



# BIODIESEL PROGRAM

## HOW IT ALL STARTED

Spring, 2007, Loyola University Chicago's Center for Urban Environmental Research and Policy (CUERP) was awarded a \$10,000 grant from the Environmental Protection Agency's (EPA) People, Prosperity, and the Planet Student Design Competition for Sustainability. The \$10,000 grant allowed CUERP to implement a new education model on Loyola's campus, titled, Solutions to Environmental Problems (STEP).

This interdisciplinary course brought together faculty, staff, and students from all over the university as they decided to tackle a tangible environmental problem that Loyola was facing; high carbon emissions from campus shuttle buses. The goal of the class was to provide a holistic education of the problem and to develop a solution. STEP students quickly identified biodiesel, made from waste vegetable oil from campus cafeterias, as the most viable alternative. So, with the first topic that STEP took on being the carbon emissions from burning petroleum based fuels for transportation, the course was called STEP: Biodiesel. Students identified, designed, and implemented an array of projects to contribute to the solution, including:

- Fuel production research
- Drafting of a biofuels legislative bill
- Developing a documentary film on the process
- Conducting outreach to local high schools so teachers would be able to deliver the STEP curriculum to their students.

Semester to semester the projects built on one another, including a \$75,000 grant from the EPA for high school outreach written by a STEP student. In the Spring of 2009, biodiesel class now focused on building its own stand-alone program.

The beginning of the Biodiesel Program was wonderfully documented in 4 short videos produced by a STEP: Biodiesel student in the Fall of 2007. These videos are available on our website: [LUC.edu/biodiesel](http://LUC.edu/biodiesel).

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## ABOUT THE PROGRAM

The Biodiesel Program was student built and continues to be run by students with the help of one staff member, the Biodiesel Lab Manager, to bring expertise and continuity to our efforts. Students have produced a financially self-sustaining education program that serves to demonstrate and enact sustainable solutions to real world problems. Student participation in the Biodiesel Program occurs in three ways: Lab Fellowships, the taking the Waste-to Energy Lab course, and becoming a member in the Biodiesel Club.

- Fellows get the chance to propose their own exploratory projects and work on them throughout the year while helping with the operations and outreach aspects of the Biodiesel Program. These paid positions have become the heart of successful day-to day operations and energetic outreach efforts.
- The Waste-to Energy Lab course is a spinoff of STEP: Biodiesel, which allows students to learn about biodiesel while exploring other waste streams at Loyola that might be utilized for energy or saleable products. This one-credit lab course consists of student projects, hands-on lab experiments, and field trips to see waste systems in action.
- Undergraduate students have organized the Biodiesel Club to help support lab operations, expose more of the student body to the lab, and broaden sustainability efforts throughout campus with fun, engaging events.

Beyond the student run aspects of the Biodiesel Program, CUERP is also striving to make this program a resource for high schools, universities, small businesses, and municipalities across the US that are interested in making biodiesel. For instance, the Biodiesel Program offers:

- Continuing education course to give adults a full overview of small-scale biodiesel production from the biodiesel production process to government regulations of its sale and use. During one of these courses we partnered with the Chicago Park District to help launch a pilot biodiesel plant that will help fuel their fleet of vehicles.
- Lab tours to any interested parties throughout the year. We host community groups, small businesses, Boy Scout Troops, after school programs, and individuals that want to learn about our program, biodiesel, alternative fuels, or general environmental sustainability.
- Oil collection from local, green-friendly restaurants and Universities in the City of Chicago. All of the biodiesel made at Loyola University Chicago is made from waste cooking oil that has already been used to cook foods and would otherwise be transported outside the city for use as animal feed (often in foreign countries).
- Biodiesel sales to small business operators and individuals in the community that want to operate their diesel vehicles on a locally produced, clean-burning alternative fuel.

**LICENSE TO SELL BIODIESEL** • The main operations of the Biodiesel lab are now focused around the sale of products and educational programming and in April, 2010, CUERP's Biodiesel Program became the first school program in the United States to be licensed by state and federal authorities to produce and sell biodiesel. Starting in the fall of 2010, Loyola will be selling the fuel to local companies.

