Biodiesel Production in Maine using Waste Restaurant Grease

Fats, Oil and Grease Management Alternatives

February 15 and 16, 2005

presented by

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Agenda

- Biodiesel Basics
- Project Overview
- Business Planning
- Market Drivers
- Next Steps

Introduction

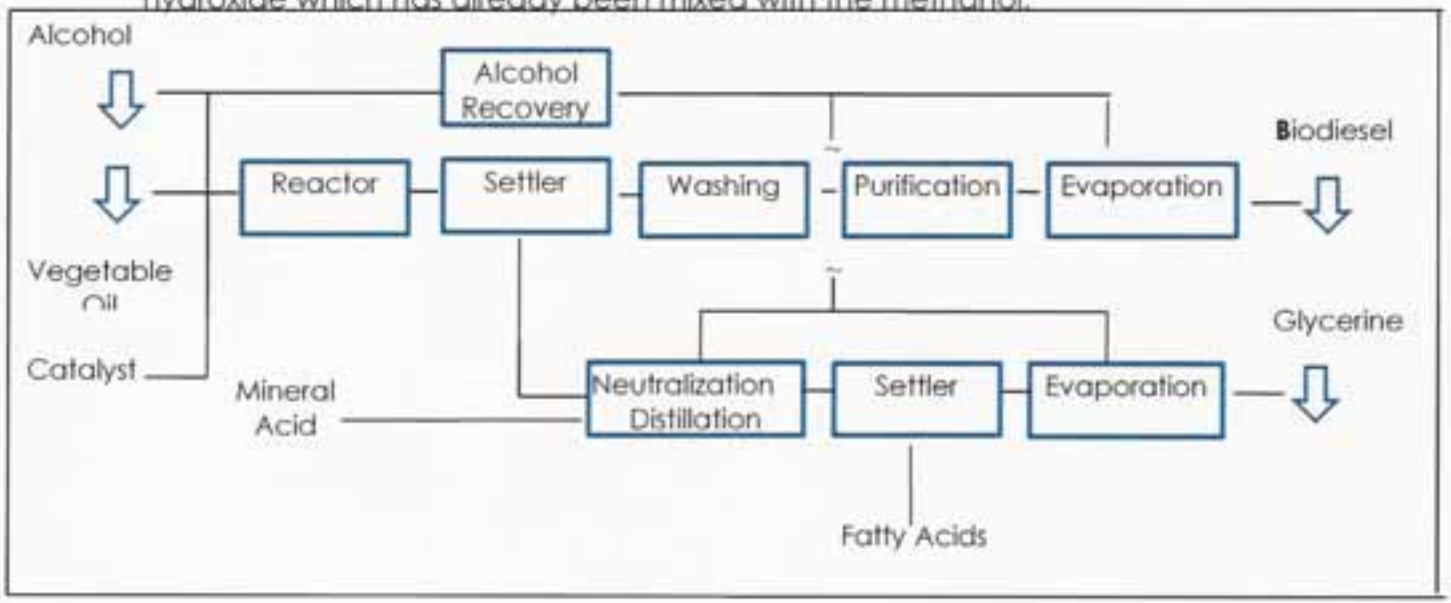
- Share information and experience gained in developing the business case for a biodiesel production facility in Maine
- Identify opportunities and roadblocks to market development

Biodiesel Basics

- Biodiesel is a fuel made from organic feedstocks; in the US, typically from oil crops such as soybean
- Biodiesel can replace petroleum diesel
- In transportation, blends are commonly used, such as B20
- Current national production of biodiesel is modest but growing
- See www.nbb.org for more information

Biodiesel Production

The general process is depicted below. A fat or oil is reacted with an alcohol, like methanol, in the presence of a catalyst to produce glycerine and methyl esters or biodiesel. The methanol is charged in excess to assist in quick conversion and recovered for reuse. The catalyst is usually sodium or potassium hydroxide which has already been mixed with the methanol.



Diesel fuel usage in Maine

- Year 2002 totals (from Energy Information Administration) of petroleum distillates in Maine
  - residential use 273 million gallons
  - commercial and industrial use 125 million gallons
  - on-highway use 168 million gallons
  - total nearly **600 million gallons**
- Biodiesel sales in Maine, 2003: no more than **45,000 gallons** (source: Frontier Energy, Solar Market)


BioDiesel B-20
FRONTIER
ENERGY


NO SMOKING
BioDiesel B-20
FRONTIER ENERGY
L.L.Bean
FREEPORT, MAINE

Overview of a facility in Maine

- Located in southern Maine (between Portland and Kittery)
- Use Waste Vegetable Oil (WVO) as feedstock
- Produce up to 1 million gallons/yr of B100 using proven technology
- Flexible design and operation to accommodate market variations (scale-up, scale-down)
- Private, profit-making venture

WHAT HAPPENS WITH WVO GENERATED IN MAINE NOW?


