

Strategies for Small Biodiesel Plants: Secrets for Success

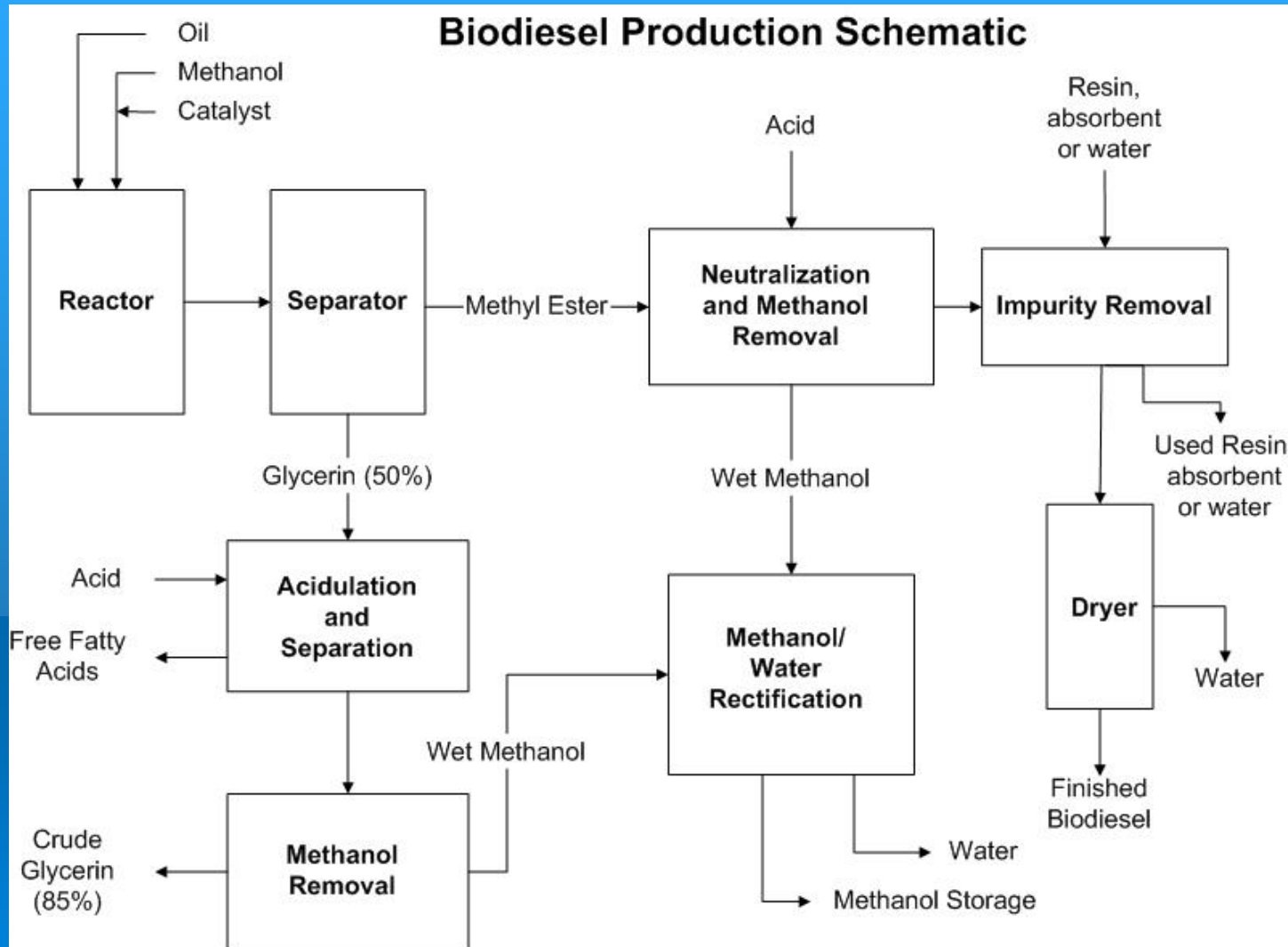
The Collective Biodiesel Conference

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by

Rudy Pruszko

Biodiesel Consultant



Basic Biodiesel Concerns

Five most important questions

- What size plant should I build?
- Where do I get my feedstock and what does it cost?
- Where do I sell or use my biodiesel?
- What do I do with the byproducts?
- Can I make it safely and protect the environment while still making a profit?

