FEASIBILITY REPORT
FOR
THE OLYMPIA BIOFUELS COOPERATIVE:

EMERGING OPPORTUNITIES
IN
RAPIDLY DEVELOPING MARKETS

A FEASIBILITY STUDY FOR THE COOPERATIVE PRODUCTION AND DISTRIBUTION OF BIODIESEL FOR LOCAL MARKETS

FALL 2006

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FUNDED BY: USDA Rural Cooperative Development
&
Support from the Olympia Biofuels Co-op

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1. Overview

This study is intended to permit Olympia Biofuels Cooperative (OBC) to make better decisions about the strategic issues of its project; this study is not a business plan or a blueprint for business operations but the foundation for those to be developed later. The study is the first time in the project development process that the different components are assembled to see if they perform together to create a technically and economically feasible concept.

This study outlines the purposes, technologies, regulatory, requirements and economics for a cooperatively-owned, community-scale biodiesel production facility in Thurston County. Unlike the standard investor-owned biodiesel bio-refinery business model predominant in the U.S., this is a cooperatively-owned system, utilizing regionally generated waste oil and selling biodiesel to regional markets. The optimum scale of this bio-refinery is smaller than the predominant model, primarily due to being based on the use of locally generated oil and servicing community markets. In the initial operational plan, production is at least 380,000 gallons per year of 100% Biodiesel or B100. The initial target market is a combination of retail and wholesale; focusing on retail while selling surplus to move sufficient product.

The economic analysis includes timetables for development, cost estimates, performance expectations, profit and loss, and cash flow projections.

This study was developed under contract with the Northwest Cooperative Development Center (NWCDC) and was submitted to the Olympia Biofuels Cooperative (OBC). Funds for this study are from the Olympia Biofuels Cooperative and from a U.S. Department of Agriculture's Rural Cooperative Development Grant. The study is the result of a year of collaboration between OBC and NWCDC. The information in this study is the result of applied research and organizational development sessions with OBC.

1.1. Executive Summary

If the key recommendations are followed and recommended options are vigorously pursued, the project holds good probability for success. The completion of this study is only the first step among many more to reaching the goals for the Co-op. Success is also highly contingent on raising nearly $500,000 for capital expenditures and to provide working capital. The Co-op must play to its core strengths of member-owned and community-based. An activist steering committee is going to need to demonstrate leadership; otherwise, this project's feasibility is marginal.

1.2. Recommendations

An overview of the critical success factors:

- **Strategic network building and partnering:** increase partnership building and networking of key stakeholders
- **Diverse capitalization sources:** secure and raise a combination of federal, state, member-based and private financing
- **Marketing the Cooperative Advantage:** leverage the Co-op's cooperative nature and its core strengths in messaging and planning, i.e. local, renewable, community-based, etc.
- **Ongoing capacity development:** hold a strong commitment to ongoing training for the management team, i.e. Board of Directors and hired manager.
- **"Right-sized" business:** seek to build a business plan around an appropriate, community-scale size; fortify the co-op's position before extending out

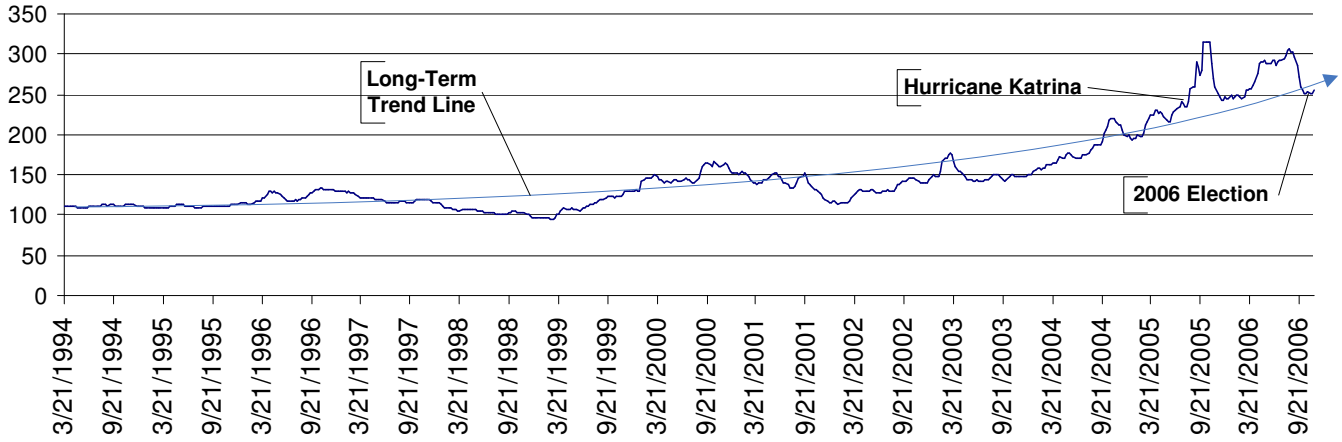
1.3. Feasibility Assumptions

Feasibility studies are a document of deliberation founded on assumptions. The closer the assumptions are to reality, the greater the chance for success. One primary assumption that this study and the committee operates under is price volatility of gasoline as a result of increasing scarcity and increasing demand. It is also assumed that biodiesel pump prices will, with minor fluctuation, be pegged to the increasing retail price of diesel. That said, no biofuel business plan should be authored on optimistically high petroleum prices but instead should prudently be built to feasibly survive lower then expected petroleum prices.

Based on the Department of Energy's Energy Information Administration, the following chart clearly demonstrates a trend of increasing gasoline prices.[1]

[1] Energy Information Administration. http://eia.doe.gov/ Retrieved April 2006 from: http://tonto.eia.doe.gov/oog/ftparea/wogirs/xls/psw18vwall.xls at http://tonto.eia.doe.gov/oog/info/wohdp/diesel.asp

U.S. No 2 Diesel Retail Sales by All Sellers
(Cents per Gallon)



If these trends hold, it is speculated that an era of relatively "cheap" energy could end. Obviously, the myriad of causes and ramifications for this trend are controversial and not a subject for this study. Nevertheless, it is currently an important variable in government policy debates and certainly for energy industry planning. For example, the July 24, 2005 Washington Post reports on a mock "war game" of an oil crisis:[2]

> *U.S. would be all but powerless to protect the American economy in the face of a catastrophic disruption of oil markets, high-level participants in a war game concluded… The exercise, called "Oil Shockwave" … had real-life former top U.S. officials taking on the role of members of the president's Cabinet convening to respond to escalating energy crises, culminating in $5.32-a-gallon gasoline and a world wobbling into recession "The American people are going to pay a terrible price for not having had an energy strategy," said former CIA director Robert M. Gates, who took on the role of national security adviser. Stepping out of character, he added that "the scenarios portrayed were absolutely not alarmist; they're realistic." When the exercise's planners first met last year, oil was in the $40-a-barrel range. As they fantasized where oil prices would be for the war game's start in an imagined late 2005, they said, they set them at $58 but worried they were being absurdly pessimistic. Yesterday, the closing price for a barrel of oil was $59.42.*

Their "absurdly pessimistic" forecast of $60-a-barrel oil came and went after peaking at $78.40 in July to settle down to $59 per barrel at the time of this study.[3] This

[2] Mintz, John. June 24, 2005. "Outcome Grim at Oil War Game; Former Officials Fail to Prevent Recession in Mock Energy Crisis." Washington Post. Retrieved June 2006 from: http://www.washingtonpost.com/wp-dyn/content/article/2005/06/23/AR2005062301896.html

[3] Dishneau, David. "Locked-In Fuel Oil Price No Bargain Now." Forbes. October 10, 2006. Retrieved October 2006 from: http://www.forbes.com/technology/feeds/ap/2006/10/10/ap3080023.html

scenario creates a new context for considering the importance of augmenting the traditional fuel supply with renewable options at a local level.

The two main assumptions are: first, for the foreseeable future, gas prices will be more volatile then it has been historically; and second, that this is an issue that can be addressed locally by the Cooperative through the sale of biodiesel.

2. Setting and Need

In previous years, the biodiesel consumer market in Thurston County was primarily served by a loosely federated group of unincorporated "collectives" with a preset number of members. These semi-social entities existed in urban areas up and down the I – 5 Corridor in the Pacific Northwest, if not the entire West Coast. There was and is a large "do it yourself" ethic to these groups and the collectives tended to operate out of a single member's garage which could be used for "brewing" and distribution of bulk purchased Biodiesel sourced from the Midwest. A small boutique fuel wholesale distribution industry was set up and still exists to serve these collectives.[4]

As biodiesel has become more readily available, a number of collectives disintegrated through lack of critical need. Their main reason for existence was now being served by other sources. In winter of '04-'05 a group of Biodiesel enthusiasts/advocates, primarily consumers and several biodiesel brewers, met to form a steering committee to explore the viability of an Olympia Biofuels Co-op (Oly Biofuels or OBC).

The Steering Committee identified the following needs to:

- Localize the fuel economy
- Increase the availability of Biodiesel
- Develop a "better use" for waste grease products

The purpose of this study was to explore whether or not a compelling economic reason existed to meet the previously mentioned needs. The elusive and seductive promise of biofuels has been that almost anybody can do it. Nations who romanticize it, groups of farmers who launch plants, entrepreneurs who recruit venture capitalists and do-it-yourself enthusiasts all have one thing in common: *they believe they can succeed in undertaking liquid biofuel production.* Olympia Biofuels Cooperative is Thurston County's biodiesel consumer's response to this phenomenon.

Through strategic planning and visioning sessions facilitated by the Center, the Co-op Steering Committee established that it didn't seek to create a volunteer-run

[4] For example, Dr. Dan's Alternative FuelWerks; www.fuelwerks.com That said, Dr. Dan's business has expanded beyond serving just these collectives.

organization, and that healthy paying jobs were a critical component of their long-term vision for the project. They seek to create a viable business, not a club, to produce this fuel. This is an important distinction because the booming biodiesel industry has been fast to wash its hands of the garage-brew biodiesel movement "in order to separate itself from potentially harmful fuel quality, safety and business practice blunders."[5] The Co-op seeks to join the industry and to leave the "garage days" behind.

2.1. BACK GROUND

Biodiesel and most renewable energy markets are growing at an astounding rate; this growth is a result of multiple factors, including:

- Public and business concerns of shrinking oil reserves[6]
- R&D coming to fruition combined with corporate anticipation of emerging renewable markets[7]
- Bipartisan support of legislative prioritization of renewable energy sources[8]
- Venture capital seeking new opportunities
- Ever increasing price per-barrel for crude oil
- Years of advocacy on part of environmentalists for petroleum alternatives
- Public desire to reduce dependency on foreign oil
- Desire to increase regional control in the fuel economy
- Domestic economic opportunity

The convergence of government and corporate interests has made for a "perfect storm" around the biofuels industry. As identified in "Sidebar One," the biodiesel industry has left a stage of "dormancy" and has entered into the "takeoff" stage. Now is the opportune time for new ventures to be launched. History will most likely remember 2005 to 2006 as the "honeymoon" stage for biodiesel. Yet any venture must prepare and brace for the imminent "shakeout" stage by maintaining a clear strategy, a well thought-out business plan and sufficient cash

Sidebar One

The 5 Stages of the Industrial Lifecycle

Caused by product innovation or deregulation, the following stages are common in emerging industries:

1. ***Dormant:*** low numbers of competitors enjoying high monopoly profits
2. ***Takeoff:*** soaring entry and virtually non-existent exit from the market
3. ***High Turnover:*** many firms entering the market and leaving it
4. ***Shakeout:*** mass exit via mergers, bankruptcies, etc.
5. ***Stabilisation:*** a stable oligopoly emerges

http://en.wikipedia.org/wiki/Industry_lifecycle

[5] McElroy, Anduin. "Will Backyard Stills Make a Comeback?" Ethanol Producers Magazine. July 2006. Retrieved October 2006 from: http://www.ethanolproducer.com/article.jsp?article_id=2154
[6] http://en.wikipedia.org/wiki/Peak_oil
[7] Hanisch, "Establishing Renewable Energy Markets"
[8] Bush, "Bush Delivers Speech on Renewable Fuels Sources."

reserves. Right around the corner could exist an era of feedstock scarcity, increased regulation and greater market saturation. This possible reality could create an environment in which unprofitable businesses with terminal cash flow problems are attempting to forestall consolidation with the emerging oligopolies.

2.2. Current Steering Committee Composition

Currently the greatest asset of the Co-op is its people, and their vision, courage and desire to move this project forward. As a community oriented project, people are one of the keystone to the project's feasibility.

The current committee is comprised of six biodiesel home brewers, consumers, advocates and enthusiasts: Duke Brady, Nick Fox, Sam Garst, Terry Minton, Kahlil Provo, and Jacob Rosenblum.

Sam Garst is an experience senior private sector manager and has operated businesses in the Midwest and England. Mr. Garst spent a decade at Garst Seed Company, a $90MM agricultural seed manufacturing firm. Mr. Garst holds a Bachelor's of Arts in Economics and is talented at financial management and client service. Mr. Garst has provided financial and business development oversight to the steering committee. Mr. Garst owns a diesel vehicle which he frequently uses biodiesel in.

The two lead individuals examining the science, operations and production details are Nick Fox and Terry Minton. Mr. Minton holds two Bachelor's of Science degrees, one of which is in Mathematics and he has decades of experience as a military nuclear pharmacist. Mr. Minton has years of experience home brewing biodiesel for friends and personal use. Nick Fox, a working member at the Olympia Food Co-op, has years of biodiesel home brewing experience and experience in fundraising, membership drives and academic-level research.

Providing organizational and marketing support are Kahlil Provo, Duke Brady and Jacob Rosenblum. Kahlil Provo, who holds a Bachelor's of Arts in Literature, has years of experience home brewing biodiesel and is a currently a high school educator. Mr. Provo was a founding member of the original biodiesel fuel-buying co-op which hosted Olympia's first commercial pump for biodiesel. Mr. Provo is an articulate supporter and advocate for the Co-op and the industry. Duke Brady holds a Bachelor's of Arts in Communications; he passionately consumes and brews biodiesel and has provided marketing support to the Co-op. Jacob Rosenblum has years of experience developing community projects and involvement with the Olympia Food Co-op. Mr. Rosenblum has been thoroughly involved with the start-up processes of launching community-based initiatives.

2.2.1. Current Operations

Currently the majority of the group consumes biodiesel and intends to continue consuming biodiesel. About half of the group currently produces waste oil-based biodiesel and has undertaken this project to not only make the product more commercially available but also to keep ownership local and community-based. They have spent a year attending regular meetings to coordinate research, strategically plan and organize the potential Co-op.

2.2.2. Steering Committee's Motivations and Vision

The committee drafted the following statements to communicate how the Co-op will affect its world.

Economic Vision
The Co-op generates sufficient cash flow to provide for reinvesting in the business with respect to improving technology and employee compensation and environment. Company officers and employees share a common goal for the mission of the co-op and work to provide replicable models of cooperatively owned industry.

Ecological Vision
The Co-op is focused on reducing the human footprint on our planet through locally sourced and sustainably manufactured energy products and services. The Co-op sets a higher standard in meeting a market that demands not only ecologically friendly product but one that is conscious of the environment as it is produced.

Ethics Vision
The Co-op has a profound respect for humanity and demonstrates a commitment to human rights and equality. Our cooperatively managed business gives its workers a fair wage and a democratic work environment. The Co-op facilitates strong lines of communication and involved in the Co-op. Our ethical values are projected in all that we do, fostering a positive image in the community.

Community Vision
The Co-op has a proactive approach of engaging and education the community about biofuels, the car culture and the workings of cooperatives. The Co-op enlivens a broad-based community shift towards an equitable, participatory economy. The Co-op fosters a world where people can actualize their role as active stakeholders in the industrial process.

Reasons for the Cooperative Business Model

In this application, OBC's intentions are well suited to the cooperative business model because it fits their vision and intention. The Committee can leverage that co-ops have a dramatic economic impact at the local level by:

- Returning profits to members
- Keeping decision making local
- Spending money where its located
- Borrowing locally
- Diversifying the local economy

Thurston County is overall suitable to a co-op; there is a history of smaller biodiesel co-ops and an above average number of credit unions, and worker and consumer co-ops indicating above average community support for cooperatively owned businesses.

2.3. Relevant Governmental Programs

There is significant governmental support at both state and federal levels. A new Renewable Fuels Standard for Washington State mandates the use of biofuels and the Energy Freedom Loan program offers 1% APR loans for relevant programs. Federally the Section 9006 Grant program offers matching grants for bioenergy projects. These factors combine to communicate a clear message that both federal and state governments not only realize the importance of the emerging biofuels industry but are willing to act as a catalyst.