BAKER COMMODITIES
BILLERICA DIVISION
1-978-454-8811
NORTH BILLERICA, MA


BAKER COMMODITIES
INC.
N. BILLERICA DIVISION
134 Billerica Ave.


BAKER COMMODITIES, INC.
BILLERICA DIVISION

Can trap grease be used as a feedstock for Biodiesel?

- Theoretically this is possible
- Problems with solids, water content, and chemical contaminants
- At least one company (Superior Process Technologies) states its technology can achieve this conversion
- Not yet proven economically

How would a facility get the WVO feedstock?

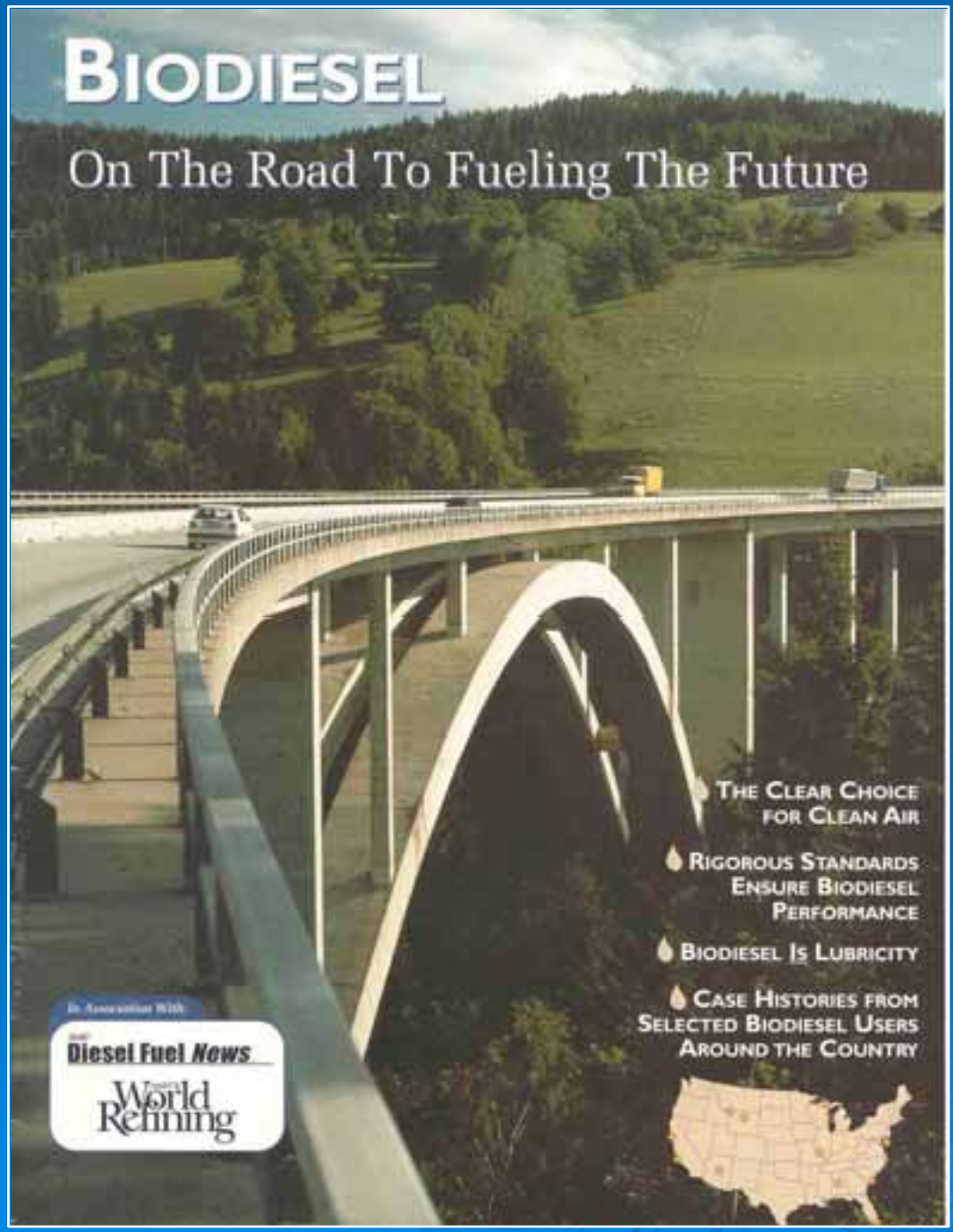
- Options:
  - 1. Collect from individual restaurants
  - 2. Purchase Yellow Grease (YG) from Baker or another rendering company
  - 3. Use a combined approach

Biodiesel Production Facility Business Planning Elements

- Definition of the business
- Raw materials
- Facility location
- Market
- Competition
- Management and staffing team
- Financial evaluation
- Supporting information

Market Drivers

…what factors detract from biodiesel sales and what factors enhance and promote sales?


