



People and Nature: Our Future is in the Balance

National Wildlife Federation

11100 Wildlife Center Drive • Reston, VA 20190 • <http://www.nwf.org/>

**Middlebury College
Middlebury, Vermont
Spring 2002, Energy**

BACKGROUND

Campus Profile

Middlebury College is a private, liberal arts college in Middlebury, Vermont. The College is comprised of 2,200 students living and working on the 350-acre campus. The students come from over 70 countries and most academic majors include an international focus.

Group/Class Profile

Many groups have assisted the Biodiesel project. Connie Bisson, the Sustainable Campus Coordinator, helped in making many of the events happen such as the campus Earth Day event and the appearance in the newspapers. Middlebury Initiative for Sustainable Development also helped in spreading the educational initiative.

Contact

Ron Schildge
MC Box 2968
Middlebury College
Middlebury, VT 05753
Rschildg@middlebury.edu

GOALS AND ACCOMPLISHMENTS

Middlebury College currently uses over 7,000 gallons of diesel fuel a year. An environmentally friendly alternative exists.

Biodiesel, an alternative fuel made from vegetable oil, has been designed to function as either an additive or replacement fuel in diesel engines. Biodiesel's advantages for the environment are enormous including:

- reduced carbon dioxide emissions
- no sulfur emissions
- significantly reduced particulate matter
- less offensive exhaust
- and fewer carcinogens.

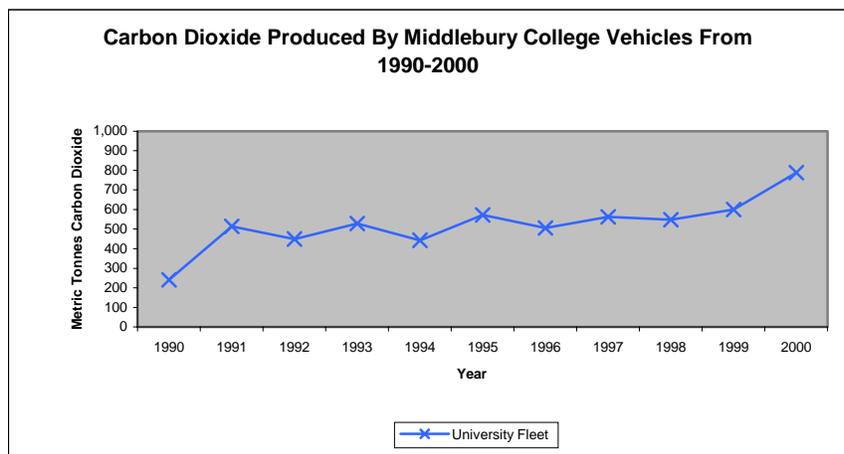


Figure 1

In addition, the cost of refining the fuel from used fryer grease can be lower than the cost of purchasing diesel fuel.

Since 2000, Middlebury College has investigated using refined vegetable oil as diesel fuel. The project began by instituting a semi-operational refinery for the production of the biodiesel resumed with new funding under the NWF Campus Ecology Fellowship Program. The NWF Fellowship provided the funds to complete the second stage of a process that began two years ago. We aimed to set up an operational refinery at the college and to produce the fuel to run a testy vehicle. Costs included the purchasing of lab equipment (beakers, latex gloves etc), chemicals (methanol, ethonal and lye), a 250- gallon drum and pump to store Biodiesel for centralized fueling and labor. Multiple vehicles at the college would be able to use the fuel. The biodiesel vehicle was to be used for educational purposes including demonstrations in local schools and community events. The college and local community was informed about the project.

Short-Term Goals

- Establish a working site and produce 15-30 gallon batches of biodiesel to run a test vehicle,
- Conduct educational outreach in the form of workshops or presentations to campus and community members about this project and alternative fuels,
- Develop and submit, to appropriate campus stakeholders, a proposal on the potential use of Biodiesel on campus and request future production management,
- Explore the possibility of hosting a NWF Campus Ecology Training Clinic,
- Document project steps and outcomes through photos and project reporting requirements, thereby creating a model for other college and universities and supporting the national campus greening movement,
- Conduct press outreach to ensure coverage in local and campus newspapers, radio stations and other relevant media.

Long-Term Goals

The long-term goals were the most difficult to attain. I have worked with Dining Services and Facilities Management to outline the long-term project objectives and the departments' necessary assistance. I have also purchased the necessary chemicals for production of Biodiesel for next year and purchased and painted a tank for centralized fueling of Biodiesel vehicles. For funding, I have spoken to the College's Environmental Council about sustaining the project next year and purchasing Biodiesel from Dog River Alternative Fuels in bulk. I contacted Dog River AF and they are aware of Middlebury College's interests.