2.3.1. Washington State Renewable Fuel Standard

With the passage of ESSB 6508, the Washington State Legislature "requires that a certain percentage of motor fuel be obtained from renewable sources such as ethanol or biodiesel."[9] The biodiesel standard starts at 2% in 2008 and increases to 5% triggered by instate feedstock availability. According to Climate Solution's K.C. Golden:[10]

> *This new state biofuels standard makes Washington a leader in national efforts to meet the federal Energy Bill's new Renewable Fuels Standard of 7.5 billion gallons per year by 2012. State fuel standards build biofuels industries positioned to take advantage of guaranteed markets created by the federal standard, while states without such industry-building standards could be passed by in the race to grow biofuels markets. The Northwest is positioning to become the leader in the biofuels industry.*

[9] Washington State Legislature
[10] Golden, "Washington State Passes Biofuels Standard."

Washington State's modest renewable fuels standard has put it on the national map as aspiring for involvement in this new industry.

2.3.2. WSDA's Energy Freedom Loans

In 2006 the Washington State Legislature established the low interest Energy Freedom Loan program as a way to leverage more private funding into start-up ventures.[11] According to the Washington State Dept. of Agriculture:

> *The low-interest loans are available to local governments, ports and other public entities and are intended to leverage additional private financing. Matching funds are required to cover at least one-half of the project's total cost. Local public entities may collaborate with private companies to develop the energy production facilities. The Energy Freedom Loans have a 10-year term with a one-percent annual percentage rate.*

Although the state's initial appropriation has been allocated, additional appropriations or returned funds could become available at a future date if determined by the Washington State Legislature. The Co-op should monitor this situation and the availability of this program.

2.3.3. USDA's Section 9006

The USDA has been offering yearly grants under Section 9006: Renewable Energy and Energy Efficiency Program.[12] "This program currently funds grants and loan guarantees to agricultural producers and rural small business for assistance with purchasing renewable energy systems." It is important to note that presently Olympia is considered "rural" by USDA standards and is therefore eligible for these programs.

2.4. Industrial Landscape and Competition

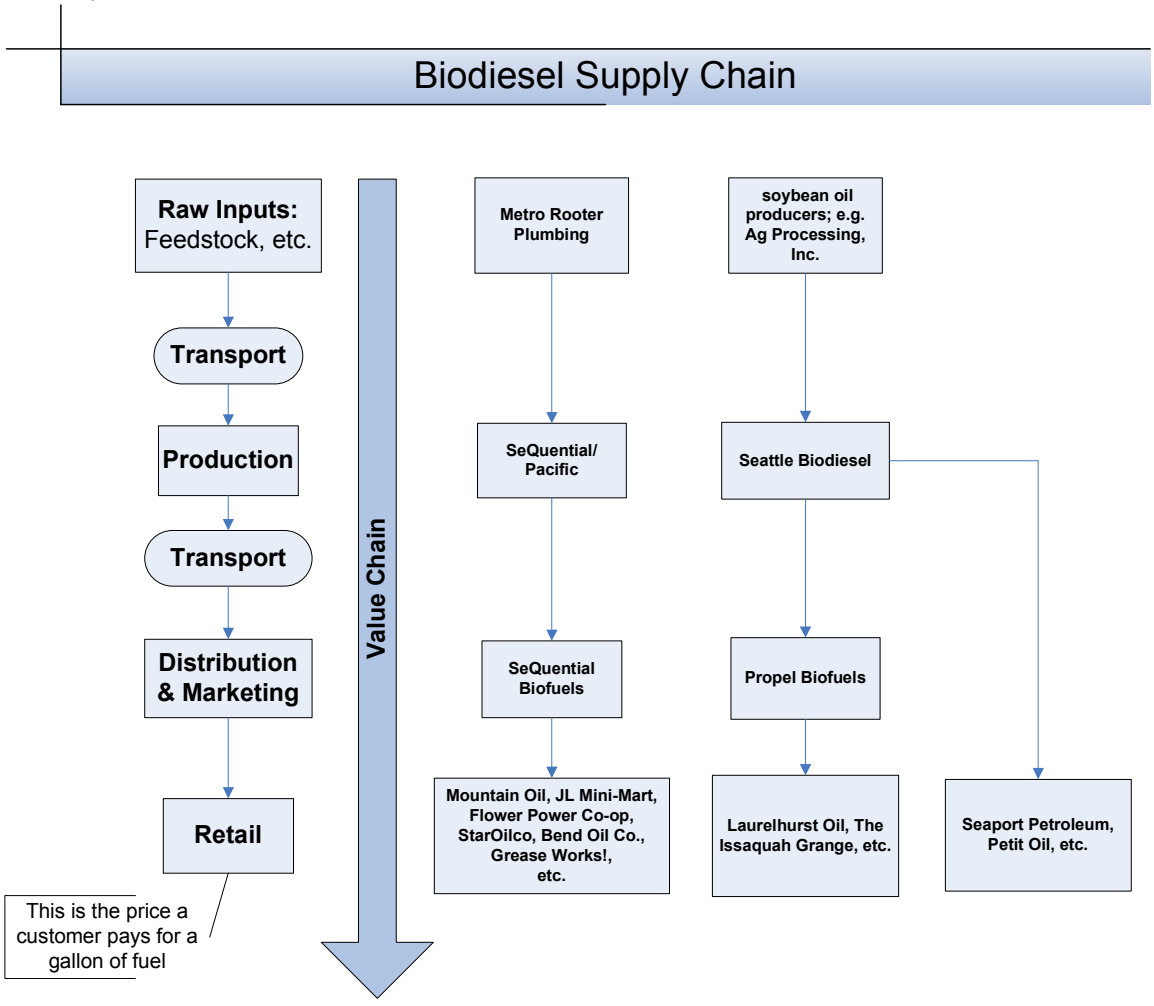
The following chart, titled "Biodiesel Supply Chain," demonstrates that in most instances there are three to six different companies which acquire, refine, transport, distribute and sell biodiesel fuel between feedstock and pump. Each of these companies has been able to leverage an entry point to "add value" to a specific set of customers.

An example in Oregon is Metro Rotor Plumbing (or MRP) which had a clientele of restaurants they already serviced and needed a WVO removal service. MRP then set

[11] News Release. "Governor Gregiore Announces Energy Freedom Loan Awards." July 13, 2006. Retrieved October 2006 from: http://agr.wa.gov/News/2006/EnergyFreedomLoanAwardsJuly2006.htm
[12] USDA. "Section 9006: Renewable Energy and Energy Efficiency Program." Retrieved July 2006 from: http://www.rurdev.usda.gov/rbs/farmbill/index.html

up an exclusive contract with Pacific-SeQuential to supply WVO from restaurants as a feedstock. SeQuential-Pacific didn't seek to enter into the WVO removal business; they sought to identify a strategic partner which had an economy of scale and a tactical advantage in acquiring their product, which would be able and willing to provide their inputs at a low cost. This partnership with MRP fulfilled this need.

The example in Washington is Seattle Biodiesel. They procure virgin oil from Midwestern producers, brew biodiesel and then market their product to retail outlets directly or wholesale their product to distributors.



A different model is GoBiodiesel in Portland, OR.[13] GoBiodiesel is a member-run and member-benefited cooperative in which volunteers collect grease and process biodiesel, administer the cooperative, etc. and their labor entitles members access to biodiesel priced below market rates.[14] This model is a prime example of a cooperative

[13] The mission of the Cooperative is to: *To bring about the environmental, economic, and public health benefits of biodiesel through education, production and use.* http://www.gobiodiesel.org/index.php?title=Mission_Statement

[14] http://www.gobiodiesel.org/index.php?title=Members:Home

organization created to meet a community need for a specific set of people (i.e. the members). Alternatively, GoBiodiesel was never designed with the idea of grand expansion but instead has focused on sharing its start-up information with the aspirations of creating a replicable model for other localities.

There are a variety of business models involved in the industry and time will separate the successful from the unfeasible. The Co-op is not alone in struggling to find a viable small-scale model.

Current and potential biodiesel production in the state of Washington could top 300 MMgpy if all current proposed projects go on-line. It is important to note, some of these projects may never break ground. The following chart was compiled by Kim Lyons[15] and updated December 6, 2006 by Peter Moulton of Climate Solutions.

Name	Location	Size	Status
Seattle Biodiesel	Seattle, WA	5 MMgpy	Operational
Columbia Biodiesel	Creston, WA	3 MMgpy	Operational
Imperium Renewables aka Seattle Biodiesel	Grays Harbor, WA	100 MMgpy	Construction
Chemical Consortium, Inc.	Walla Walla, WA	63 MMgpy	Planning
*Washington Biodiesel	Port of Warden, WA	35 MMgpy	Planning
*WI Biofuels	Spangle, WA	15 MMgpy	Planning
*Natural Selection Farms	Port of Sunnyside, WA	.5 MMgpy	Operational
Baker Commodities	Tacoma, WA	10 – 15 MMgpy	Proposed
Sound Refining	Tacoma, WA	30 MMgpy	Proposed
*Spokane Conservation District/ Palouse Bio	Spokane, WA	5 MMgpy	Planning
Whole Energy	Mount Vernon, WA	10 MMgpy	Proposed
*Inland Empire	Odessa, WA	5 MMgpy	Construction
*Pacific AgriEnergy	Columbia County, WA	10 – 17 MMgpy	Planning
Planetary Fuels	Moses Lake, WA	5 MMgpy	Planning

*Denotes recipients of Energy Freedom Loan

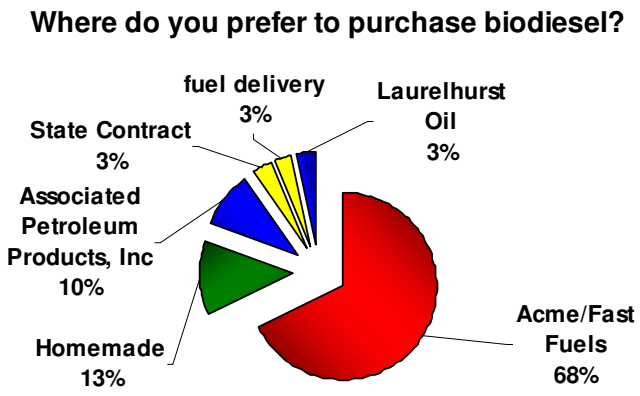
There are proposed projects on the list which have been in the "proposal" stage for years. A purely speculative theory is that as long a firm repeatedly announces a plant then nobody else will build nearby. There are a limited number of firms that could easily have broken ground by now but perhaps they are biding their time when financial opportunity is most ripe.

The following chart titled "Where do you prefer..." indicates there is essentially only one source for retail biodiesel in Olympia, WA.[16] The only competition Acme currently faces are the home-brewers or the retail outlets in Pierce and King County; it is assumed that people who prefer to purchase biodiesel in Seattle or Tacoma are

[15] Kim Lyons, Alternative Fuels Specialist, Pacific Regional Biomass Energy Partnership WSU Extension Energy Program, 925 Plum St. SE; Building 4; Olympia, WA 98504; Phone: 360.956.2083

[16] This chart is based on market research conducted by the Center, as elaborated in Section 4.3.

commuters who are routinely near the proximity of either Associate Petroleum Products or Laurelhurst Oil.



2.5. Setting and Need Summary

There will rarely be an industry as booming and as underserved and with as much governmental support as the 2006 biodiesel industry; the proverbial "iron is hot." If OBC cannot cooperatively organize to serve this market, it should be assumed that other profit-oriented business are positioning to do so.

3. Project Description and Options

The purpose of this section is to outline the possible options and recommended processes of producing biodiesel at a Thurston County bio-refinery.

To inform decision-making and direction-setting, the Co-op's mission is:

> *To locally produce and distribute quality renewable fuels, utilizing sustainable methods and innovative technology. Our workers and members benefit from a democratically controlled business that actively engages the local economy in support of a positive future for our community.*

Possible Options

A. Do Nothing – Not Recommended, but a possibility

The path of least resistance is always a tempting option. Progress with this project will necessitate a great deal of effort and time and should not be undertaken unless founders are able to provide those inputs. It would be a

Newton's First Law of Motion

Objects at rest tend to stay at rest and an object in motion tends to stay in motion with the same speed and in the same direction unless acted upon. Objects tend to keep on doing what they're doing.

disservice to the mission and the previous work to quit now. However, unless sufficient inertia can be generated, "doing nothing" is a possible reality.

B. Wholesale Purchase/Retail Sales – Not Recommended At This Time

Retail sales and the wholesale purchase of biodiesel has probably been the most common route taken by other biodiesel consumer co-ops.[17] This route is not recommended at this time; there has been insufficient research to-date on this option. The margins on fuel retail are extremely thin and without other operations to "cross-subsidize" fuel sales or other fuel blends, it will take some careful consideration to successfully launch a retail operation. Furthermore, there will be increasing competition from traditional industry as biodiesel becomes more readily available. This scenario, which typically involves outside investment and production, was the exact reason that the Co-op was initially organized to examine production.

C. Small-Scale Production – Recommended if "critical success factors" can be mitigated

For the sake of discussion, "small-scale" is defined as production under 1MMgpy and can be considered synonymous with "community-scale." This was always the intention of the group and primary focus of research. As mentioned, inertia will need to be created and the outlined critical success factors will need to be followed. As this is the most feasible option, the study is built around this proposition.

D. Large-Scale Production – Strongly Not Recommended At This Time

For the sake of discussion, "large-scale" is defined as production over 1MMgpy.

It is doubtful that the current group could sufficiently capitalize a multi-million dollar operation at this time. Moreover, entering into this arena would put the group in direct competition with well-financed heavy hitters; locally the Co-op will be able to leverage its visibility, locality, co-op nature, etcetera and would loose these advantages if it immediately sought to enter into larger, more competitive markets like Portland or Seattle. Even with an angel investor, a strong business plan, more expertise, greater marketing and pre-existing market share, a large-scale production competing with the entire regionally would still be quite risky.

[17] For an example, See Prairie Fire Biofuels Co-op in Madison, WI (www.prairiefirebiofuels.org)

3.1. Nature of Project

Securing sufficient feedstock at a competitive price will determine the overall feasibility of the venture. The Co-op will acquire waste oil collection contracts from as many restaurants as it can reasonably attain and manage and supplement the rest of its feedstock need through purchasing yellow grease from rendering companies. If production is to eventually equal 384,000 gallons and only 34,200 gallons are collected then the remainder will need to be purchased or contracted from a vender, most likely yellow grease or possibly even virgin oil if its affordable or even available.

3.2. Potential Locations and Site Options

As this industry exists in a rapidly developing set of conditions, final site evaluations will be postponed until the business plan. That said, possibilities will need to be fully explored, outlined and analyzed. Due to the uncertain context of the project, leasing is encouraged over purchasing. Criteria needed in business plan involve:

- Access to transportation
- Cost and amount needed
- Visibility needs and/or traffic flows
- Location with respect key partners (i.e. customers, feedstock supply, etc.)
- Waste water treatment
- Future anticipations for growth

3.3. Proposed Ownerships Structure and Management

As a cooperatively-owned and managed business, OBC will be owned and controlled by those who use its services, i.e. the membership. The core business to be offered is the sale of biodiesel to consumers both midsized and small. Additionally, there will be other tangential services the co-op will offer as a course of doing business, from WVO collection to the employment of workers. If the Co-op seeks to open membership to the beneficiaries of these services then that should be elaborated in the business plan and bylaws.

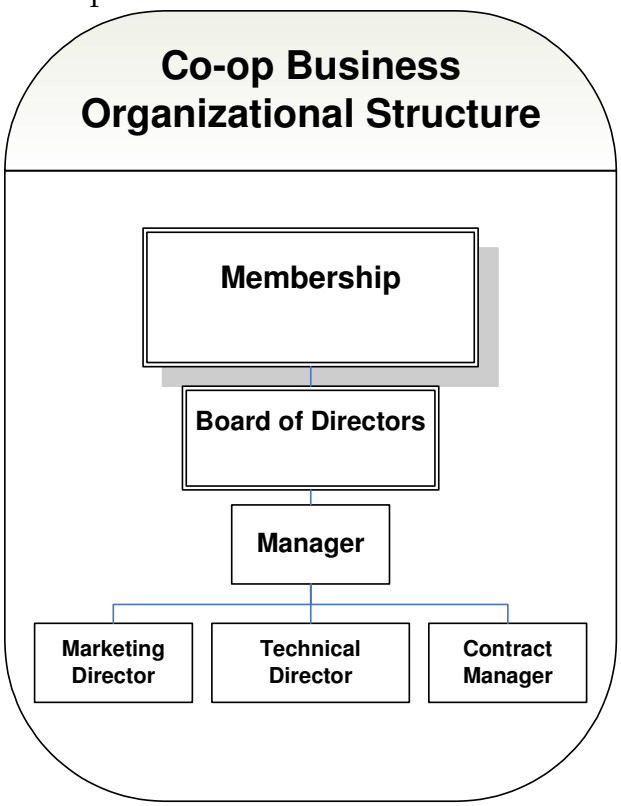
The four primary participants in the business will be the Board, the manager, the employees and the members. The Board of Directors will be elected by and serve the will of the membership as defined in the bylaws. The Board serves two primary functions: to hire management and to guide the direction of the Co-op through policy, planning and oversight. That said, for the initial years a great deal of volunteer energy from fundraising to recruitment will need to be done by the founding Board. This study assumes a manager will be hired by and report to the Board and will be responsible for the day-to-day operations, including employee oversight. As with

other businesses, the feet on ground will be the employees, who will be responsible for carrying out the Co-op's operations and mission as defined by the membership, as expressed by the Board and as implemented by the manager.