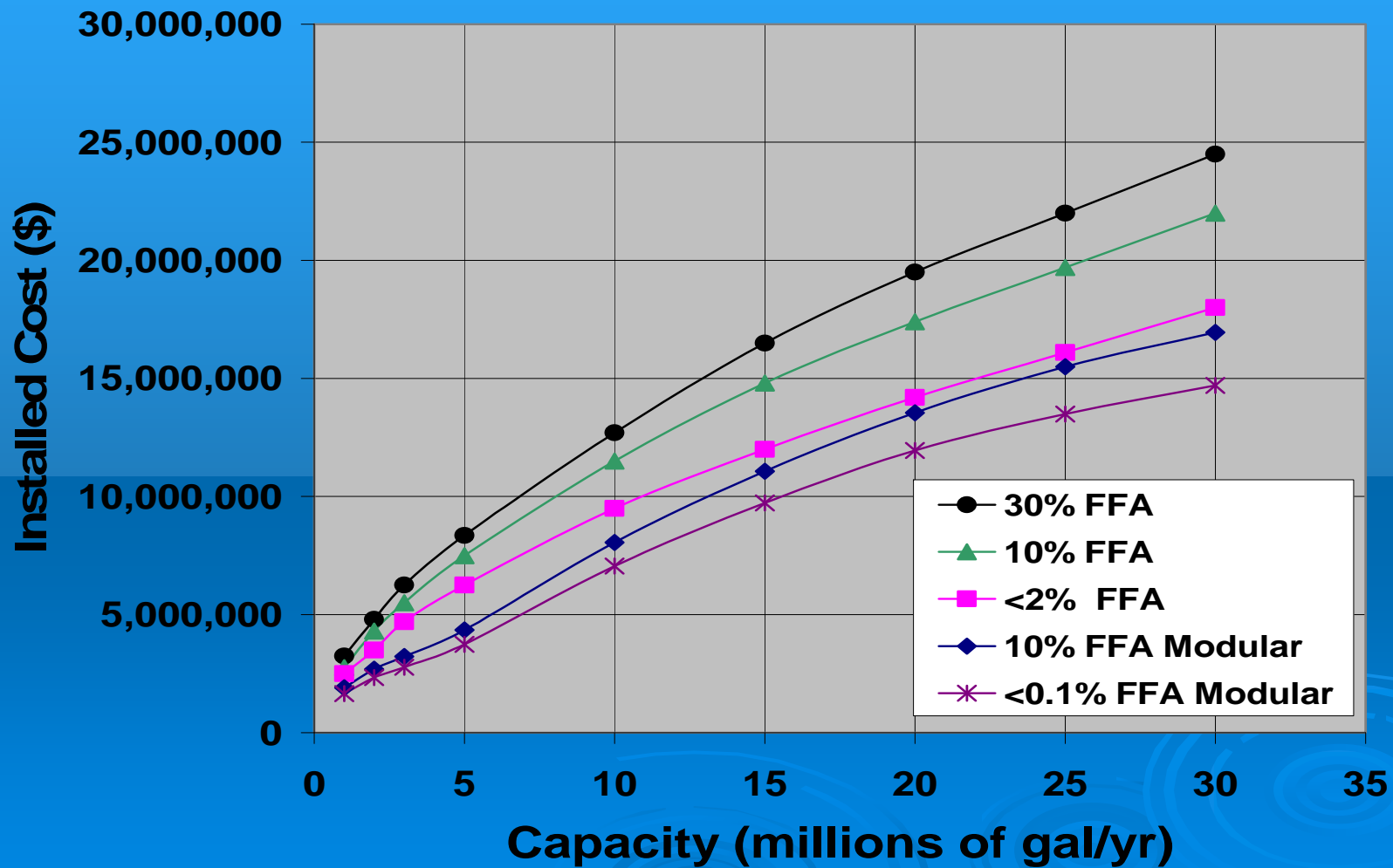
Plant Size and Cost

What size should I build and at what cost?