BIODIESEL
On The Road To Fueling The Future
THE CLEAR CHOICE FOR CLEAN AIR
RIGOROUS STANDARDS ENSURE BIODIESEL PERFORMANCE
BIODIESEL IS LUBRICITY
CASE HISTORIES FROM SELECTED BIODIESEL USERS AROUND THE COUNTRY
In Association With
Diesel Fuel News
World Refining

Biodiesel to Grow in 2005 With New Tax Incentive

January 20, 2005

Domestically-grown soybeans which can be made into biodiesel - are helping to clean up the transportation network in the U.S.

Photo: NREL

St. Louis, Missouri [RenewableEnergyAccess.com] Rising fuel prices, growing national security concerns and a new tax incentive for biodiesel are all contributing to renewed interest in biodiesel - the cleaner burning alternative to petroleum-based diesel made from renewable resources like soybeans and other natural fats and oils.
"Because it can be used in today's diesel vehicles, biodiesel offers a seamless transition to a cleaner burning American fuel immediately."

- Kevin Herdler, Coordinator for St. Louis Clean Cities

"I believe biodiesel has an outstanding future in St. Louis and in the rest of the state and nation," said Kevin Herdler, Coordinator for St. Louis Clean Cities, a Department of Energy program dedicated to reducing petroleum consumption through cleaner burning fuels. "Because it can be used in today's diesel vehicles, biodiesel offers a seamless transition to a cleaner burning American fuel immediately."

A biodiesel production plant is also in the works in Missouri, which should lead to increased economic activity and better accessibility to the fuel for Missouri consumers. Missouri startup biodiesel company, Mid-America Biofuels, plans on opening a 15 million gallon per year biodiesel

Retail Fuel Pricing Trends

- Petroleum diesel (petrodiesel) prices steadily rising
- Soy based diesel prices rising due to rising input costs
- A B20 blend is 20% affected by soy pricing and 80% by petrodiesel price
- Rising petrodiesel prices heighten public awareness

Energy Self-Sufficiency

- Reliance on imported oil puts us at risk of supply instability
- Heavy imported oil use increases the importance of international stability
- Domestic production of biofuels offsets this risk, while increasing value-added domestic activities

Significant Environmental Benefits

- Biodiesel improves emissions in almost all categories of contaminants
- Biodiesel is nontoxic and nonhazardous
- Biodiesel production and use reduce net CO2 impacts
- Biodiesel from WVO turns waste into a resource, enhancing sustainability, and creating social and environmental benefits

Environmental Objectives

- Environmental policies or objectives that are addressed by using biofuels
- Some jurisdictions have implemented biofuel percentage objectives
- State of Maine has shown leadership in using biofuels
- Individual consumers also make choices in line with personal objectives

Task Force, new projects propel biodiesel in Minnesota

After Minnesota Soybean Processors announced in November its plans to build a 30-mmgy biodiesel plant, other projects are moving forward in the state, according to project revelations at the most recent Minnesota Biodiesel Task Force meeting.

Agricultural Marketing Specialist Ralph Groschen, who serves on the Minnesota Biodiesel Task Force, told *Biodiesel Magazine* that at least two projects were announced at the Task Force's Jan. 15 meeting. Central Byproducts has proposed a 3-mmgy plant, which would be built north of Redwood, Minn., and use recycled vegetable oil as its feedstock. In addition, SoyMor has proposed a 25-mmgy plant near Albert Lee, as reported in the Jan./Feb. issue of *Biodiesel Magazine*. Both of these projects are scheduled to produce biodiesel by July 2005, when Minnesota is expected to implement a blend requirement of 2 percent biodiesel in regular diesel fuel.

According to Groschen, Minnesota uses 800 million gallons of diesel fuel per year, which roughly translates into a demand for 16 million gallons of biodiesel per year to meet the 2 percent mandate. The state legislature hopes to meet at least half of that demand with Minnesota-produced biodiesel.

