



An Alternative Summer Studying Alternative Fuels

By Erika Sladky

In May of 2007, I left my previous institution, Boston University, and began a new academic life at West Virginia University. In order to satisfy major requirements, I decided to take three summer courses. However, I also wanted a summer job, but not a typical job for high school and college students (such as an easy job at clothing stores, fast food restaurants, etc.). I decided to search for anything developmental to my career choice. As an advocate for alternative fuels, I applied to an undergraduate research position at the National Research Center for Coal and Energy. I entered the job and began a summer's worth of interviews and internet research on one of the most highly debated topics in the world.

My job began with not only researching alternative fuels through web sources, but also learning about them through interviews. My employer, Carl Irwin, knew that I was interested in alternative fuels but also knew I was unsure of my intended major; I assumed chemical engineering would be best for an alternative fuels research position, but I still was not sure. I interviewed many professors and researchers within the engineering school as well as the chemistry department. Not only did I learn about the alternative fuels they researched, but I also became interested in these studies and moved closer to deciding on my major.

After about two months of continuous research, I decided to write a general summary of the majority of alternative fuels studied today. However, I chose specifically to address the controversy over corn-based ethanol and my belief that it is not the right option for an alternative to gasoline. My report included descriptions, advantages, and disadvantages of the following alternative fuels and alternative fuel vehicles: forest biomass, biodiesel, bio butanol, switch grass, electric vehicles, hybrid vehicles, plug-in hybrid vehicles, hydrogen

fuel, fuel cells, solar power, natural gas, coal-to-liquid fuels, and finally corn-based ethanol.

After the research, I decided that the future of America's energy should not be dependent on a monopoly of one fuel. Instead, I concluded that more cars should be developed of the "flex-fuel" type, meaning they can operate using more than one energy source. For example, Ford has developed a concept called the Airstream, which utilizes electricity and hydrogen fuel cells as the source of power.

Whatever the combination, I decided that the most reliable transportation vehicle would be one that could combine any of the following: fuel cells, electricity, and cellulosic ethanol. Electricity and fuel cells emit no greenhouse gases, but, depending on the method of production, may require an immense amount of energy to create. However, the energy input is usually less than the energy output. Also, there is a significant reduction in greenhouse gas emissions by the aforementioned fuels compared with the emissions of gasoline. For hydrogen, the reduction is usually around 40%, and the fuel cells operate at around 50% efficiency. As for the other fuel option, cellulosic ethanol, depending on the method used to analyze the net energy and to produce the fuel, this fuel usually reduces greenhouse gas emissions by about 80-90%. This is due to an idea called the carbon dioxide cycle: although the combustion of cellulosic ethanol produces carbon dioxide, the plants used to create the fuel will use the released carbon dioxide to grow. Finally, although there are arguments concerning ethanol, I have concluded that most reports show cellulosic ethanol to be very efficient and can be derived from plants that will not affect any nation's crops and therefore will not affect those suffering from malnutrition.

After this summer, I have concluded that it is best to pursue a Chemical Engineering degree along with a B.A. in Chemistry. I believe the engineering discipline will help me to find mathematically the best fuels for our nation, while the chemistry degree will aid me in my understanding of these fuels. This year, I hope to gain even better knowledge of alternative fuels as I plan to join the biodiesel club as well as perform research on fuel cells.

The report can be accessed on the IOF-WV website at <http://iofww.nrcce.wvu.edu>.

EVENTS

Best Practices Process Heating Workshop, sponsored by the U. S. DOE Office of Energy Efficiency and Renewable Energy Industrial Technologies Program and the Industrial Gas Utilization, will be held October 4, 2007 at the Robert C. Byrd Institute for Advanced Flexible Manufacturing in Huntington WV. To register visit <http://iofww.nrcce.wvu.edu> or contact Kathleen Cullen at Kathleen.Cullen@mail.wvu.edu or (304) 293-2867 ext. 5426.

Coating Technology Seminar is sponsored by American Glass Research and will be held October 2-3, 2007 in Butler, PA. This seminar provides a complete explanation of the role of surface coatings in the maintenance of glass surface strength, their application in the hot end and the cold end as well as solutions to the problems associated with the use of coatings. For more information go to www.americanglassresearch.com or contact Linda Pilosi at lpilosi@agrintl.com.

IEEE Industrial Energy Efficiency Workshop - October 22-23, 2007, Baltimore, Maryland. This workshop will provide information to help manufacturers and processors save energy and reduce costs. For more information, go to <http://ieew2007.googlepages.com/>.

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Co-Funding Opportunities for IOF-WV Research Teams

| <i>Announcement</i> | <i>Due Dates</i> | <i>Funding</i> |
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| National Science Foundation Engineering Design www.nsf.gov | Now Open (Request for Proposals) September 1 to October 1, 2007 (Proposal Due) | TBD |
| National Science Foundation Material Design and Surface Engineering (MDSE) www.nsf.gov | Now Open (Request for Proposals) September 1 to October 1, 2007 (Proposal Due) | TBD |
| U.S. Department of Energy Solar America Initiative University Photovoltaic Process and Product Development Support www.grants.gov | Now Open (Request for Proposals) October 16, 2007 (Proposal Due) | \$6-\$10 million in total funding is anticipated for FY 2008 |
| U. S. Department of Energy Solid State Energy Conversion Alliance (SECA) www.grants.gov | Now Open (Request for Proposals) Due Date: January 15, 2008 | \$3,000,000 in total funding is anticipated for FY 2008 |
| U.S. Department of Energy Manufacturing Research and Development for Hydrogen and Fuel Cell Systems www.grants.gov | Now Open (Request for Proposals) October 10, 2007 (Proposal Due) | \$5,000,000 is anticipated to be awarded for FY 2008 |
| U.S. Department of Agriculture National Research Initiative Competitive Grants Program www.grants.gov | Now Open (Request for Proposals) Due Date varies- See Solicitation | \$190,000,000 in total funding is anticipated for FY 2008 |

DOE Industrial Technologies Program WEBCASTS

Building an Energy Performance Awareness Program - Webinar is sponsored by Building Owners and Managers (BOMA) International and will be held October 18, 2007. This course presents the key components of an energy awareness program for tenants, owners, brokers and asset managers. The training focuses on how to create an effective awareness program, communicate accomplishments and benefits to key stakeholders, and provides samples and templates for attendees to easily customize. For more information, go to www.boma.org or call (202) 408- 2662 or email to beep@boma.org.

WEBCAST- Fan System Assessment Tool (FSAT) Introduction will be held October 22, 2007. This webcast will provide an overview of the Fan System Assessment Tool (FSAT) to help plant personnel prepare for a successful Energy Savings Assessment.

WEBCAST- Steam System Assessment Tool Introduction will be held October 29, 2007. This webcast will provide an overview of the Steam System Assessment tools to help plant personnel prepare for a successful Energy Savings Assessment.

<http://www1.eere.energy.gov/industry/newsandevents/events.html>



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