3.4. Staffing Needs

The board will need to initially contract with a short-term project coordinator for the Development Phase and Construction Phase. For the Operations and Maintenance Phase, the Co-op should carefully select a CEO/Business Development Manager. The CEO should hire the following positions:

- Production Manager or Technical Director
- Sales and Outreach Coordinator or Marketing Director
- Contract Manager/WVO Collector

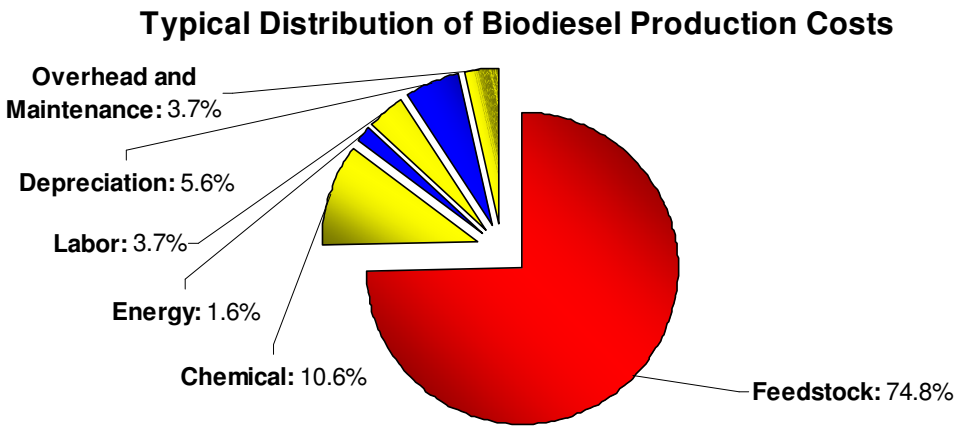


This preliminary human resources strategy will give the Co-op a staff of four. The initial management team should be very carefully selected and will be one of the deciding factors that determine success or failure. Additional growth should be analyzed by the CEO based on cash flow, sales, anticipated opportunity, etc.

4. Supply

As the chart titled "Typical Distribution of Biodiesel Productions Costs" demonstrates, the combination of feedstock and requisite chemicals comprise almost 86% of the production costs.[18] Even if this proportion can be mitigated through advanced technology, economy of scale or intelligent management, these factors dominate and define any biodiesel production plan.

[18] Pruszko, Rudy. February 2006. "Rendered Fats and Oils as a Biodiesel Feedstock." Renderer Magazine. Retrieved May 2006 from: http://www.rendermagazine.com/February2006/RenderedFatsandOils.pdf



4.1 Inputs

In addition to feedstock and chemicals, other important inputs into the process are labor, overhead/maintenance and location; much of those details will need to be more fully fleshed out in the business plan. Capital needs are discussed later in Section 8.

4.1.1. Feedstock Options

The steering committee has always held an ethic of reducing wastes and sourcing locally; therefore, one of the main feedstocks under consideration is local waste vegetable oil (WVO). Typically WVO refers to used fryer grease from restaurants. In addition, "Yellow grease" was examined; yellow grease specifically refers to a product with industry specifications that is produced by the rendering industry. Also under consideration is virgin oil, i.e. soy, canola, corn, palm, etc. Brown grease refers to trap grease, sewage grease and black grease; although it makes for a very environmentally conscious concept, as of yet, there are no commercial-scale plants utilizing brown grease.

Feedstock Options Overview

Option	Source	Purchase Price	Additional Costs
WVO	Collection from producers	"Free"	Cost of collection Increased processing costs
Yellow Grease	Commodity brokers, i.e. Baker, Darling Int., etc.	$.12-$.15 per .lb	$.0075 to $.013 per .lb shipping 6,500 tanker
Brown Grease	LOTT Wastewater Alliance	"Free"	Cost of transportation Greatly increased costs of processing Increased costs of waste streams R&D costs resulting from untried methods
Virgin Soy	AGP/Ag Processing Inc.	$.26 per .lb	$.02 per lb. shipping 25,000 gallon rail car

4.1.1.1 WVO

One of the primary feedstocks under consideration is locally generated WVO, primarily from restaurants. Two sources of data were used to calculate the quantity and availability of WVO in the Thurston County area: first, a restaurant survey was completed and second, cross-reference was made to a study produced by the National Renewable Energy Labs (NREL). In NREL's document, "Urban Waste Grease Resource Assessment," Olympia, WA was one of 30 randomly selected sample cities.[19] A quick overview of NREL's 1998 assessments of Olympia, WA follows:

	Pounds/year	Pounds/year/person	Pounds/year/Restaurant
Yellow Grease	1,080,000	6.7	4,500
Grease Trap grease	1,200,000	7.4	5,000

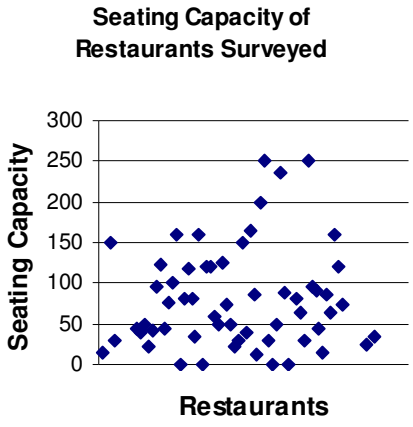
NREL's 1998 figures using 7.3 pounds to a gallon conversion rate:

	Gallons/year	Gallons/year/person	Gallons/year/Restaurant
Yellow Grease	147,945	.918	616.4
Grease Trap grease	164,384	1.014	684.9

Survey Methodology:

The survey was developed collaboratively between the Center and the OBC Steering Committee with questions based on brainstorming on past experience collecting WVO and past surveys done on this subject.[20] The survey was mailed out to 269 Thurston County restaurants from a database which was acquired from the Washington Restaurant Association and with all irrelevant establishments, e.g. Starbucks, culled by hand. A response was received from 71 restaurants; this high return rate, >26%, can possibly be attributed to a dollar bill "incentive" that was included in the mailing.

The following chart, "Seating Capacity of…," demonstrates the variety of restaurant sizes which were represented in the survey.



[19] Wiltsee, G. November 1998. "Urban Waste Grease Resource Assessment." National Renewable Energy Lab. Retrieved May 2006 from: www.nrel.gov/docs/fy99osti/26141.pdf
[20] A copy of the survey can be found in Appendix II

Survey Results:

Statistical overview:

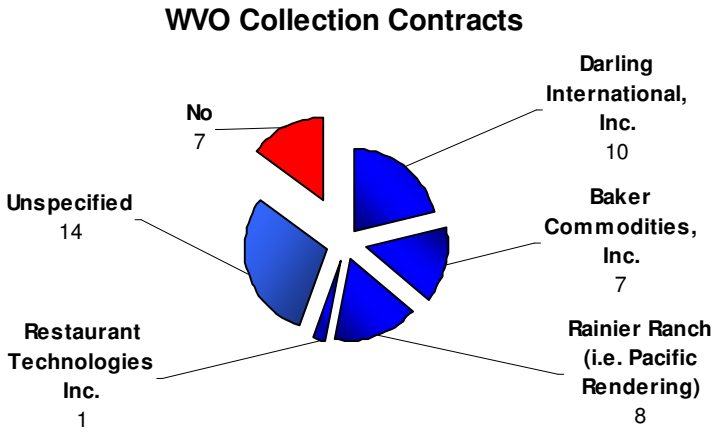
- Total oil production surveyed was 49,284 gallons per year
- 69% (or 49) of the responding restaurants surveyed produced oil
- WVO-producing restaurants produce an average of **83.8 gallons per month** with an annual production of **1005.6 gallons**

To draw conclusions from these averages: assuming 69% of all restaurants in the region produce oil then, through extrapolation, 185 restaurants in Thurston county produce WVO. If 185 WVO-producing restaurants produced an average of 1005.6 gallons per year then it would equate to an estimated annual universe of 186,036 WVO gallons in the Olympia area. At a crude statistical average, this roughly verifies the 1998 NREL survey estimation of 147,945 WVO gallons annually available in the Olympia area.[21] NREL also estimated an average of .917 gallons of WVO per person per year in Olympia was produced; therefore, if the Olympia metro area (i.e., Lacey, Olympia, Tumwater) total population is 224,100[22], it would equal a total annual quantity of 205,680 gallons.[23]

In conclusion, it would be reasonable to guess the regional annual production of WVO in Thurston County is between 180,000 and 200,000 gallons.

Collection:

Of particular interest in the survey were the patterns of WVO collection (see chart titled, "WVO Collection Contracts"). The goal was to assess accessibility to the WVO streams and identify points of entry for leveraging the Co-op access. It is a business planning assumption that OBC would be able to gain new contracts and maintain existing contracts based on a combination of lower rates and higher customer service and satisfaction (i.e. being cleaner, nicer and more responsive).



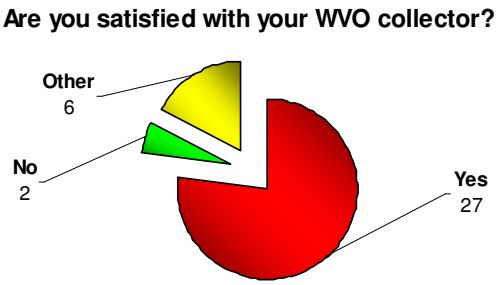
Currently WVO collection is under command of the rendering industry. The rendering industry is reusing

[21] http://www.soypower.net/calculator.asp
[22] Population totals taken from http://en.wikipedia.org/wiki/Olympia,_Washington
[23] Wiltsee, G. "Urban Waste Grease Resource Assessment."

WVO by taking "what would otherwise be waste materials and making useful products such as fuels, soaps, rubber, plastics, etc."[24]

According to the survey, the largest three firms that dominate the collection of WVO in the Olympia area are Darling International, Inc., Baker Commodities, Inc., and Rainier Ranch/Pacific Rendering.[25] Phone surveys then were conducted to all three companies to provide further detail of this industry.[26]

Even though there was a surprising amount of anecdotal evidence regarding collection dissatisfaction, 77% of restaurants surveyed were satisfied with their current situation. That said, the owner of the Voyeur, answered "Yes" to "Are you satisfied…" and continued on to say, "please help see that the huge amount of fry oil is recycled." This respondent was not alone in this attitude; it implies that an intelligent marketing campaign focused on local sustainability could encourage restaurant managers and owners to put their "waste" to a better use.



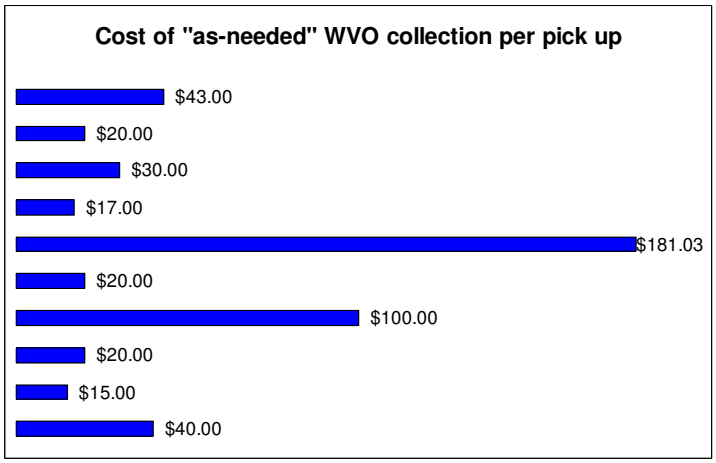
The standard collection model is rendering companies contract to collect WVO from the alley or near the dumpsters. An exception to this dominate business model is a different paradigm which offers a more holistic approach to oil management service. However, it is doubtful that a smaller, localized firm could economically compete with the full service approach of firms such as Restaurant Technologies Incorporated (RTI)[27]. What follows is a description of RTI's services:

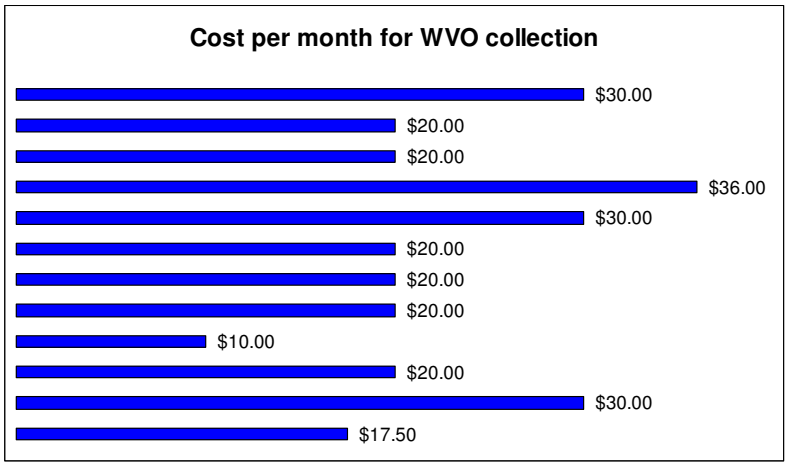
> ***RTI's automated, closed-loop system*** *consists of a high-efficiency filtration system, fresh oil tank, and waste oil tank. With a flip of a switch, oil is added, disposed, or filtered. This system completely eliminates the practice of employees manually removing used hot oil…*
>
> ***RTI's Full Service Program Includes:***
>
> - *Free Installation and Hook-Up to Fryers*
> - *No Up-Front Costs or Capital Investment*
> - *All Maintenance & Repairs*
> - *Premium Quality Cooking Oil*

[24] http://en.wikipedia.org/wiki/Rendering_%28industrial%29
[25] Based on an uncommunicative reticence of Rainier Ranch over the phone and a referral for all inquires to Pacific Rendering, it is assumed that Rainier Ranch is under an exclusive contract with Pacific Rendering. While most the rendering industry is typically controlled by larger international commodity brokers (such as Griffin, Cargill and Darling) Pacific appears to have a single office in Seattle and no website.
[26] See Appendix III - Phone Surveys of Rendering Companies
[27] http://www.rti-inc.com/services.asp

- *Comprehensive Training*
- *Continuing Education on Proper Care of Cooking Oil*
- *Scheduled Oil Delivery and Waste Oil Pick-Ups*

Other then the full-service orientation, there appears to be two prime models for collection service; one is "as-needed" and the other is on a regular basis, be it weekly, monthly, etc. Below are representations of the cost for these services.





With an average WVO collection monthly bill of over $20, the high cost of WVO collection in such a cost-sensitive industry demonstrates some real leverage for any business seeking to collect oil with better customer service for less expensive rates.

Survey Shortcomings:

There were occasional discrepancies in respondent's math. For example, Eagan's Drive-In said in one question that they produce 55 gal per month and then later said they replace the oil in their 10 gallon fryer twice per week; that would equal 80 gallons of oil. Tumwater Valley Bar and Grill said they produce 280 lb per month while changing their 40 lb fryer 3 times per week; which would equal 480 lb per month. The aim in any survey is to aggregate out specific errors so any single one mistake will be over-shadowed by the entire dataset and that objective was comfortably met.

Survey Summary:

Averaging the NREL estimate (with new population figures) of 205,680 WVO-gallons and OBC's surveyed 186,036 WVO-gallons, equates to a 200,000 WVO-gallon universe in metro Thurston County. 200,000 gallons is not a lot to share with

potentially aggressive competitors.[28] It is yet to be demonstrated if OBC can leverage substantial numbers of collection contracts from Darling, Baker, and Rainer; therefore initial planning estimates start at 25 WVO removal contracts.

4.1.1.2. YELLOW GREASE

Yellow grease specifically refers to a product with industry specifications (see side bar) that is produced by the rendering industry. The rendering industry collects and "renders" animal tissue, WVO, etc. and recycles the by-products into value-added materials, such as bone meal and tallow which is turned into cosmetics, antifreeze, glues, etc.[29] The primary attraction to yellow grease is that it's the most low-cost feedstock to purchase wholesale.

Darling's guaranteed yellow grease specifications:

- *<15% FFA (Free Fatty Acid)*
- *<39% Max. FAC Color (Fat Analysis Committee of the AOCS)*
- *<2% M.I.U.(moisture, impurities, and unsaponifiable material)*

http://www.darlingii.com/products/fatsoils/yellowgrease.html

To gain an understanding of the rendering industry phone interviews were held with the following four firms:[30]

- Darling International Inc.
- Baker Commodities Inc.
- Pacific Rendering Company Inc.
- Restaurant Technologies Inc.

The overall trends from these interviews suggest the following.

Most firms can deliver a 6,500-gallon tanker truck of yellow grease; since outside temperature will affect the weight, the product is sold by the pound. Using a 7.3 lb per gallon conversation rate, a filled tanker would equal around hold 47,450 pounds of yellow grease. During the interviews, they were all reluctant to nail down a price because it moves up and down with the commodity markets despite lacking a Chicago Board of Trades price, they did say that it was averaged around $.12 to $.15 per pound. Therefore, a tanker full of yellow grease could cost in the range of $7,800 to $9,750 with a delivery fee ranging from $300 to $750.

