

Biodiesel Initiative

- Student project to convert waste vegetable oils from dining halls to biodiesel for use in University fleet
- Conceived in fall of 2006
- Students designed reactor, pick up oil, and produce the fuel
- 80 gal batches – ramping up to 320 gal
- First 275 gals accepted in Oct' 09
- Est. annual production of 12,800 gals
- Funded by SSC
- Supported by the Illinois Sustainable Technology Center
- <http://biodiesel.illinois.edu/>



Algae Sequestration and Biodiesel

- Abbott Power Plant flue gas to be used as feedstock for algal bioreactor system
- Biodiesel will be combined with other project
- Construction underway – completed by April
- ~60 gallons per year
 - May scale up



Student Biodiesel

- 940 gallons of 100% biodiesel in the last year, Oct 2010

Cornell Gas Turbines, Billing and Biofuels

- 1) You mentioned that your cogeneration plant upgrade involved the installation of two new gas turbines and HRSGs, for \$82 million. What component of this was the actual turbine and HRSG costs? Did you reuse existing steam turbines at your facility or purchase steam turbines as well, to be driven by the HRSGs?
- I believe the costs for each turbine was ~\$5 million and each HRSG was ~ \$5 Million. Twenty million to buy the 4 of them. We did reuse existing steam turbines. The steam turbines are supplied steam from our 400 psi header which is also fed by package boilers.
- 2) You mentioned that Cornell bills departments for their energy use, and that you utilize rates that include the costs of debt service, and other fixed costs. How long have you had such a system in place?
- In excess of 20 years.
- How do you deal with the issue that if departments engage in aggressive energy conservation efforts, their bills could fall by more than the cost to you to provide them that energy?
- We are a large campus with expected growth and aggressive energy conservation our steam sales over the last 10+ years have stayed constant and we plan for small growth in the future. We sell the energy on a \$/1000lbs of steam.
- We are preparing to decentralize utility cost billing to the various colleges (by providing them a lump sum appropriation based on their utility usage over the past few years), however there is significant administrative concern about this issue, and we've been considering a variable-cost model instead - though this does not allow for funding any new capital projects, or help retire old debt.
- We maybe going to a similar billing system. In the proposed billing scheme customers would only be billed the variable costs. Not sure how this will work for us either.
- 3) Finally, you mentioned that Cornell is looking at Biofuels as an option to utilize your old coal boilers. Have you engaged in any fuel testing or other exploratory work yet?
- NO.
- What type of coal boilers do you have?
- Mass overfeed and spreader stokers.
- We are looking at biofuels as a bridge solution, but we expect that we will need to co-fire with coal.
- We have committed to moving beyond coal and will be expected to not fire any coal. Biofuels only at best.

Morris

- I asked Jerome Malquist (director of energy at the UMn Twin Cities campus) about Morriss. He offered to sell us the biogasification system at Morriss for \$8 million. It doesn't seem to work well, and he at least would like to see it disappear. UMn has not had great experiences with biofuels. They have a circulating fluidised bed boiler in which they occasionally co-fire oat-hulls with coal (33% oat hulls, 67% coal), but they have had lots of trouble with silicate contamination forming glass in the boilers, and on the heat exchanger tubes. They've had similar trouble with the biogasification at Morriss. Some of the glass contamination has led to boiler constrictions that has basically turned the fuel stream into a high-pressure cutting torch as far as I gathered They also warned us to watch out for chlorine emissions since we won't be doing this in a fluidised bed.

South Carolina

- <http://www.biomassmagazine.com/articles/1470/biomass-on-campus>

Madison, WI

- http://host.madison.com/wsj/news/local/article_27f12c2d-8e4e-5a10-9f85-03d2a5c4dbaf.html
- <http://downtownmadison.channel3000.com/content/ground-broken-charter-st-biomass-power-plant>

Montana

- http://missoulian.com/news/local/article_8c5ff1ba-d5ba-11df-becd-001cc4c002e0.html
- <http://news.umt.edu/2010/10/101110boil.aspx>

Mizzou

- <http://mizzouweekly.missouri.edu/archive/2010/32-9/power-plants-biomass-boiler-is-a-study-in-campus-collaboration/index.php>