- Let your feedstock supply determine the plant size
- Match your market size
- Start small and then expand
- Determine financial resources
 - Rule of thumb \$1 per gallon of capacity

Plant Size and Cost

Biodiesel Plant Budget Installed Cost



Feedstock Type Comparison

Animal fats

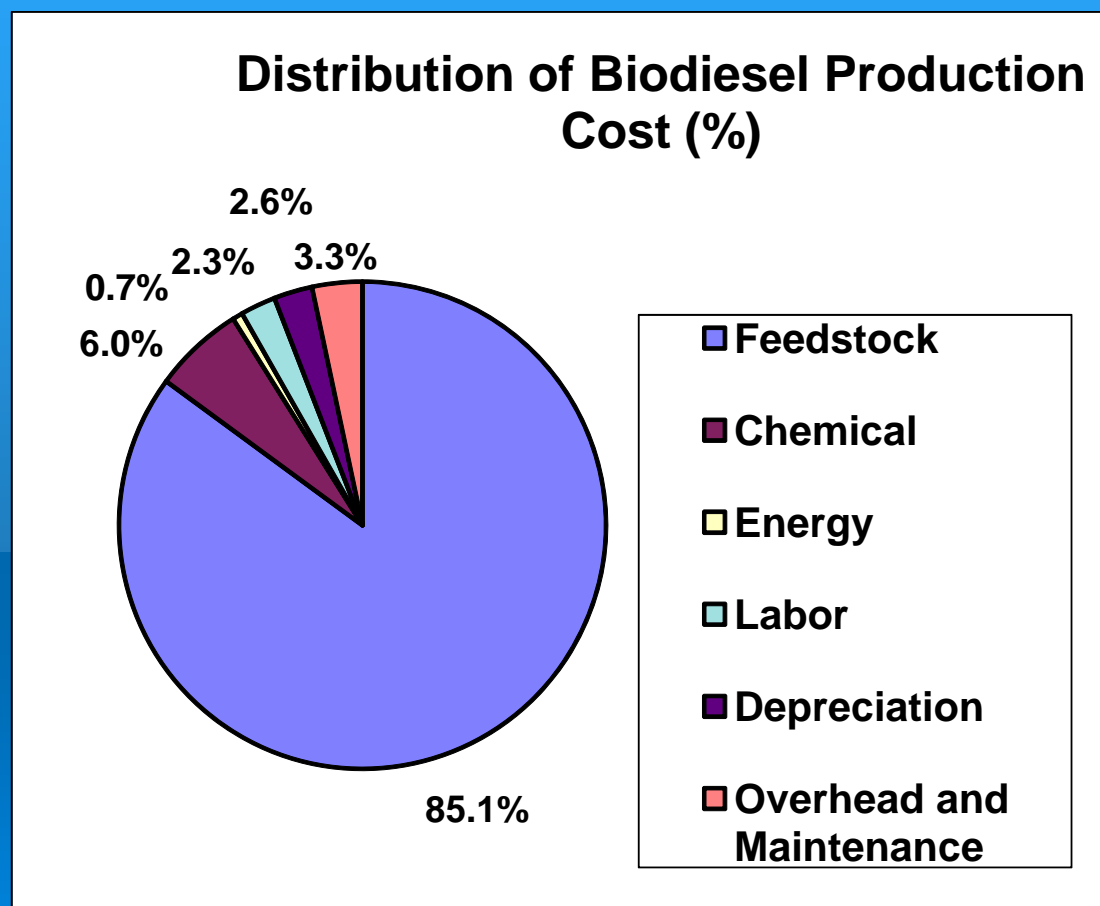
- Less expensive
\$0.34/lb average
- Higher sulfur
- FFA 5-50%
- Less available
- Higher gel temp.
- More stable
- Lower Sterol Glycosides