For the most part these firms don't like long-term contract agreements and yet, prefer to sell a truck a week to a single source and not to sell trucks randomly here and

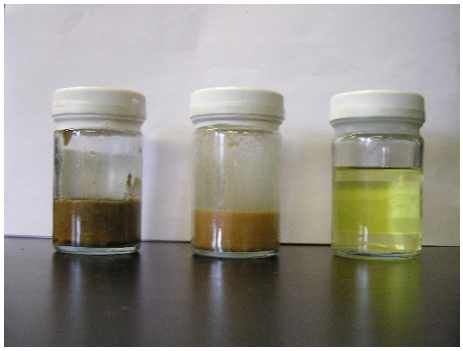
[28] McCarthy, Susan. November 6, 2000. "Grease Rustlers." Salon.com. Retrieved June 2006: http://archive.salon.com/business/feature/2000/11/06/grease_wars/index.html
[29] http://en.wikipedia.org/wiki/Rendering_%28industrial%29 and http://www.darlingii.com/products/fatsoils/index.html
[30] Notes from those interviews can be found in Appendix III

there. The goal of these companies is to, as easily as possible, sell their produce to the highest bidder, be it a local feed mill or a plant in Singapore. That said, Pacific Rendering mentioned that they have cultivated a 40-year history with some of their best customers, i.e. feed mills. Baker mentioned that the majority of their yellow grease sales were internal to Baker.

These firms were supportive of the Co-op concept in as far as they seek new customers because more demand could equate to higher prices. They didn't seem to have any extra goodwill to offer for a community-based project.

4.1.1.3. Brown Grease

As a feedstock, brown grease presents some interesting challenges and opportunities. Brown grease is probably the worst feedstock imaginable; it is incredibly stinky, extremely high FFA and gelatinous at ambient (i.e. "room" or outside) temperatures.[31] Conversely, there are municipalities which have a vested interest in piloting a better use for the material because it is abundantly available and a headache for the Lacey, Olympia, Tumwater Treatment Alliance or LOTT Alliance.[32]



One company, Philadelphia Fry-O-Diesel LLC (PFoD) has met with success converting this waste grease "through the processes of dehydration and filtration, the grease can be separated out and used as a feedstock in the same way as yellow grease…"[33] Although aggressive in business development, there is no PFoD commercial production site in the works yet.[34]

If the Co-op is interested in this feedstock and process, it ought to monitor PFoD develop.

4.1.1.4. Virgin Oil

Virgin is and will be the predominant feedstock in the biodiesel industry; virgin refers to mainly to soy and canola although the future is promising for palm kernel oil. Although virgin oil is the most straightforward to purchase, most chemically consistent and easiest feedstock to brew biodiesel from, it's also the most expensive

[31] Tyson, K. Shaine. "Brown Grease Feedstocks for Biodiesel." June 2002. NREL PowerPoint Presentation. Access June 2006 from: http://www.nrbp.org/pdfs/pub32.pdf
[32] www.lottonline.org
[33] www.fryodiesel.com/demo_project.htm
[34] McElroy, Anduin. "Ultimate Makeover" June 2006. Biodiesel Magazine. Access October 2006 from: http://www.biodieselmagazine.com/article.jsp?article_id=946

and increasing in price as soy- and canola-based mega-plants are under construction. Although virgin oil is the most readily available feedstock, a "feedstock crunch" is expected and a subsequent vegetable oil price increase will ensue.[35]

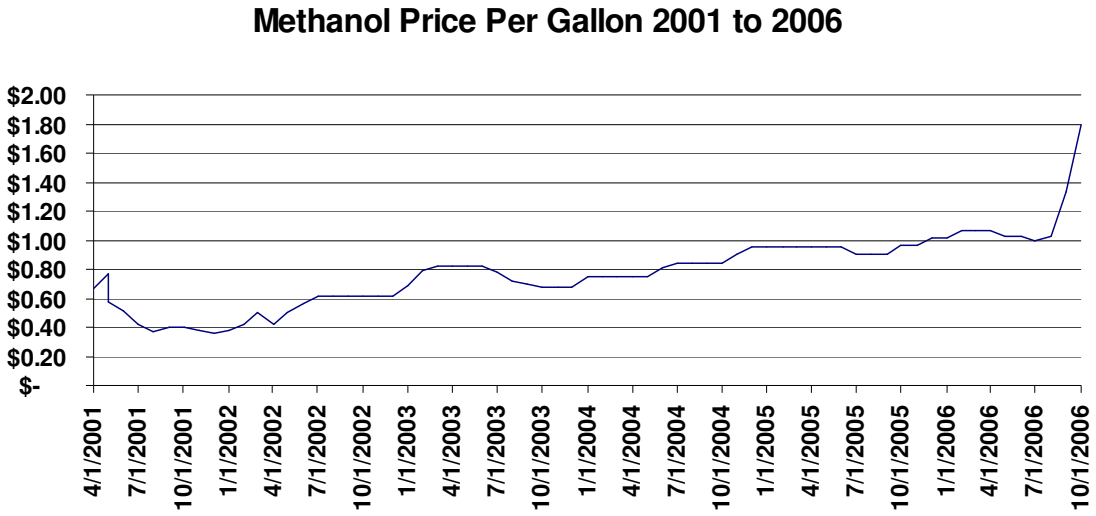
A tanker car of soy oil could be ordered from the Midwest; for example the co-op AGP or Ag Processing Inc. could ship a 25,000 gallon tanker railcar weighing 182,000 lbs plus $.02 per lb shipping.[36] Although the price of soy is based on the Chicago Board of Trade (CBOT), any purchasing would be done on the "cash" market.[37] Since May of 2006, the price of soy oil has ranged from $.24 to $.27 per lb but a safe average to plan on is $.26 per lb.[38]

4.1.2. Other Chemicals

The other primary chemicals for biodiesel production are methanol and a catalyst. In biodiesel production, i.e. transesterification, methanol is added with a catalyst to vegetable oil to transesterificate the oil into biodiesel and glycerol. Transesterification means to swap alcohols and this process occurs through adding another alcohol, i.e. methanol, and a catalyst. For chemical inputs per 100 gallons of WVO, the Pelly Model A processor uses 18 gallons of methanol and 18 lbs of KoH.

Methanol prices have been steadily climbing and for planning purposes the Co-op is anticipating spending $1.60 per gallon for methanol. The following chart, titled "Methanol Price per Gallon…" indicates the past 5-year trend.[39] Although, there has been a recent dramatic spike in methanol prices, this is expected to level off or decrease in the foreseeable future.[40]

[35] Reg Clause, Ray Hansen, Craig Tordsen, Rudy Pruszko; Iowa State University Conference Call on "Biodiesel Industry Projections" July 18, 2006
[36] Phone interview with Dave McCormick, AGP Salesperson 402.498.2210. Jan. 9 2006
[37] Phone interview with Fred Seamon, CBOT Economist 312.347.3808. Jan. 9 2006
[38] CBOT Soybean oil Quotes Open Auction; Accessed August 10, 2006: http://www.cbot.com/cbot/pub/page/0,3181,1272,00.html
[39] Historical prices based on monthly averages of Methanex list price; access November, 2006 from: www.methanex.com/products/methanolprice.html
[40] The price of methanol is connected to MTBE and



More catalyst then usual will be needed for treating high FFA feedstocks. The follow chart outlines common FFA ranges.[41] The most common catalysts are sodium hydroxide or potassium hydroxide (KoH); KoH is the preferred catalyst in the Olympia Green Fuels processor. It will be key in the future to convert as much of the FFA as possible into biodiesel. The Olympia Green Fuels processor doesn't use acid catalysis and most of the FFA will end up with the glycerol.

Feedstock	FFA Range
Vegetable oils	<1%
WVO	2 – 7%
Animal Fat	5 – 30%
Trap Grease	40 – 100%

Price quotes for these inputs where received from local distributors Columbia Cascade Distribution in Seattle, WA and Univar in Kent, WA.[42] Although Univar USA is unable to sell methanol for biodiesel production purposes, their price is $215.88 for a 55 gallon drum of methanol. Columbia Cascade's price quotes where $181.50 for a 55 gall drum of methanol and plus a $25 "energy surcharge" per order.

4.2. Supply Summary

The feedstock supply will be a combination of WVO and yellow grease. WVO will be collected from restaurants through acquiring contracts and providing a collection service. This will initial be the domain of a designated employee of the co-op. This employee will also be in charge of procuring yellow grease to supplement the difference between the WVO and the total output.

[41] Van Gerben. "Building a Successful Biodiesel Business" Page 87
[42] Univar USA's contact information is www.univarusa.com or 253.872.5000
Cascade Columbia Distribution's contact information is: www.cascadecolumbia.com or 206.282.6334

5. MARKETS

The primary markets examined are whole distributors, and retail. As a member-owned co-op which will have a majority membership of consumer, the brake down of these markets will be determined through the membership. Most likely, retail consumers will comprise a majority of the membership with a minority of wholesale members, such as construction companies or small fleets. To complement excess production, biodiesel can be dumped on whole sale market to distributors, such as SeQuential or Seaport Petroleum. SeQuential and Seaport Petroleum are mentioned her because they both expressed verbal interest in purchasing ASTM-spec fuel.

5.1. MARKET OVERVIEW

Theoretically the biodiesel market is as large as the regional diesel market. Optimistically the market is as large as the new renewable fuels standard mandates. But for the Co-op, the practical market is as large as the membership and few wholesalers.

5.2. WHOLESALE/DISTRIBUTION

Wholesaling biodiesel carries pros and cons. On one side, to solely deal with several vendors, it guarantees a dependable demand and the Co-op can concentrate on production. It is recommended that wholesale be used to offload any excess capacity to keep product moving, to keep the business with positive cash flow but should be viewed as an unsustainable crutch. The Co-op should focus on what it does best: community interaction. Over-reliance on wholesaling to large distributors will detract from the Co-op's core business and, through commodification, Co-op's product will loose its identity.[43] The Co-op should maintain ongoing positive working-relationships with these vendors but not sacrifice its core business in the process.

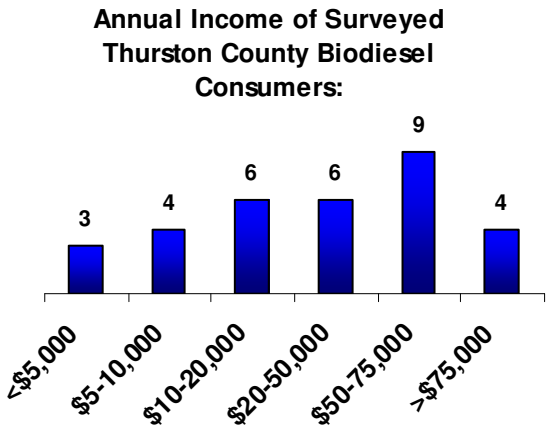
5.3. RETAIL

To assess the local retail market for biodiesel an online market survey was created, sent out via email and posted on relevant electronic mailing lists (i.e. listserv) and online forums.[44] 89 responses were received by September, 2006 of which 57 responses represented consumers located in Thurston County, 34 of those responses were from people who currently use biodiesel in Thurston County. The goal was to better understand who, why and where they purchase biodiesel; moreover, would these individuals be interested in the cooperative.

[43] Here the term commodification or commoditization implies turning a non-commodity into a commodity.
[44] See Appendix V for a copy of the survey

5.3.1 DEMOGRAPHICS

Thurston County's 2004 median household income was $51,195 and the 2004 average annual income was $34,183.[45] Probably what is most surprising about the income breakdown (titled "Annual Income of Surveyed Thurston County Biodiesel Consumers") is that there is nothing unordinary about the numbers; in other words, biodiesel consumers appear to be representative of a broad range of socioeconomic backgrounds. The days of greasy-do-it-yourself-ers in their garage have given way to broader acceptance of biodiesel as an alternative fuel. Therefore, it will be important for the target members/consumers of the co-op to be inclusive of the overall community.

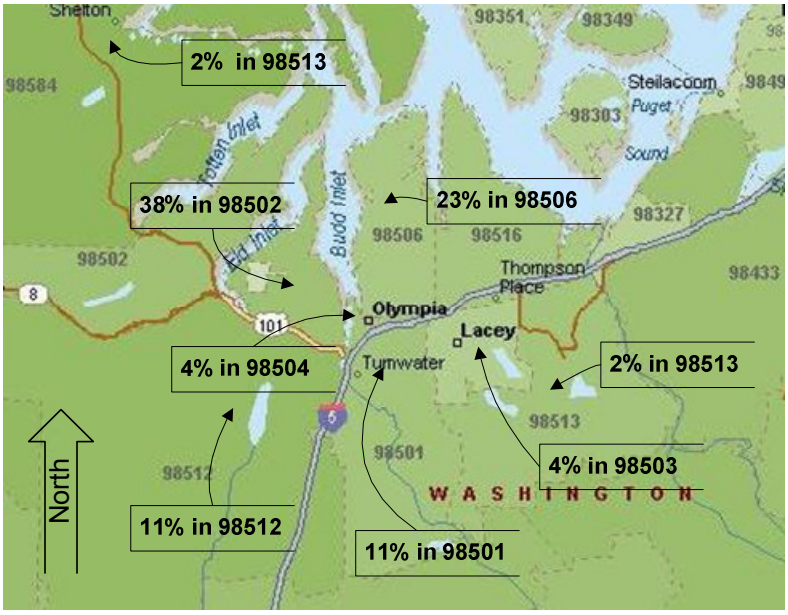


To annunciate the range of socioeconomic backgrounds, what follows is a list of occupations represented in our sampling; in addition to three retirees there were:

- Natural Builders
- Environmental planner
- Piano teacher
- Real Estate
- Builder
- Fire-fighter/organic farmer
- Social worker
- Environmental Specialist
- Groundskeeper
- Caregiver
- Public relations
- restoration/construction specialist
- Environmental Manager
- Carpentry
- Pilot
- Merchant marine
- Artist and captain
- Non-profit director

To identify where the biodiesel consumers are located in the County, the following map points to the percentage of biodiesel users in their respective zip code:

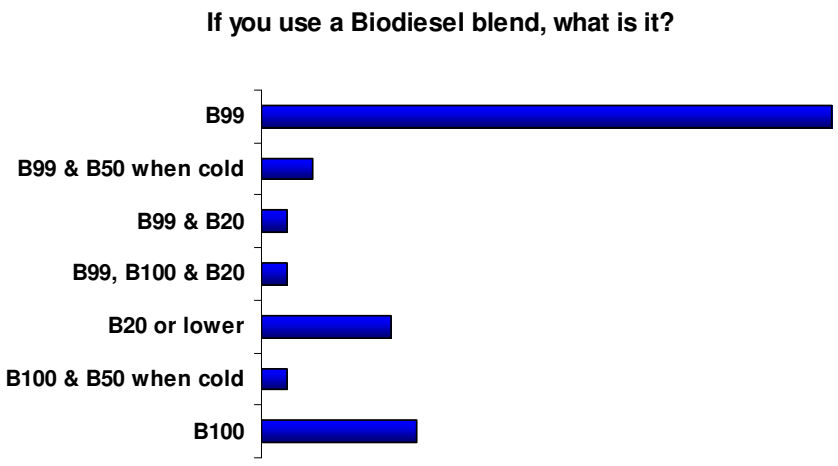
[45] "Statistics at a Glance." Thurston Regional Planning Council. Accessed September 2006 from: http://www.trpc.org/programs/estimates+and+forecasts/demographics/statistics+at+a+glance.htm



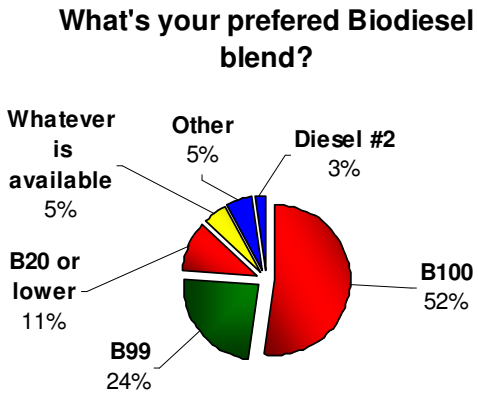
An additional combined 5% of those surveyed lived on the Olympic Peninsula (i.e. northern Greys Harbour County or up Highway 101 North) and frequently travelled to Thurston County for work; therefore, they were included for the purposed of market research. Based on the survey, it appears that biodiesel consumers tend to be located primarily in West Olympia (specifically the Northwest), Northeast Olympia and the urban core of Olympia.

5.3.2. Consumer Preferences

The chart "If you use a… blend…" indicates, consumers who choose biodiesel overwhelmingly choose B99. Moreover, based on the chart titled "What your preferred…" it also appears that most consumers would prefer to have access to B100. While it's philosophically logical that most consumers would prefer "pure" biodiesel without 1% petroleum, it is doubtful that the same consumers would pay an extra dollar per gallon if they lost the tax credit subsidy.

