232,971	203,927	-12.47%	24.53%
Utica/Rome	224,345	150,105	-33.09%	3.91%
Alfred	177,789	157,696	-11.30%	25.70%
Canton	214,926	225,100	4.73%	41.73%
Cobleskill	249,684	194,554	-22.08%	14.92%
Delhi	250,776	186,198	-25.75%	11.25%
Farmingdale	180,233	150,962	-16.24%	20.76%
Morrisville	154,647	139,797	-9.60%	27.40%
Cornell	271,353	234,327	-13.64%	23.36%
Geneva	313,816	249,352	-20.54%	16.46%
Alfred Ceramics	198,397	229,536	15.69%	52.69%
Forestry	223,379	168,065	-24.76%	12.24%
Maritime	141,264	140,305	-0.68%	36.32%
Sys. Admin.	254,984	227,297	-10.86%	26.14%
Optometry*	193,277	182,317	-5.67%	31.33%
University Avg.	**264,302**	**219,470**	**-16.96%**	**20.04%**

Note: A negative number reflects a decrease in usage from 1989/90 baseline.
A positive number reflects an increase in usage from 1989/90 baseline.
***Optometry - used baseline of 2003/04; in rental building until 2001/02**