Gov. Tim Pawlenty assigned the Task Force last year; the group's primary function is to make sure there is ample biodiesel production in the state by July 2005. Also, the Task Force is concerned with minimizing any adverse impact the use of biodiesel may have on the state's marketplace, Groschen told *Biodiesel Magazine*. The Task Force plans to solve as many problems—and answer as many questions—as it can, gathering recommendations along the way that will help the program operate successfully.

"This project is similar to ethanol," Groschen said. "If you handle it properly, it works out quite well. But there are similar issues. What if we run out? Then we won't be able to sell diesel fuel. But those are the kinds of things the industry will take care of. You never expect to run out of ethanol, [and we won't] run out of biodiesel."

-Staff Report

Environmental Education

- USM biodiesel fuel program based on student input
- Chewonki Foundation environmental education and demonstration projects
- High School pilot programs for use of biodiesel fuel in school buses
- National efforts i.e. National Biodiesel Board

Maine campuses go green to stay clean

After having asthma difficulties from riding diesel shuttle buses from Portland to Gorham, Sarah Ferriter campaigned to get the University of Southern Maine to use cleaner-burning biodiesel fuel.

Staff photo by John Patriquin

● Often at students' insistence, colleges are increasingly choosing clean-energy sources.

By MEREDITH GOAD
Staff Writer

Sarah Ferriter was tired of her asthma flaring up whenever she rode the shuttle from Portland to the University of Southern Maine's Gorham campus.

Pollution from the diesel buses triggered breathing problems for Ferriter, a 29-year-old senior majoring in environmental science and policy, and she began to miss classes. "Two years ago, I was just really, really sick," she said. "I literally could not go to school."

So Ferriter organized a campaign to get the school to use cleaner-burning biodiesel fuel in its buses. She gathered 63 signatures on a petition and sent a long letter to USM's president. Then, helped by a $600 grant from the National Wildlife Federation and a $75-per-week fellowship from EnviroCitizen, she convinced students to vote for a $1-a-year addition to their student fees to help pay for the project.

Ferriter is among a growing number of student activists pushing school administrators and fellow students to put their time and money where their convictions are by supporting a move to greener energy sources. And administrators are warming to the idea as a way to reduce overall energy costs and stay competitive with schools that are adopting similar environmentally sensitive policies.

Colby College in Waterville was the first Maine school to announce that it would buy electricity only from renewable energy sources, cutting its nitrogen oxide emissions by 41 percent and its sulfur dioxide emissions by 98 percent. The school has also committed to building two green-certified buildings and has a special energy committee that includes

Please see **GREEN**, *Page* **10B**

Taxes and Subsidies

- **Blender credit** passed into law at federal level – not yet regulated
- **Producer credit** recently approved at State of Maine level (5 cents per gallon)
- *These tools can serve as catalysts for a project*

RESULTS OF BUSINESS PLANNING FOR BIODIESEL PRODUCTION IN MAINE

Business Plan Supporters

- Chewonki Foundation (sponsor)
- New England Organics (a division of Casella Waste)
- John Allen (private investor)
- Alfred Padula (private investor)

Production

- Capital and operating cost estimates developed
- Economy of scale favors larger facilities (10 million gallons per year and up)
- Budget pricing obtained directly from vendors

Scale of Investment

- Level of investment is modest (2-3 million)
- Scale of project makes it difficult to provide a comprehensive, integrated project team on a fulltime basis
- Potential sources of investment capital:
  - Individual private investors
  - Corporate investments
  - Partial support from state funding sources

Financial Projection

- Base model of 1 million gallons per year of production
- Capital cost estimates
- Operating cost estimates
- Revenue projections
- Performance (net return) projections

Financial Results

- Capital Cost between 2.5 and 3.0 million
- Annual operating cost between 1.5 and 2.0 million
- Net production of 1 million gallons/yr B100
- IRR from -17 to +50 percent based on five years of operation, depending on assumptions taken

Cost Uncertainties

- Wholesale sales of B100 at what prices?
  - Financial modeling at $2.50 and $3.00 per gallon
- Highly influenced by:
  - Input (WVO) costs
  - Glycerin disposal costs
  - Tax credits

SUMMARY

- A one million gallon per year B100 production facility is potentially financially viable
- Financial results highly dependent on WVO cost and B100 revenue
- Smaller scale facility would be more of a ‘boutique’ operation and could be less adversely affected by B100 revenue limitations
- Larger scale facility would be more regional, and perhaps better located in MA, RI or CT

WHAT'S NEXT?

- The project is potentially economic
- It needs incentives to help get it off the ground
- It needs a management team and structure to support it
- It needs commitments to purchase the product

Thanks for your interest.

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