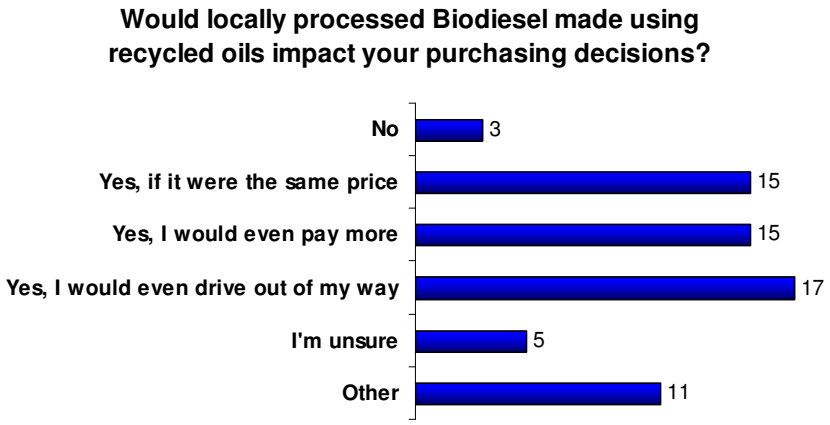


There are some speculations that can also be deduced from the above chart. One, since "B50" is not commercially available people are guessing by filling with a few gallons of Diesel #2 and then filling with a few gallons of biodiesel or "splash pouring." Two, B100 is not commercially available and therefore, people who use B100 are either "brewing" it themselves or acquiring it from friends who are "home brewers."



If you purchase petroleum Diesel, how often are you motivated by...? (check all that apply)						
	Never	Hardly Ever	Sometimes	Frequently	Always	Total
It's What I'm Familiar With	**51% (27)**	8% (4)	19% (10)	15% (8)	8% (4)	**53**
Fuel Quality	**39% (20)**	14% (7)	4% (2)	22% (11)	22% (11)	**51**
Reliability	**36% (19)**	17% (9)	4% (2)	19% (10)	25% (13)	**53**
Price	**36% (19)**	15% (8)	13% (7)	17% (9)	19% (10)	**53**
Convenient Location	**25% (14)**	12% (7)	**25% (14)**	21% (12)	18% (10)	**57**
Weather/Cold Flow Properties	21% (12)	21% (12)	**30% (17)**	11% (6)	16% (9)	**56**
No Biodiesel Available	16% (9)	11% (6)	21% (12)	9% (5)	**44% (25)**	**57**
					Total Respondents	**60**

As the above matrix titled "If you purchase petroleum…" reveals, the single greatest motivating factor for the respondents purchasing diesel #2 is a lack of biodiesel availability. It is beyond the scope of this survey to determine if this is a result of consumers travelling and they are unaware of where to purchase biodiesel or because they live on Olympia's Westside, work downtown and find Acme's Fast Fuels on Lily Rd. in Lacey too far to go for fuel. Another interesting key point to note from this matrix is that familiarity seems to have the least influence over people purchasing diesel #2.



The "other" responses included multiple comments that although they might pay more, they wouldn't pay much more and that although they would drive out of the way, any retail location would need to be accessible on weekends or evenings. In addition, a respondent expressed that he would not purchase biodiesel from tropical oils and another respondent expressed concerns over quality standards. Fortunately the mosaic of motivations creates an encouraging picture; i.e. that provided with greater access to biodiesel, comparably priced to diesel #2 people will purchase it.

5.3.3. Thurston County Retail Market Overview

In order to measure the entire local (i.e. Thurston County) diesel market it was necessary to estimate the resident number of diesel consumers; for elaboration, see following chart:

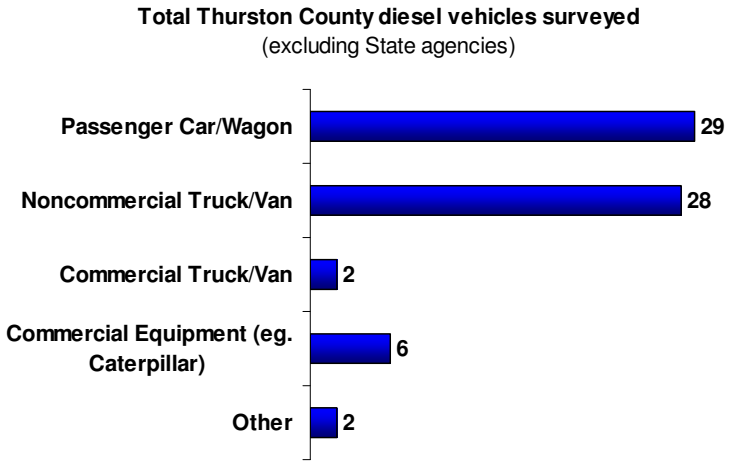
Population Totals Compared to Vehicle Ownership and Estimated Diesel Ownership[46]

Population Totals	2005
Entire Thurston County	224,100
Incorporated Lacey, Olympia, Tumwater	89,460
Registered Vehicles in Thurston County	**2004**
Passenger	163,196
Trucks	63,091
Total Vehicles (excludes recreation, trailers, etc)	**226,287**
Estimated diesel vehicles in Thurston County	
Diesel percentage of light duty passenger fleet (3%)	4896
Diesel percentage of total truck and passenger fleet (4%)	9051

[46] Thurston Regional Planning Council. "The Profile." Accessed September 2006: http://www.trpc.org/programs/estimates+and+forecasts/demographics/the+profile.htm
The percentages of diesel vehicles taken from Washington State Department of Licensing (www.dol.wa.gov) and are consistent with national averages.

Initial project planning estimates revolved around 3,500 diesel vehicles in and around Olympia.[47] The number seems realistic when considering that slightly less than 5,000 light duty vehicles (cars, SUVs and light trucks) run diesel and another 4,000 trucks (freight, bus, etc.) run diesel in the entire county. Thus subtracting large state and corporate fleets (which purchase delivered diesel on contract) and vehicles outside a serviceable range (i.e. Yelm, Roy, etc.), assuming 3,500 diesel-consuming vehicles in urban/suburban Thurston County appears to be a safe, conservative number for the purposes of planning.

The survey identified the following:



5.4. Home Heating Oil

Up to B30 "Bio-heat" or 30% biodiesel home heating oil (HHO) is interchangeable with #2 diesel heating oil. This is an attractive market for businesses already offering home heating oil delivery to an existing clientele base, such as Acme Fuel in Olympia, WA and Laurelhurst Oil and Genesee Oil in Seattle, WA.[48] Offering a "Bio-heat" blend makes good business sense as an additional product line to supplement traditional HHO.

It is unadvisable for the Co-op to concentrate much energy in this market. With a history of cheap hydropower, HHO systems are not as common in the Northwest as they are in the Northeast; 69% of the 7.7 billion homes that consume HHO are in the North-eastern U.S.[49] Two out of the 57 diesel consumers in Thurston County used

[47] This number was established through conversations with midlevel Washington State Department of Licensing personnel.
[48] http://www.biodiesel.org/markets/hom/
[49] "Biodiesel; An Industry Update For Those Interested In Using Biodiesel As A Home Heating Oil Blend stock." Accessed September 2006 from: www.nbb.org/markets/hom/**Heatingoil**websectionppp.ppt

"Bio-heat" purchased from Acme Fuels.[50] Because of the small, virtually "niche," market size, it would be imprudent to attempt market penetration unless an already healthy retailer held a dynamic strategic advantage. For the sake of having a market to unload excess production capacity, the Co-op ought to consider forming a relationship with any "bio-heat" providers for the sake of supplying their need but "bio-heat" should not be considered as a core business.

5.5. Co-Products & Glycerol

Glycerol or glycerin will be 10% of the output of any biodiesel production operation. Although in the past considered a "high-value" co-product, glycerin is in effect a waste product. Currently, good markets for glycerin are difficult to secure and moreover the modest future estimates for domestic biodiesel production will create an enormous glut of glycerin on the market.[51] To further exacerbate the decreased value of glycerin, WVO and rendered feedstocks create glycerin with adverse color and odor properties and the glycerin will not be Kosher, which limits its food and pharmaceutical usage.[52] Lastly, smaller biodiesel facilities produce a variety of glycerin by-products with a wide range of methanol residue and impurities. Although color and odor impurities can be refined out of the glycerin through pre- and/or post-treatment in the transesterification process, it will most likely not be economically feasible for a smaller biodiesel production facility to do so.

Some uses for glycerol include pharmaceuticals, lubricants, solvents, emollients (i.e. skin softener) and humectants (i.e. moisture retention).[53] Government and big business are busily seeking to find an R&D solution for the expected and probable glut of glycerin.[54] Industry experts speculate that crude natural glycerin may supplant synthetic petrochemical-based glycerin as oil prices increase.[55]

As OBC has no test glycerin to offer from a sample process and no interested parties to take glycerin, it is difficult to predict at this time what the highest value use of its glycerin will be. The Co-op should consider it waste until a better use is secured. Bearing in mind the considerable amount generated, no biodiesel business is complete without a creative or strategic solution to the glycerin problem; this is a matter which will require future attention.

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[50] See Appendix V
[51] Van Gerben. "Building a Successful Biodiesel Business" Page 110
[52] Ibid. Page 111
[53] For further information see: http://en.wikipedia.org/wiki/Glycerol#Applications
[54] Nilles, Dave. "Combating the Glycerin Glut." Sept. 2006. Biodiesel Magazine. Retrieve October 2006 from: http://www.biodieselmagazine.com/article.jsp?article_id=1123
[55] Ibid.

Currently, smaller biodiesel operations deliver glycerine to a plant in Tacoma which is very happy to have a free source of an additional boiler fuel. Glycerin produces too much toxic hydrocarbons to be burned at lower temperatures and can only safely be burned in industrial burners. Thus the disposal cost for glycerine will initially entail delivering loads to Tacoma.

5.6. Market Summary

The Co-op should concentrate on its core business: member-based biodiesel sales. Insufficient supply is a greater issue then insufficient demand at this stage. The market is only growing and the primary issue is profitably and reliably serving it. There are viable supplemental operations to this but the Co-op should seek to balance is buyers between the community and distributors. The Co-op should intentionally develop a glycerine co-product with a keen eye to the future.

6. Technical Needs

The primary question that will determine technical needs is scale. Scale will be determined by:

- How much feedstock can the Co-op access?
- What is the expected market size?
- How much money can the Co-op access?

The primary technical needs are:

- Processing technology and process engineering (technology licensing)
- Design engineering
- Construction and assembly
- Permitting

In order to process oil into biodiesel, capitol equipment will need to be acquired or built and designed. The following list organizes the possibilities from most-time-consuming/least-capital-intensive to most-convenient/most-expensive. The routes that the Co-op could take to meet this need are:

- Develop and fill these needs internally; i.e. design and build a process
- Subcontract and manage the different steps; i.e. be the "general contractor"
- Hire a "turnkey" installation company to organize and manage the project[56]

[56] Turnkey is defined as: "a project in which a separate entity is responsible for setting up a plant or equipment and putting it into operations. It can include contractual actions at least through the system, subsystem, or equipment installation phase and may include follow-on contractual actions, such as testing, training, logistical, and operational support. It is often given to the best bidder in a procurement process." Retrieved November, 2006 from http://en.wikipedia.org/wiki/Turnkey

An often, and almost overly, cited figure is $1.00 per gallon per year; or a 1 MMgpy plant would cost $1 MM and a 100 MMgpy plant would cost $100 MM. Although this "ballpark" number provides an easy approximation, it is not solid enough for business planning purposes and requires greater detail.

6.1. Processing Technology Providers

Technology provider firms, such as Pacific Biodiesel or Greenline Industries, are in the business of selling their proprietary processing technology to processing companies, typically in the form of a long-term business relationship. The disadvantage is that these services are expensive, sometimes untried and typically continue to siphon off capital if and when the plant moves into profitability. The advantage is that the processing firms can focus on their core business of processing and not busy themselves worrying about developing and refining the processing technology. Another advantage is the customer purchases a guarantee that the process will meet ASTM specification, is provided with training on operations and receives hands-on technical assistance in the eventuality that something isn't going as planned. By purchasing a processing technology a business is essentially outsourcing that risk to external experts.

To evaluate the processing technology providers, a series of phone interviews were held with the following firms: [57]

- SunBio Systems
- Superior Processing Technologies
- Epic Modular Process Systems
- Greenline Industries
- FORE Energy

Pacific Biodiesel declined an interview because SeQuential Biodiesel has "right of first refusal" over any Pacific Biodiesel plant to potentially be built in Washington State. Axen Systems, Biodiesel Systems, BioSource Fuels and Canentec Inc. all declined to be interviewed because they do not deal in smaller plants. Generic bids were received from Greenline and Olympia Green Fuels.[58]

The overall trend for these process providers were that most preferred to not deal for less than a million dollars with >1MMgpy operations. These firms offered a range of services from offering just the "process engineering" minus "design engineering" to a fully installed turnkey operation. Due to the high cost of most outside entities, the committee decided to most seriously entertain Olympia Green Fuels processor.

[57] See Appendix VII for the interview notes
[58] See Appendix VIII for Olympia Green Fuels bid

In fall of 2006, Olympia Green Fuels sold two processors to different operations in the Northwest. The Co-op decided that these pilot projects will either evaporate or reinforce any previous concerns regarding those specific processors. It was also determined that during the actual business planning stage the Steering Committee would visit those operations and interview those operating the process.

The primary concerns with Olympia Green Fuels are:

- Commercial viability; i.e. what works small scale might not work in an ongoing industrial process
- Scalability; just how much can be produced annually
- Lack of desire to participate in piloting someone else's process

The major benefits are:

- The current Steering Committee has an ongoing relationship and amicable rapport with Mike Pelly, the owner/operator of Olympia Green Fuels
- Mike Pelly has a long history of involvement in the budding industry
- Cost affordable process which Olympia Green Fuels is willing to offer at an even lower cost
- Local vender will be more responsive then out-of-state provider
- Olympia Green Fuels has a compelling interest in successful local pilot projects

6.2. Location and Siting

Typically biodiesel plants are located close to one of two things: feedstock or market. In the case of Oly Biofuels, the Co-op's potential membership is the Thurston County retail market and this is an advantage that should be utilized and ought to be leveraged. Therefore if the Co-op intends on having a retail pump, it would behoove the Co-op to locate a site as close as possible to the I-5 corridor that was easily visited by their target market. With the uncertainty in the renewable fuel market at this early stage it makes more economical sense to lease then to purchase. This will provide greater flexibility as the Co-op grows and will decrease start-up costs. It is important to note that all site considerations will be finalized during the design phase of the project.

In a meeting with Debbie Draper, a commercial real estate agent with Coldwell Banker, Ms. Draper provided a collaborative set of listings from Coldwell, Rants Group, Prime Locations and Hodges Commercial of possible warehouse lease site locations south of Olympia in Tumwater and north of Olympia in Lacey/Hawks Prairie.[59] According to her experience, a reasonable average cost for planning purposes of industrial rental lease space is $.40 per square foot of shell and $.70 per

[59] Debbie Draper. Coldwell Banker; 3333 Capitol Blvd. S.; Olympia, WA 98501-3305; p.360.352.7651

square foot of office. Therefore, a theoretical location with 3,800 sq ft shell and 200 sq ft office would rent for around $2,000 per month.

6.2.1. PERMITTING

As with the building of any industrial process, there will be a series of permits to acquire and review processes. Permits and processes are location, scale and municipality specific. The Office of Regulatory Assistance (ORA) has a six-step "Biodiesel Facility Permits Fact Sheet" which clearly outlines the overall process and offers time and money saving tips.[60] The Co-op should begin to intimately familiarize a subcommittee of the Board with this document as soon as possible. The ORA also published a "shopping list" of all possible permits needed.[61] To further elaborate the steps needed, the Department of Ecology has a set of Permit Process Schematic flow charts outlining the processes.[62]

The first step of which most other permits are contingent upon is a Washington State Environmental Policy Act (SEPA) environmental review and if federal loan and grants are going to be involved a National Environmental Policy Act (NEPA) review may be required. SEPA and NEPA will examine zoning, air quality consideration and the availability of water, sewer and road. Starting this evaluation process early and pre-application meetings are encouraged.

Anecdotal evidence provided by those who have been through the process suggests doubling the expected time for these steps. That said, regulators should not be perceived as the enemy; these agencies desire the same thing as OBC: *an operating functional, safe and environmentally sensible facility*.

6.3. PLANT DESIGN

The financial model this study is based on is built around the Olympia Green Fuels generic bid. The next step of plant design after finalizing the scale would be to engage the professional services of a reputable biodiesel design consultant or to work closely with the process technology provider to help guide the process in the most appropriate direction.