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ABOUT THE PROGRAM • CONTINUED

**COLLEGIATE BIODIESEL PRODUCERS NETWORK (CBPN)** • The Biodiesel Program is working with other colleges and universities across the United States to form the Collegiate Biodiesel Producers Network (CBPN). The purpose of this group is to share knowledge, resources, and experiences in the hopes of facilitating better collaboration amongst peer institutions that are pursuing projects related to biodiesel throughout the United States. By collaborating on grants, outreach efforts, and best practices we hope to expand access to biodiesel production and research to institutions of higher education while helping to develop a well-trained, educated biodiesel workforce (or consumer).

**BIODIESEL SOAP** • The students have also taken the glycerin byproduct of biodiesel production and created a recipe to make it into soap. BioSoap has great grease-cutting power and is very moisturizing thanks to the oil and glycerin. The soap is sold in university bookstores and other campus retail locations. We are working toward supplying all soap dispensers on campus with our student-produced BioSoap. Sales revenue from biodiesel, soap, and some custom designed biodiesel reactors now cover the operating costs of the Biodiesel Program.

### 'BIOFUELS FOR SCHOOLS'

- The high school outreach project, "Biofuels for Schools," has become another major focus. Seeded by an our second phase EPA grant for \$75,000, the Biodiesel Program has been able to bring mobile biodiesel processors, lab equipment, speakers, teacher development workshops, and a new biodiesel curricula to eight high schools in the Chicago area.
- The Mobile Green Energy Lab (MGEL), a mobile mini biodiesel processor that essentially puts Loyola's lab on wheels, has been deployed into high schools to take biodiesel technology and experiments beyond the classroom.
- High school students make biodiesel from their cafeteria waste vegetable oil to fuel a biodiesel generator that in turn runs a deep fryer that can be set-up at school events. Not only do the students cook delicious food, they are also demonstrating a closed-loop energy system as the fryer oil goes back into the MGEL for the next batch of biodiesel.
- "Biofuels for Schools" has reached hundreds of students and exposed them to the hands-on process of making biodiesel and opened their eyes to the real difference they can make for the environment by converting waste into energy.

**INSTITUTE OF ENVIRONMENTAL SUSTAINABILITY (IES)** • The Center for Urban Environmental Research and Policy and the Environmental Science Department from the College of Arts and Science will be combined to form a new degree granting institute that focuses on environmental education, research and outreach. Scheduled to launch with the opening of a new LEED (Leadership in Energy efficiency Design) building in the Fall of 2013, IES will have Renewable Fuels Labs featuring expanded biodiesel production, research, and educational capacity.

**COLLEGIATE BIODIESEL PRODUCERS NETWORK (CBPN) and NATIONAL BIODIESEL BOARD (NBB)** • The Loyola Biodiesel Program is leading an effort by the CBPN to gain membership in the NBB for all member colleges and universities at a group, or collegiate level. The mission of the CBPN and the NBB mirror each other closely, potentially creating a mutually beneficial relationship.

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## WHAT THE FUTURE HOLDS

**PRODUCTION EXPANSION** • Expand both the production and sales of Loyola Biodiesel, BioSoap, Mobile Green Energy Lab (MGEL), and other products developed by students.

**COLLABORATIONS** • With other universities in the Chicagoland area to collect and utilize waste vegetable oil as biodiesel in school vehicles and shuttle services.

**BIOSOAP** • Use of BioSoap will expand to be used in all soap dispensers in campus bathrooms.

**OUTREACH EXPANSION** • Expand outreach to more schools, small businesses, and individuals interested in biodiesel. Our future outreach will be technology driven with lessons, tours, and discussions posted in on-line videos as well as live video interaction with classrooms across the United States.

**CONTINUING RESEARCH** • Students in the Biodiesel Program will continue to research efficient production techniques for Loyola Biodiesel and BioSoap, new cleaning products that can be made from our glycerin, and additional ways to utilize current waste products on campus to create a more sustainable community. This expansion will make CUERP's Biodiesel Program financially sustainable with sales covering all costs from salaries to supplies, with the goal of becoming a truly sustainable (economic, social, political, education, environmental) program which serves as a demonstration of sustainable/responsible business/education for the future.

To learn more visit, [LUC.edu/biodiesel](http://LUC.edu/biodiesel).