Accomplishments

Over the course of the project, many goals were accomplished. In the fuel production, I was able to establish a working site to produce 15-30 gallon batches of biodiesel. I conducted scaled-down test batches with less-expensive chemicals in the lab and worked at the local high school to produce large batches of biodiesel. By regularly obtaining



Leading a Class Discussion on Alternative Fuels

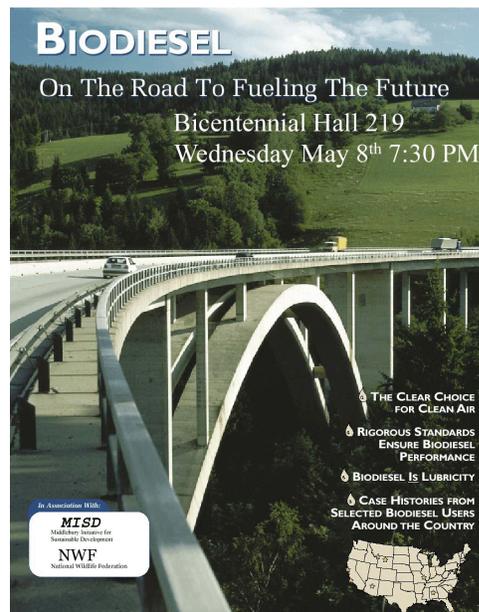
vegetable oil from Dining Services, I produced over 90 gallons of biodiesel in total.

Challenges and Responses

Over the course of the project many difficulties hampered the forward progress. Initially I lacked space to work, but I was eventually given space in the Hannaford Career Center at the local high school. The drum purchased for centralized fueling couldn't be stored outside, so I had to purchase an alternative drum. I then had to paint that drum with rust locking paint before it would be safe to use. Access to the refining equipment at the Hannaford Center was also restricted to the school's hours, so I also had to schedule work before the 4 PM lockdown.

Many difficulties also hampered my long-term goals. Securing room in the new recycling center building has been extremely difficult. I have been given room on campus in the facilities building, but that cannot be a permanent location. Also, I have found that the quality of the fuel at the cheapest price is not up to par. I will have to try to see if other fuel sources offer more quality products or if the fuel can be made to work in the refining process.

In response to these challenges, I enlisted the help of other partners in the project. Connie Bisson was helpful in securing the space to work. Other partners helped in raising awareness. Constant vigilance and patience were the only solutions.



Flyer for Presentation

ENGAGEMENT AND SUPPORT

Funding

I have secured \$1,400 from Middlebury College's Environmental Council for next year's project. The funds will carry the project through the year and help pay for other expenses of the project. This was in addition to the \$1,200 received from Campus Ecology.

National Wildlife Federation's Campus Ecology Program

I received literature on Alternative and Sustainable Transportation programs from Campus Ecology. The Campus Ecology tool kit and book *Campus Ecology* were especially helpful. Writing the bi-monthly reports and receiving feedback was helpful as were e-mails from Kathy Cacciola.

OUTREACH, EDUCATION AND PRESS

I received a significant amount of press from the project. There were articles in both the College newspaper* and the magazine. I appeared in New England Monthly Magazine, and was discussed in a forum of Biodiesel producers on the internet.

* <http://www.middleburycampus.com/main.cfm/include/detail/storyid/239011.html>

The outreach of the project also was a huge success. I held workshops in collaboration with MISD (Middlebury Initiative for Sustainable Development), demonstrated my Biodiesel vehicle at Winter Carnival and was a panelist at Middlebury's forum on "The International Energy Regime: Implications for the global community and the environment." On Earth Day, I appeared at the town Earth Day event with Campus Ecology information while demonstrating my alternative-fuel vehicle. At the College, I presented the vehicle at the separate Earth Day event with another biodiesel producer from VT Technical College who was running on straight vegetable oil. The College event was a huge success and it has opened a strong line of communication between the two institutions. I also presented a lecture on biodiesel to students and community at Middlebury and went to local elementary school to teach the younger generation about renewable fuels.

CLOSING REMARKS

"This is a very exciting and worthwhile project, which I was happy to support in its initial stages and which is now getting the wider attention it deserves." President John McCardell of Middlebury College.

*A step-by-step description of making biodiesel can be found at-
<http://www.clenoir.com/bd.htm>.*



Measuring Oil



Measuring Oil



Grinding lye for biodiesel



Workspace at Hannaford Highschool



Mixing Biodiesel with Tickell's Book



Displaying Final Product- Biodiesel