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[60] "Biodiesel facility Permits Fact Sheet" is located at:
http://www.ora.wa.gov/documents/BiodieselFactSheet.pdf
[61] "Permit List for Biodiesel Facilities" is located at:
http://www.ora.wa.gov/documents/BiodieselPermits.pdf
[62] "Permit Process Schematic" is located at:
http://www.ecy.wa.gov/programs/sea/pac/ppds_info/review.htm

6.4. Quality Assurance & Quality Control

The American Society for Testing and Materials has a very specific chemical definition for what constitutes "biodiesel; see Appendix X for the elaborated ASTM specifications. ASTM is a third-party, laboratory-assured quality rating. This standardization assures buyers and sellers that they are communicating about the same thing and be it blenders or retailer customers, most buyers are going in insist they are purchasing ASTM fuel. Selling ASTM and keeping batch archives will be a necessary step in the Co-op's risk management.

According to Rachel Nieuwendaal of Magellan Analytical Services in a phone interview said that the "full slate" of ASTM testing runs about $1,057.[63] She also mentioned that most new producers, especially WVO producers tend to fail several specific tests and to start with these and in the following order of importance:

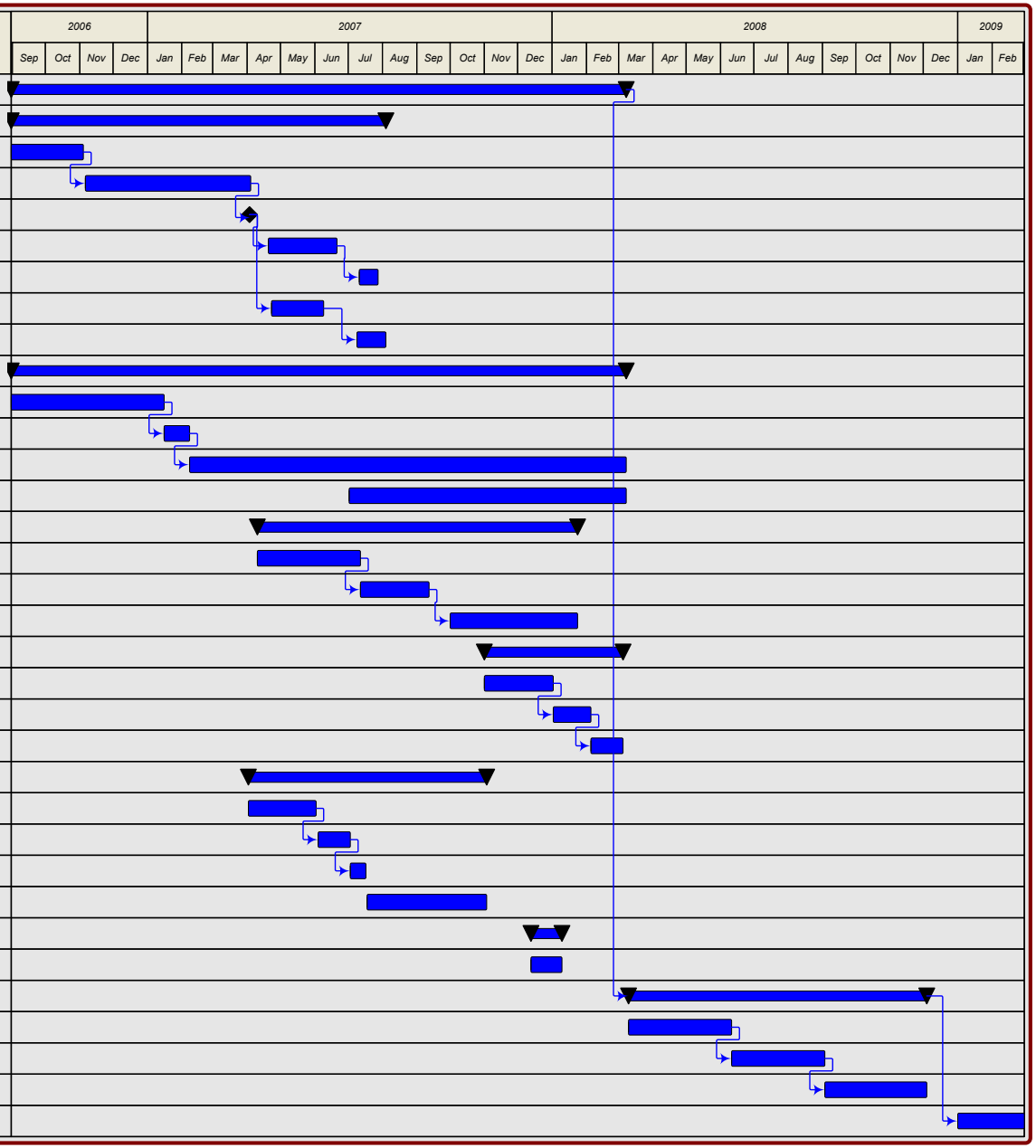
- **Free and Total Glycerine**; cost is $89 (typically failed four to five times and it relate to amount of un-reacted glycerine)
- **Flashpoint**; cost is $43 (relates to the amount of un-recovered methanol)
- **Acid number**; cost is $43 (mostly a problem with soy-based biodiesel)
- **H20 content**; (this should be visibly noticeable)

Magellan offers a five-test "pre-screen" or "start-up oversight" package for $269. She recommended setting aside around $5000 to initially get any kinks out of a new process and to reach specification.

[63] Magellan Analytical Services. www.magellanlp.com/lab.asp or 888.660.9593. Phone conversation on December, 2006.

7. Development Schedule and Production Plan

ID	Task Name	Start	Finish
1	**DEVELOPMENT PHASE**	**8/31/2006**	**3/26/2008**
2	**Business Development**	**8/31/2006**	**8/3/2007**
3	Author Feasibility Plan	8/31/2006	11/3/2006
4	Author business plan	11/6/2006	4/3/2007
5	Finalize development schedule	4/3/2007	4/3/2007
6	Solicit feedstock agreement	4/20/2007	6/20/2007
7	Execute feedstock contract	7/11/2007	7/27/2007
8	Solicit distribution agreement	4/23/2007	6/8/2007
9	Execute distribution contract	7/9/2007	8/3/2007
10	**Financing**	**8/31/2006**	**3/7/2008**
11	Investigate loan and grant option	8/31/2006	1/15/2007
12	Develop cash flow balance sheets, income statements	1/16/2007	2/7/2007
13	Complete applications for grants and loans	2/8/2007	3/7/2008
14	Founding-Members membership equity drive	7/2/2007	3/7/2008
15	**Siting**	**4/10/2007**	**1/23/2008**
16	Review potential sites	4/10/2007	7/11/2007
17	Select and acquire location	7/12/2007	9/11/2007
18	Acquire permits	10/1/2007	1/23/2008
19	**Insurance**	**11/1/2007**	**3/4/2008**
20	Define requirements	11/1/2007	1/1/2008
21	Solicit estimates	1/2/2008	2/4/2008
22	Execute agreement	2/5/2008	3/4/2008
23	**Legality**	**4/2/2007**	**11/2/2007**
24	Author Articles of Incorporation	4/2/2007	6/1/2007
25	Attorney Review	6/4/2007	7/2/2007
26	File Articles with Secretary of the State	7/3/2007	7/16/2007
27	Author By Laws	7/18/2007	11/2/2007
28	**Procurement**	**12/13/2007**	**1/9/2008**
29	Place Processor Order with Deposit	12/13/2007	1/9/2008
30	**CONSTRUCTION PHASE**	**3/10/2008**	**12/3/2008**
31	Site Preparation	3/10/2008	6/10/2008
32	Processor Installation	6/11/2008	9/2/2008
33	Testing and Commissioning	9/3/2008	12/3/2008
34	**OPERATIONS AND MAINTENANCE PHASE**	1/1/2009	4/1/2009



8. Capital Needs

An overview of start-up expenses follows:

Start-up Expenses		
Leasehold Improvements	$	50,000
Capital Equipment	$	187,500
Location / Admin Expenses	$	114,800
Opening Inventory	$	12,603
Advertising / Promo Expenses	$	16,500
Other Expenses	$	1,750
Contingency Fund	$	45,000
Working Capital	$	100,000
Total Start-up Expenses	**$**	**528,153**

An elaboration of start-up expenses is located in Excel spreadsheet file titled "OBC Pro Forma."

9. Financing Strategies

To successfully capitalize the facility, the Co-op's business plan will need to outline the composite of financing sources; these sources will generally fall into two categories:

- **Equity:** an ownership right, i.e. members/investors
- **Debt**: a liability, i.e. banks/creditors

Equity is traditionally more expensive than debt but is typically required to access debt; most lenders will not loan money to an entity with a low "equity to debt ratio." Equity is the first finance needed and the last to get paid in liquidation, whereas debt is often the final piece of financing and has the first stake in insolvency.

Equity in a consumer co-op is typically without high expectations of return on equity (ROE) other than low-cost access to the co-op's services; conversely, if a co-op chooses to offer preferred stock there will be ROE expectations outlined in the bylaws. Unless equity is desperately needed, it is more advisable to offer member loans, then to sell of pieces of the business; in which case there is a fixed rate of debt servicing that can be less expensive than an equity dividend. Although dividends can be 0% if the co-op is returning no surplus, theoretically members who hold loans are still just members with a single vote in the management of the co-op.

Another source of funding vigorously active in the renewable industry are "angel investors." Angels tend to be affluent people seeking investment in firms to gap the "Three Fs" (friends, family and fools) and venture capital firms. Angels are generally

not aggregated groups of investors, like venture firms, but do form networks. Angel investors are often seeking to be actively involved with a project and may be willing to provide noneconomic benefits, such as leveraging their past networks or offering their expertise.

Outside the debt and equity dichotomy, the least common and most desirable source of financing is grants which are essentially a donation without the expectation of repayment. That said, there will be relationships to build, applications to complete and obligations to fulfill which are connected to any grant; a grant is in no way "free" money.

Fundraising for any biofuels project can be a complex and challenge undertaking. Having a clearly articulated business plan and feasibility study will prepare the Co-op for that task.

9.1. Potential Funding Streams

The primary funding stream for start-up is a combination of member investment and debt, banks and the community debt, and, as a last resort, nonvoting preferred stock can be issued to provide replacement funding. The plan also relies upon USDA support via the 9006 program.

Owner Investment		
75 Founding Members @ $200	$	15,000
40 member loans @ $4,000 average loan @ average 3%	$	160,000
Nonvoting Preferred Stock	$	70,000
Total Investment	**$**	**245,000**
Debt		
Bank loans	$	125,000
Community loan	$	50,000
Total Bank Loans	**$**	**175,000**
Other Sources		
9006 Grant	$	125,000
Total Other Sources	**$**	**125,000**

9.2. Sales Plan

The sale plan is articulated in the financial projections and operates with the assumption that a combination of both retail and wholesale options will be pursued.

10. Financial Projections

See attached Excel file titled "OBC Pro Forma" for complete financial model including the assumptions, cash flow analysis, four year profit and loss, and amortization plan for bank, community and member loans.

11. Recommendations

The following are the primary risks assessed, overall key recommendations for next steps and possible paths forward.

11.1 Risk Assessment

"When the perfect storm has passed and the industry consolidation begins, the difference between the buyers and sellers will be their risk management skills…"
- James Eiler of Cybus Capital[64]

Any new business venture will have risks and this plan has more then some due to the adolescent and overheated nature of the industry. It will be the Co-op Board's role to identify, assess, plan and implant risk management strategies; it will undertake this process with or without an intentional formalized plan. All businesses consciously avoid, reduce, retain or transfer risk through contracts, insurance policies, smart practices, etc. It is important to note, that funders will most likely require a risk management strategy.

Initial primary risks follow:

A. **Problem:** Feedstock issues: Insufficient availability, decreasing supply and/or increasing price of WVO.
Possible Causes: Rendering industry maintains custody of WVO to produce Biodiesel, or more aggressively pursues WVO collection contracts. Industry (e.g. SeQuential/Pacific) consumes regional supply.
Effect: More expensive inputs, tighter margins, and/or increased price, resulting in decreased surplus.
Proposed Solutions:
   - Identify low-cost alternative sources of WVO or alternative feedstocks
   - Aggressively acquire WVO contracts from producers (e.g. restaurants or industrial sources)
   - Offer greater customer service to WVO producers

[64] Eiler, James. June 2006. "Sustainable industry or .com exuberance." *Biodiesel Magazine.* Retrieved June 2006 from: http://www.biodieselmagazine.com/article.jsp?article_id=948

- Form early strategic alliances with partners up and down the supply chain

B. **Problem:** Insufficient retail market demand for product.
Possible Causes: Overly optimistic market assumptions, changing market landscape or unanticipated competition in region.
Effect: Sales do not keep pace with projections and expectations.
Proposed Solutions:
   - Identify, network and cultivate wholesale market partners (i.e. I.T., midsized fleets or fuel blenders)
   - Penetrate new markets (e.g. HHO or marine)
   - Market research, perhaps selling more diverse product line

C. **Problem:** Undercapitalization.
Cause: Lack of start-up working capital is a common cause for new venture failure.
Effect: Operations and production will not have the resources to continue and will be slowed and/or ineffectual. This could potentially result in long term damage through lasting negative brand association if the product line is inconsistently available or low quality.
Proposed Solutions:
   - Follow an intelligent financing strategy
   - Ensure a surplus in cash reserves
   - Access to an available line of credit
   - Engage key stakeholders and form strategic partnerships

D. **Problem:** Potential internal capacity issues.
Cause: Lack of experience in the industry of the senior management.
Effect: Weak governance and mismanagement resulting in poor business decisions.
Proposed Solutions:
   - Commitment to continuing education for all staff and board
   - Commitment to ongoing organizational development
   - Development of clearly understood systems

E. **Problem:** High cost of ASTM certification
Cause: Initially every batch of fuel must be sent off for ASTM certification costing $1,000 per test.
Effect: Greatly increased costs of production.
Proposed Solutions:
   - Larger batch sizes and testing multiple batches at once (is this possible or too risky)

- Producing non-certified but "to ASTM specs" and selling only to co-op members
- Keep other costs low

F. **Problem:** Industrial landscape dominated by well capitalized and entrenched business interests resulting in oligopolies with anticompetitive practices.[65]
Cause: Traditionally the petroleum industry is characterized by expensive "barriers to entry" in which large economies of scale are developed. These oligopolies will eventually form in the renewable fuel industry.
Effect: Complicated industry regulations that serve vested interests. Potential predatory marketing strategies by competition. Propriety R&D and patented technologies. Exclusive supplier agreements between key industry players.
Proposed Solutions:
   - Niche marketing by leveraging "localized fuel economy" aspects
   - Cultivating trusting relationships with key industry players (i.e. suppliers, fuel retailers and fuel wholesalers, consumers etc.)
   - Aggressive marketing as part of a comprehensive marketing plan
   - Strongly marketing the co-op advantage

G. **Problem:** Incapacity to meet demand
Cause: Ever-increasing demand coupled with a lack of production capacity
Effect: Lost revenue in potentially unrealized opportunity cost. Leave an opening for competitors. Negative impression for consumers who show up to purchase goods that aren't there.
Proposed Solutions:
   - Keep flexibility in production process scale
   - Monitor general demand in target market
   - Seek feedstock acquisition opportunities

11. 2. KEY RECOMMENDATIONS

Return on investment is the fundamental and inescapable bottom-line: *no margin, no mission.* Aside from that truism of business, the key recommendations are elaborated on: networking; capitalization; "co-op advantage"; capacity development; and scale.