Seed oil

- More expensive \$0.42/lb average
- Lower or no sulfur
- FFA <5%
- More plentiful
- Lower gel temp
- Less stable
- Higher Sterol Glycosides

Why Feedstock Price is Important

5 mm gpy Biodiesel Production Cost



Feedstock Sources

Alternate Sources

- Off Spec feedstock
- Collect WVO and pretreat yourself
- Byproducts from other industries
- Grow new crops and toll crush

Plant Size Considerations

- Batch plant cost less than a continuous plant
- Batch plant footprint is usually larger than continuous plant footprint
- Batch plant can be operated for short periods of time
- Flow rate through a Continuous plant must be balanced and run 24 x 7

Small Plant Considerations

- Safety is most important
- Batch plants are preferred
- Quality of biodiesel produced
- Government regulations and taxes
- Environmental regulations
- Government registrations and permits

Biodiesel Washing Methods

➤ Water Washing

- Soft water, de-ionized (DI), distilled, reverse osmosis (RO)
- Shower head
- Counter current flow
- Bubbling nitrogen

➤ Absorbent

➤ Resin bed

Methanol Removal Methods

Recoverable methods

- Flash evaporator
- Still (batch)
- Distillation column (continuous)

Non recoverable methods

- Water wash

Problem Solving Tips

- Make test batches in the lab
- Make it wrong in the lab
- Do mass balances
- What goes in must come out
- Visual appearance - first check of quality
- Know the affects of temperature on your product, process and reactions

Problem Solving Tips

- Free Fatty Acid (FFA) can be a problem
- Minimize water in reaction phase
- Understand the process and equipment
- Feedstock determines the biodiesel properties
- Soap produced is difficult to remove
- Sample and test frequently when troubleshooting

Do Your Homework

- Conduct a Feasibility Study
- Write a business plan
- Do your research before you start your Biodiesel business
- Look at the financing
- Understand the Markets
- Meet all regulations and permit requirements

Why Conduct a Feasibility Study?

- Learn about the industry and business
- Provide information for a business plan
- Determine if you should enter into the business and can make a profit
- Requirement from financial institutions, federal and state programs, or grants
- Understanding the risks involved

Parts of a Business Plan

- Request Page
- Table of Contents
- Executive Summary
- Business Description
- Management
- Market Analysis
- Marketing Plan
- Product of Services
- Manufacturing Plan
- Financial Data
- Supporting Documents

Ten Key Points to Remember When Writing a Business Plan

- Be honest
- Write in easy to understand terms
- Describe your company's image
- Provide the reader with an understanding of your business and how you will use the loan
- Evaluate the company's management team

Ten Key Points to Remember When Writing a Business Plan

- Strategic planning
- Quantify your market
- Illustrate major points
- Nature and complexity will vary
- Business plan is your sales document

Winning Strategies

- Use a low cost feedstock and understand the characteristics
- Know your biodiesel market
- Have a plan for the byproducts
- Make biodiesel safely and protect the environment while still making a profit
- Understand the properties of your biodiesel

Biodiesel Quality Concerns

Why is Quality important?

- ASTM D6751 must be met to obtain government incentives
- Liability issues
- Engine life and performance
- Quality, performance, and safety are all related

Areas of Efficiencies

Potential areas for efficiencies in a small plant

- Feedstock procurement and selection
- Market and production flexibility
- Trade time for equipment
- Washing methods
- Methanol removal

What is on the Horizon?

- Solid catalyst
- New feedstocks
- Small niche plants
- Low energy plants
- Integration with other processes and plants
- New or different technologies to make biodiesel

Resources



Rudy Pruszko, John Van Gerpen, Davis Clements, Brent Shanks, and Gerhard Knothe, *Building a Successful Biodiesel Business*, 2006, Iowa.

Available from
<http://www.biodieselbasics.com>

Contact Information

Rudy Pruszko

BioRudy@gmail.com

563-599-0645

Contact for Biodiesel and biofuel consulting expertise, in areas such as feasibility studies, technology evaluation, business plans, plant design, troubleshooting, marketing and start-up...