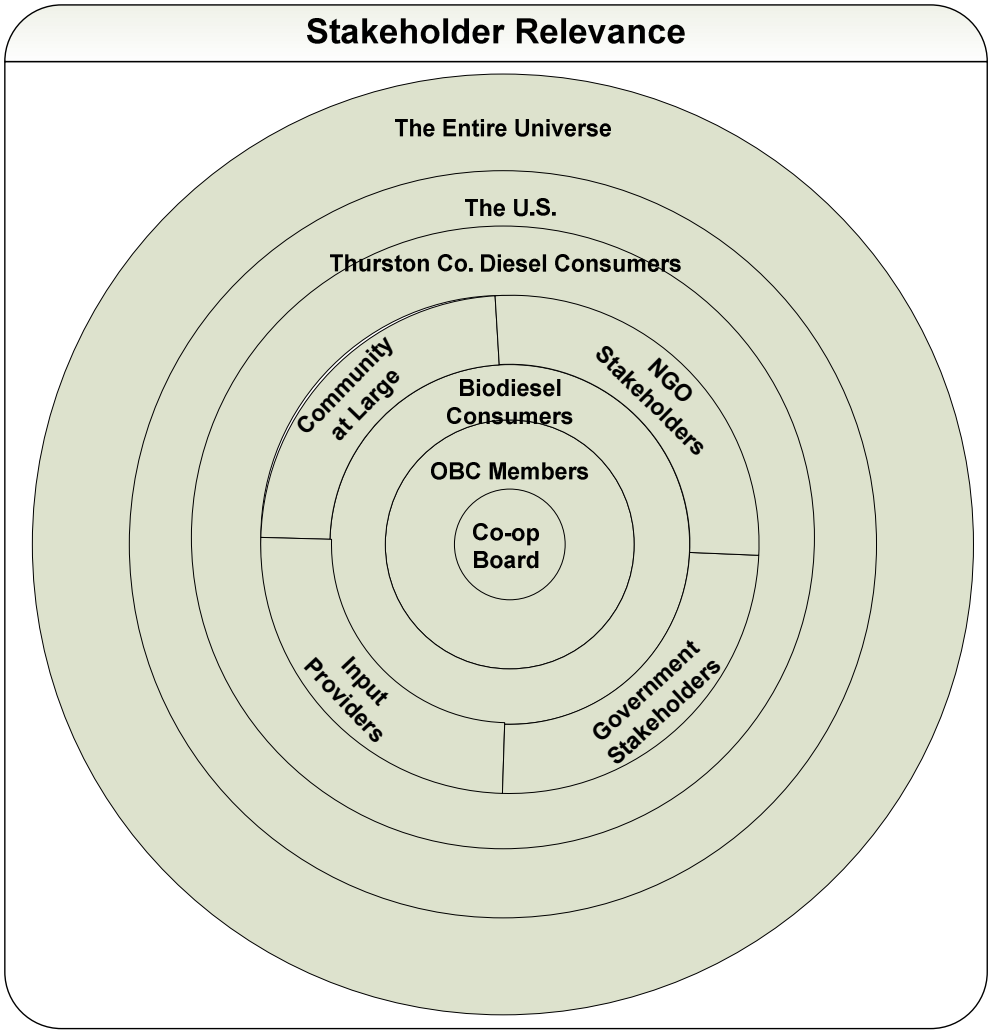
Strategic network building and partnering:

There is clearly a need to increase partnership building and networking of key stakeholders. As this project moves forward with an increasingly more crystallized plan of action, it will be important to bring more parties to the process. Since this

[65] http://en.wikipedia.org/wiki/Anti-competitive_practices

initiative is not venture-driven but community-driven, the fullest engagement of the community will be needed to move forward. Create a dynamic database of people who have an interest in the success of this project, then form relationships with them and frequently communicate with them.

The following chart, titled "Stakeholder Relevance," attempts to demonstrate that the world is filled with interested parties who will have varying intensities of relevance and interests in the future of OBC. Identify these stakeholders and why they care or, if they don't already know, educate them on why they should care. From the WSDA who has an interest in showing successful projects in the Energy Freedom Loan program to Aqua Tierra's desire to tell clients it uses biodiesel, there will be a range of parties, people and agencies seeking a different stake in OBC; the Co-op will excel by brokering these opportunities for the benefit of the membership.



A co-op's purpose is to meet its members' needs through providing the requested benefit, in this case biodiesel, locally produced, waste feedstock, etcetera. Although

this may sound simple enough, it doesn't serve members needs to run an unprofitable or unsustainable enterprise. The business world can be a harsh landscape built on quid pro quo and through strategic involvement of key stakeholders OBC will better position itself for a more stable future.

Diverse capitalization sources:

It will be critical to secure and raise a combination of federal, state, member-based and private financing. Use of membership fees and member-loans can leverage government money and inexpensive bank loans. In any start-up venture, especially co-ops, capitalization is the "make it or break it" issue. Even under best case scenarios fledging businesses of any size can find themselves struggling with poor cash flow and diminishing the goodwill of their suppliers. All new co-op businesses have unusual levels of funding dependency that decrease with time and healthy business practices; the broader these obligations can be disaggregated onto diverse lenders and stakeholders, the better.

Marketing the Cooperative Advantage:

Co-ops must seek opportunities that they are uniquely qualified to meet.

As a cooperative, OBC will have goodwill to draw upon community support in a deeper way than other investor-owned bioenergy businesses; OBC must utilize this benefit to the fullest. There is an entire host of intangible and concrete benefits that a co-op can offer to stakeholders and members; the Co-op's ability to leverage and market that story will help define its niche and its identity.

For example, frequently co-ops are perceived as both ethical business partners and reliable quality suppliers.

A trip to any Wal-Mart will demonstrate how globalization's consolidation, centralization of power and control has created a more homogenized world for the consumer. Ironically, there have been more isolated grassroots consumer movements desirous of regional niches at local levels. Based on the market research, there is

Sidebar Two

Advantages of the co-op model over investor-owned firms

1. **Democratically controlled** by those it serves and surplus is distributed equitably
2. **Ties to local community** mean more socially conscientious
3. **No investors to feed:** income stays in the community
4. **Permanence:** co-ops live beyond its founders
5. **Self-management:** co-ops are a self-help tool for the economically disadvantaged
6. ***Investor-owned firms focus on the bottom line and co-ops focus on social, individual and community needs in addition to the bottom line***

sufficient cause to justify OBC being that regional niche for Olympia's renewable fuel needs.

OBC has these "goods," now it needs to go market them.

Ongoing capacity development:

If the Co-op is to succeed, it must hold a strong commitment to ongoing training for the management team and make capacity development into an intentional and essential part of the long-term and short-term plan of OBC. This is must for any business but the tight margins, industry volatility, etc. of the bioenergy sector absolutely forbid sloppy management. Leave poor governance to large firms like Archer Daniels Midland which have the capacity to cross-subsidence their entrance into bioenergy production. The Co-op must be a well-defined, well-organized undertaking and this can only be achieved by acquiring the best talent available and through continual "upskilling."

"Right-sized" business:

As a community scale project, OBC should seek to build a business plan around an appropriate size. It should fortify the Co-op's position before extending out from there. The co-op shouldn't launch a highly debt-leveraged business just to achieve generally accepted assumptions of economies of scale. Alternatively, the Co-op will never become a truly community-based business if it only seeks to sell an exclusive and small membership.

11.3. Opportunities: The Way Forward

With the many recommendations and next steps outlined in the production schedule, the committee should be for no small want of activities and tasks needed to be done, many of which concurrently. The steering committee was convened to research the feasibility of a community-scale, cooperatively-owned biodiesel production facility to meet regional demand in Thurston County Washington. The different components were examined and analyzed. Now if this project is going to reach fruition, then the advised actions and recommendations are going to need to be implemented. Sufficient market and ability to serve it has been demonstrated. Adequate momentum is going to need to be generated to attain the outlined goals.

APPENDIXES

APPENDIX I

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APPENDIX II - Qualifications and Disclaimer

Eric L. Bowman has been a Cooperative Development Practitioner since joining the Center in the winter of '03/'04. Eric has since managed workshop series focusing on cooperative development, co-authored feasibility studies and provided technical assistance with committees seeking to form co-ops. After graduating the Evergreen State College with a focus in non-profit administration, Eric has attended multiple professional development workshops, including both sessions of the *2005 Cooperative Development Training Program: the Art and the Science of Starting a Cooperative Business*. Eric is a Director on the Board the Tulip Credit Union in Olympia, WA. His background includes owning a gardening business and being a farm interpreter (i.e. guiding and designing educational tours and animal husbandry) for a regional park authority at an agro-tourism operation.

Eric L. Bowman has used has combined his experience and knowledge with extensive research to prepare this study and has reached it conclusions in an objective and unbiased manner. There is no assurance given, nor should any be inferred by Olympia Biofuels Cooperative or anyone with whom the Cooperative shares this study that any projections or forecasts made by this study or implied by it will in fact be realized.

APPENDIX III - Interview with Seaport Petroleum President, Randy Thomas

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Date and Time:	4:00 pm Thursday, April 27, 2006
Company:	Seaport Petroleum / Seaport Biofuels
Contact:	Randy Thomas President, Seaport Petroleum randyt@seaportpetroleum.com 7800 Detroit Ave SW Seattle, WA 98106 (206) 971-7999 Off (206) 971-7299 Fax (206) 255-9510 Cell www.seaportpetroleum.com
Subject:	Biodiesel Sales

Questions:

1. About Seaport Biofuels:

- **Market:**

Seaport Biofuels has partnered with Propel Biofuels, using the Propel brand and staff to market their biodiesel. They are working on contracts with Shell stations, Seattle Garbage Trucks, and numerous fuel pumps in the greater Seattle area (5 stations to come online this spring/summer), as well as NW Washington. Propel is interested in branding nationally and is opening locations throughout the country. Currently Seaport sell biodiesel through an onsite pump, and two satellite pumps in Seattle. They also sell to a number of smaller distributors and commercial fleets. They have higher volume retail deliveries as far south as Olympia.

- **Sales:**

Sales have dropped over the winter to roughly 10k gals/week. They are now at 30k gals/week and rising. This includes roughly 3,000 gals/week sold at their onsite pump. Seaport expects to outrun Seattle Biodiesel's production capacity by the end of the summer. Current price is 2.99 for B99.

- **Facilities:**

They currently have a total of 14,000 gallons onsite storage. This includes 8k dedicated and 3k gal blend tank. They have a heated blending tank and blend at 75*F. They have a fleet of tanker trucks (4-9.4k gallons) that have run on B99 all winter.

2. Seaport & Seattle Biodiesel:

The two companies have a "gentlemen's agreement" that Seaport will buy everything that Seattle Biodiesel can produce. If Seaport is unable to purchase on any given occasion, then Seattle Biodiesel can sell on the open market. Seaport gets first priority.

3. Would you be interested in buying from OBC?

Randy is very concerned about quality control with a yellow grease based biodiesel. He has heard many stories of inconsistent product and fuel quality issues concerning yellow grease biodiesel (Whole Energy, Sequential Pacific, Port of Portland). He would certainly

be interested in OBC biodiesel if we could provide consistent product (above ASTM specification) and ensure low water content. Also, it would have to be price competitive.

4. Would you be interested in a long-term contract?
Not clear.

5. What price do you pay for B100?
Current price (today) from Seattle Biodiesel is $3.02/gal. It is available for $2.78 from West Central Soy in Tacoma. Seaport has bought from them in the past, but there were major fuel quality issues that were unresolved (phases falling out of fuel). They will now only buy from West Central if they have to.

6. Do you expect this price to come down?
We would hope so. The price from Seattle Biodiesel has come up and down- all over the place. But we would hope it will stabilize somewhere on the low end.

7. Logistics of Fuel Pickup:
It would take about 2 hours of labor to pickup from Olympia (roughly $150 cost). They have trucks available from 4,000 – 9,400 gallons capacity. They would likely pickup 8,200 gallons by truck and trailer. They have to ride light over the scales between Seattle-Olympia.

Currently, they call Seattle Biodiesel when they need fuel. Seaport sends over a truck, and Seattle Biodiesel pumps through a 3" metered hose with a 1 micron absolute filter. It is pumped at 250 gpm. There is an automatic shutoff valve, but there is always someone manning the shutoff switch, just in case.

8. Propel Biofuels:
Call Rob Elam to help OBC with siting and permitting (marketing, outreach, education, etc.). He has very many resources and is very experienced in getting projects going.

APPENDIX IV - WVO Survey

Today's Date: _____/_____/2006
Name of Restaurant: [MailMerged in]
Address of Restaurant: [MailMerged in]
Your name: [MailMerged in]
Your email: _____
Phone: [MailMerged in]
Your Position/title: _____

---

1. Restaurant's Type of Cuisine:
(circle one or more and please elaborate)
- American:
  - Bar and Grill
  - BBQ
  - Diner/family
  - Other: _____
- Asian:
  - Chinese
  - Japanese
  - Indian
  - Vietnamese
  - Thai
  - Other: _____
- Bakery: _____
- Deli: _____
- European:
  - Greek
  - Italian
  - Irish
- Mexican
- Other:_____

2. Restaurant's Seating Capacity: _____

3. How much waste vegetable oil (i.e. fryer oil etc.) do you produce?
- _____ (gallons or pounds) per _____ (week, month, etc.)

(if 0 gallons per month, please skip to question 17)

4. How often do you change your fryer oil?
- _____ times per _____ (day, week, month)

5. How many gallons is your fryer's capacity? _____

6. What kind of oil do you dispose of?(please circle all that apply)
- Canola
- Lard
- Soy
- Blended (if, so what)_____

- Other_____
- Don't know

7. Where do you currently store your waste vegetable oil?
   - Stored in kitchen
   - Stored in alley
   - Other: _____

8. What do you currently store waste vegetable oil in?
   - We do not store our waste vegetable oil
   - 35 pound jugs
   - 5 gallon container (i.e. carboy or bucket)
   - 55 gallon drums
   - Dumpster
   - Other: _____

9. In the drain system, do you have a:
   - Grease trap
   - Grease interceptor
   - Nothing

10. Is the grease disposal system automated?
   - Yes
   - No

11. Do you filter your waste vegetable oil?
   - Yes
   - No

12. Do you contract with a collector for your waste vegetable oil disposal?
   - Yes; if so, who: _____
   - No; if not, then please skip to question 17

13. Length of your contract for waste vegetable oil collection?
   - Quarterly
   - Monthly
   - 6-month
   - Yearly
   - Other: _____

14. How much do you currently pay for waste vegetable oil collection?
(please include all fees)
$_____ per _____ (month, week, pick-up, etc.)

15. How often does your collector make a pick-up?
   - Weekly
   - Monthly
   - As-needed
   - Other: _____

16. Are you satisfied with your current collector?

- Yes
- No
- Other: _____

17. Would you like to know more about Biodiesel being produced locally?
    - Yes – please contact me
    - No

18. Do you have any thoughts you would like to add?

_____

_____

Thank you very much for your time!!!

APPENDIX V – Phone Surveys of Rendering Companies

Renderers and Collection Phone Interview
Today's date and time: March 14, 2006
Interviewer: Eric Bowman
Interviewee: Shane Jrutsch; corporate office in MN. 651.796.1600
Interviewee's company: RTI; Restaurant Technologies, Inc.

---

1. **Do you sell yellow grease wholesale?**

Yes, but call the MN office to set up a deal.

- **Would you sell directly to the co-op?**

Call Shane J. for a delivery. The day-to-day dealings will be with the office in Kent.

- **Volume?**

45,000 pounds; only sell in truck loads, 6,000 gallons

- **Product rates? Terms?**

Take the highest bidder for sales. The market moves every day; the price changes. There is no CBOT price for yellow grease. Seattle is 12 cent picked up from their location. Penny to penny and half per pound for delivery price. They use a 3rd party delivery service. $500 min. freight then plus $250 delivered to Oly. Today's market would be 13 to 14 cents.

- **Discounts for local delivery and/or quantity?**

Discounts if we pick up.

2. **What is the availability of your product?**

They sell it every week. They don't like to shop load-to-load. They want somebody who can dependably take a truck a week. To talk about a truck load here and truck load there is too much of a time sink for them.

3. **What is the frequency which you pick up your yellow grease?**

4. **What are the delivery methods?**

5. **How predictable is feedstock?**

They supply all the fresh oil to these restaurants; so they know what they are getting. He would guess on average a mix of 90% soy and 10% corn.

6. **What are the quality measurements used for your final product?**

7. **Do you know if it is Vegetable v. Animal?**

They put a system in; deliver their oil fresh oil and pick it up when it is used.. They have 2 holding tank system; 1 for fresh and 1 for old. At the push of a button, the fryer is cleaned.

8. **Are there any other local collection companies? If so, who do they sell to?**

9. **What do you think for the future of your rendered product is?**

In the next year to 2 years; the price will increase. It will trade at a 6 to 7 cent discount because of the tax credits for blending. You get double the credit for WVO supposed to soybean oil. Soy bean oil has very little to do with BD; it is growing. Less then 10% of soy is ending up in BD. Yellow grease is tied closely to corn pricing because it is used in feed rations and feed guys and play with fat, corn, etc. they go on what is cheap. We will see increase but it will be muted. If the incentive is rewritten to be not pegged to corn; then the spread will be 4 cents and not 6 cents. Although the price will appreciate, it will be held back by the tax incentives.

(Can we call you again if we have any other questions?)

Renderers and Collection Phone Interview
Today's date and time: January 9, 2006; 2.18pm
Interviewer: Eric Bowman
Interviewee: Roxanne Wydick
Interviewee's company: Rainier Ranch

---

1. **Do you sell yellow grease wholesale?**

No, they are under a contract and refer everybody to Pacific Rendering.

- **Would you sell directly to the co-op?**
- **Volume?**
- **Product rates? Terms?**
- **Discounts for local delivery and/or quantity?**

2. **What is the availability of your product?**
3. **What is the frequency which you pick up your yellow grease?**
4. **What are the delivery methods?**
5. **How predictable is feedstock?**
6. **What are the quality measurements used for your final product?**
7. **Do you know if it is Vegetable v. Animal?**
8. **Are there any other local collection companies? If so, who do they sell to?**
9. **What do you think for the future of your rendered product is?**

Renderers and Collection Phone Interview Questions
Today's date and time: January 9, 2006; 2.23pm
Interviewer: Eric Bowman
Interviewee: Jim Johnstone – call back on Thursday or Friday afternoon
Interviewee's company: Pacific Rendering Co., Inc.

---

1. Do you sell yellow grease wholesale?
Most of it is sold. It would be a "spot load." Most of their product goes to the mills they have been servicing for 40 years.

- **Would you sell directly to the co-op?**

Maybe…

- **Volume?**

A single tanker truck = 48,000 to 50,000 in truck.

- **Product rates? Terms?**

(also rates for their collection)
They sell by the pound. The market sheet if for 11 cents per pound picked up. They can deliver to Oly for penny and a quarter to penny and half.

- **Discounts for local delivery and/or quantity?**

2. What is the availability of your product?
Depends on market. They have 1 load a month potentially or maybe 6 loads.

3. What is the frequency which you pick up your yellow grease?

4. What are the delivery methods?
Truck.

5. How predictable is feedstock?
The majority of it is restaurant; i.e. not predictable at all. This is not just a veg oil.

6. What are the quality measurements used for your final product?
They send it out to analysts. 2% H20 or less.

7. Do you know if it is Vegetable v. Animal?
No.

8. Are there any other local collection companies? If so, who do they sell to?

9. What do you think for the future of your rendered product is?
The big one is the raw material. Most of the material is spoken for. His process they remove moisture and most of the product is spoken for.
At the present time, he thinks the future will stay the same; but future depends on world wide markets.

Renderers and Collection Phone Interview
Today's date and time: January 9, 2006; 2.52pm
Interviewer: Eric Bowman
Interviewee: Phil Anderson
Interviewee's company: Darling International

---

10. Do you sell yellow grease wholesale?
Yes, we do. It is currently being sold for Biofuels or feed ingredients.

- **Would you sell directly to the co-op?**

Yes.

- **Volume?**

Sell in 6,500 gallon tanker loads. These tend to weigh around 40,000 to 60,0000.

- **Product rates? Terms?**

(also rates for their collection)
This price will depend on current market. Commodity prices tend to change. Sell by pound and the weight depends on. Sold 2 semis for 15 cents a pound; Picked up.

- **Discounts for local delivery and/or quantity?**

The price for ¾ cent a pound less if picked up.

11. What is the availability of your product?
The product is available at most times.

12. What are the delivery methods?
Via the tanker truck or picked up.

13. How predictable is feedstock?
It can be blended to order. We could order one or the other or order it blended. We could order any sort of blend that we want.

14. What are the quality measurements used for your final product?
50% free fatty acid max. less then 2% moisture and impurities.

15. Are there any other local collection companies? If so, who do they sell to?
He will not tell us about them.

16. What do you think for the future of your rendered product is?
Availability its going to stay the same and demand is only going up because of the several plants being built. He envisions an increase in price. He gets calls every day for Biofuels from people who are trying to make a B10 or B20 mix. The majority of his business is still internal to Darling.
15,000 to 20,000 gallons for boiler fuels.

APPENDIX VI - Lessons for Success

The following tips for cooperative success are adapted from articles printed in the *NCBA Cooperative Business Journal* and the USDA magazine for cooperative businesses.

Why Cooperatives Fail

- poor selection of directors, especially those who fail to support their cooperative
- members who join but never use their co-op and bypass it for a small gain elsewhere
- members who use cooperatives but fail to take responsibility. Each member must be ready to accept responsibility when asked, or as the need arises. Every member should have an equal opportunity to be president of the cooperative
- members who never ask questions and who let a few persons make policy
- members who don't attend annual meetings and directors who fail to attend board meetings
- lack of consistent membership education about the problems cooperatives face and the challenges they must meet
- not supporting the cooperative with enough money (risk capital) to get the job done
- low-cost management - it's the most expensive item for a cooperative. High-priced management is usually the least expensive item
- not closely watching the formation of cliques and special interest groups within the co-op
- concealing facts about a cooperative. All facts, both good and bad, should be placed on - not under - the table
- errors in financial policy, such as over-extension of credit, too little capital, poor accounting records, lack of a financially sound, systematic program for reimbursement of equity
- errors in educational and social work. This begins by failing to teach cooperative ideals to members unfamiliar with how cooperatives function, neglecting general educational programs, failure to develop member loyalty or countering the development of factions within the association
- management errors, such as inadequate inventory, poor location, improper equipment, neglected appearance of physical facilities, employee dishonesty, ineffective management, incompetent directors, nepotism, poorly conducted meetings, admittance of disloyal and dissatisfied members

Why Cooperatives Thrive

- providing only the goods and services members use
- financed by the members. The greater the financing (risk capital) supplied by the members, the more efficient the cooperative.
- using all major fixed assets at the 75 percent level, or more
- members who do the majority of their business with the cooperative
- low administrative and overhead costs
- more individualized and specialized services, particularly in the marketing area
- maintaining an open line of communication with members. Individual members will then become more influential

- selecting and developing a quality management team
- placing more emphasis on electing business-oriented directors
- developing and implementing a systematic method of cooperative education for members, employees, directors and paid management
- aggressively positioning for changes in operations, markets and member needs

APPENDIX VII - Market Survey reprinted from www.surveymonkey.com

Page 1. Introduction

The following survey is designed to help the Olympia Biofuels Cooperative understand the local market for diesel and biodiesel in the South Puget Sound. Your participation in this survey will assist in building a diverse economy and ensuring fuel security in our region.

By contributing to the future success of the Co-op you will increase the availability of renewable fuels in the region, and help shape our energy options in the future.
This survey has only 4 Pages and should only take 5 to 10 Minutes. Try to answer each question completely, so we can gather a more complete picture.

Thank you!

Page 2. Vehicle Ownership

1. How many Diesel vehicles do you own?
   - Passenger Car/Wagon
   - NonCommercial Truck/Van
   - Commercial Truck/Van
   - Commercial Equipment (eg. Caterpillar)
   - Other

2. If you do not own a Diesel vehicle, are you seriously considering purchasing one in the next:
   - 6 months
   - 1 year
   - 2 years
   - Other (please specify)

Page 3. Fuel Usage

3. How many miles do you drive your Diesel in an average week?
   - >10 miles
   - 10-25 miles
   - 26-50 miles
   - 51-150 miles
   - 151-250 miles
   - Other (please specify)

* 4. Do you currently use Biodiesel in your vehicle?
- Yes
- No

5. Do you heat your home with Biodiesel fuel?
- Yes
- No

* 6. How much fuel do you consume per week? (mark '0' for zero gallons used)
- Gallons
- Diesel #2
- Biodiesel
- Gasoline

Page 4. Fuel Preference

7. If you purchase petroleum Diesel, how often are you motivated by...? (check all that apply)

Never Hardly Ever Sometimes Frequently Always

- It's What I'm Familiar With
- Fuel Quality
- Reliability
- Price
- Convenient Location
- Weather/Cold Flow Properties
- No Biodiesel Available

8. How often do you choose Biodiesel? (check all that apply)
- Always
- Most Of The Time
- When It Is Inexpensive
- When I Can Access It
- When It Is Convenient
- Only In The Summer
- Only By Mistake
- Never
- Other (please specify)

9. Where do you purchase your Biodiesel: (Please list)
- Preferred Choice
- Second Choice

- Third Choice
- Also
- Also

10. If you use a Biodiesel blend, is it... (check all that apply)
- B20 or lower blend
- B99
- B100
- Other (please specify)

11. What's your preference?
- B20 or lower blend
- B99
- B100
- Diesel #2
- Whatever's Available
- Other (please specify)

* 12. What excites you most about Biodiesel use?

Not Excited Somewhat Excited Excited Very Excited

- Domestic Product
- Support American Farmers
- Carbon Neutral
- Clean Air
- Renewable Energy
- Energy Independence/Security
- "No War for Oil"
- Recycling

13. How long have you been using...
Time
Diesel #2
Biodiesel

* 14. Would locally processed Biodiesel made using Recycled oils impact your purchasing decisions?

- No
- Yes, If It Were The Same Price
- Yes, I Would Even Pay More

- Yes, I Would Even Drive Out Of My Way
- I'm Unsure
- Other (please specify)

Page 5. Demographics

This will help us understand who you are and provide us an overall picture of who buys Biodiesel.

Privacy: Your personal information will be fiercely protected and will not be sold, or used to market to you directly; the use of this information is for planning and development purposes only.

* required fields noted by asterisk

15. Personal:
- First Name
- Last Name
- Address
- Email
- Phone

* 16. Zip Code:

17. Occupation:

18. Approximated Annual Income:

Page 6. Additional Comments:

19. Any additional thoughts? Let us know what you think!

Page 7. Completed!

Thank you for your time! If you are interested in knowing more about OlyBiofuels, contact us at:
360.753.9169
info@olympiabiofuels.org

APPENDIX VIII – Phone Interviews with Processing Technology Providers

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Processing Tech Phone Interview Questions
Today's date and time: 7.20.06 @ 10.30 PDT
Interviewer: Eric Bowman
Interviewee: Mark Mays
Interviewee's company: FORE Energy 425.280.4223

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1. ID exactly what services are offered that would be relevant to OBC?
It is not economically feasible for them to scale something at that size.
12MMgpy is the smallest that is maybe economically feasibly.

- **High (Variable) Free Fatty Acids (over 20%)?**

This is their specialty.

- **Willingness to work or relevancy with small scale biodiesel producers (<.5MMgpy)**

This would be great but it would not make sense. It may be better to have just a retail operation. It is a heck of a lot of work. A breakeven venture will still mean a lot of work for a lot of people; this is not glamorous work, there are chemicals, it is dangerous. There are a lot of environmental and safety issues.

2. Cost estimations?

3. What would this business relationship look like?

4. How flexible is their design to adding on more capacity later?
N/A

5. Batch or continuous?
Only continuous will convert the FFA. Most systems use plastic plumbing for smaller processes and that wouldn't work for all the chemicals involved. It isn't feasible to have an automated system at that scale. It is not feasible to get stainless tanks for a smaller production. There are economies of scale involved. There are safety issues.

6. Will their service handle variable feedstocks?

(Will they mail us some information on their tech)?
(Can we call you again if we have any other questions?)

Processing Tech Phone Interview Questions
Today's date and time: 7.21.06 @ 8.45
Interviewer: Eric Bowman
Interviewee: Steve Austin
Interviewee's company: SunBio Systems – 408.377.1810, San Jose, CA

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1. ID exactly what services are offered that would be relevant to OBC?
The market is not the same market as it was in January. The industry has matured with the cost of oil. He's down in Silicon Valley in the land of start-ups. We started a lifestyle of emerging and new markets. On the first edge, there is a small market with innovators. Market adoption chart. We are now in the mainstream.

A local regional distributor in Dec. a company like OBC would take care of local market and this would go on for a few years (in the "olden days"). Then it would expand. In a typical market, someone would have gotten support from a larger firm would buy up 3 in WA, 3 in OR, etc. Revenue of 5 MM a year is not worth getting out of bed. They would never come in at that level. If you are a bigger player, it is not worth messing around with smaller plants.

We are planning this on the old model just like him. He was hoping to make a few plants a year. Since Jan, he has had investors shout at him for not doing more. They are racing to put money in his. The market grew very, very fast. The model that we are working on is outdated.

Their idea is to make money fast. "Wake up kid, if they old grey hairs are talking about it at cocktail tables." There is money all over the place to invest. $204MM market cap on Willie Nelson.

They sold a machine for used waste oil. From their view point, if you put a management structure into a single plant; it is a waste to use it in a single plant. How can you ask for money if you are refusing to replicate it (i.e. need manager, book keeper, etc.) But if we had regional plants, in CA biodiesel is $.40 cheaper then diesel. So why are we not collecting more money?

When he goes to buy steel, or concrete he is being out-competed by China. If co-op people cannot see it, then go with a different model. If we had of put this same money into the framework 3 months ago, our value would be in the $100's of MMs.

They market is changing fast; they are ramping up.
Here is the deal, they are big on research, they have some exotic equip. They are not finished with that. They have collaboration with an E.U. University; they have collaboration with an American University. Their goal is to get tied into this deeply.
Biz plan can get outdate in a few weeks.

- **High (Variable) Free Fatty Acids (over 20%)?**

They make the system with standard models, considering you use fresh oil. If you are using used, and then there is a pretreatment on the front end.

This is “turnkey” in the sense that it is easier. The complete making the fuel and the filtering. They can supply a cooling tower and a boiler. They will handle up to 15%, this would handle most yellow grease.

They train people how to use the plant. If we have a million gallons of used oil.

- **Willingness to work or relevancy with small-scale biodiesel producers (<.5MMgpy)**

SUS 316 for pretreatment (more expensive)
SUS 304 is fine the for rest

2. Cost estimations?
$500K - .5MMgpy – un-automated
$625K - .5MMgpy – don’t need to automate it but he encourages it
$800K - 1.2MMgpy -

3. What would this business relationship look like?

4. How flexible is their design to adding on more capacity later?
Certain parts of the system, you are buying pumps and tanks. There is a limit to how much to punch through.

Level 1 – what about used feedstock? Consider buying 1 MM of new and blend it to reduce FFA. If you do a 50/50 mix, then you have a margin in the middle since virgin is more expensive. Then you have 2 times the fuel contributing to the fixed overhead. We still have rent on the facility. You spend $5,000 to get 1 tank but to double the tank size is $6,000. The cost of upgrades is enormous compared to inputting it up front.

5. Batch or continuous?
They do batch and at this small scale would use acids and acids must be batch.

6. Will their service handle variable feedstocks?
Yes. They will not make their reactors out of stainless. Methanol burns like crazy.

Methanol recovery, they have a full distillation recovery; but it is difficult if not impossible to scale it up in the field.
He has had calls from people who have purchased plants w/o methanol recovery.

(Will they mail us some information on their tech)?
The higher the FFA, the more times the feedstock will take to pretreat, pretreatment is the most time consuming part

Processing Tech Phone Interview Questions
Today's date and time: 7.28.06 @ 12.30
Interviewer: Eric Bowman
Interviewee: Arvinder Singh - 612-378-0808
Interviewee's company: Superior Processing Technologies

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1. ID exactly what services are offered that would be relevant to OBC?
Proprietary technology, but mostly standard. For such a small plant, they would provide us with the information. It would be cheaper to have a fabricator build it. They would then train the operators and specifications. They would provide the fabrication drawings, pump info, energy usage, etc. There would not be boilers and cooling towers.

8 hours a day and 5 days a week. They have designed bigger plants (40MMgpy) which are continuous flow. They have designed 1 smaller unit like this in HI, it is still under plans. A lot of people are asking for plans of 1 to 2 MMgpy; they are working on a smaller design which is batch. It will include all of the processes.

For pretreatment, the bleaching, deodorizing.
WVO, more then 5% then pretreatment is necessary, then you add sulfuric acid and methanol before the first reaction.

- **High (Variable) Free Fatty Acids (over 20%)?**

Can handle up to 20%.

- **Willingness to work or relevancy with small scale biodiesel producers (<.5MMgpy)**

2. Cost estimations?
Equipment cost = $700K; depending on safety and metallurgy because of chemicals (this can save $100K) to a million; this could cover methanol, heat exchanger and instruments
Other costs would be construction, piping, electrical.
They typically do engineering and equipment.
Engineering cost = $200K; this includes tech fee and engineering services and license to use, they will provide support if feedstock meets the quality.

3. What would this business relationship look like?
Their parent company is Baker. Their plan is 30MMgpy continuous flow.

4. How flexible is their design to adding on more capacity later?
If you run more shifts, then you can run more capacity.

5. Batch or continuous?
Batch, skid mounted. A couple of reactors do various steps in 1 reactor. Do multiple unit in a single vessel.

6. Will their service handle variable feedstocks?
(Will they mail us some information on their tech)?
(Can we call you again if we have any other questions?)

Processing Tech Phone Interview Questions
Today's date and time: 7.25.06
Interviewer: Eric Bowman
Interviewee: Brad Alvis – 866.247.4763 ext. 6#
Interviewee's company: Greenline Industries

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1. ID exactly what services are offered that would be relevant to OBC?
Up to 3MM a year for the "CF-3". They no longer have the CD500 or CF-1.
For approx. 40% more price, you get 8 times the profit. The market is scaling up.

- **High (Variable) Free Fatty Acids (over 20%)?**

All systems are designed around seed oil, but cannot do avocado or coconut but they can do all mainstream oil. They can also do alternatives, such as rendered products and WVO. They do not sell the pretreatment technology. It is not difficult, you put it in a tank. He recommends blending in canola with the yellow; to keep the FFA less than 5%. As long as you are below 5%, the yield is smooth; if you go over the 5%, the transesterification process fails. It does so in an increasing rate; 1% over (i.e. 6%) is not bad but 3% over is 3 times as bad.

- **Willingness to work or relevancy with small scale biodiesel producers (<.5MMgpy)**

2. Cost estimations?
They have a manufacturing plant, the CF-3 $1,148,000 – this is pipe-to-pipe. We need to have a set of tank and a flat place to put it. This price should hold stable for a while.

3. What would this business relationship look like?

4. How flexible is their design to adding on more capacity later?

5. Batch or continuous?
This process is continuous; the start-up time is 45 minutes. If we want to shut it down for an afternoon or a few hours, you can just turn it off. To shut it down for a few days, it would take 45 minutes. The processor is pc controlled, you turn it on and it knows what to do. Some of the other companies who advertise continuous, they are actually batch. Advises us to request to view any company's processors; they may not even have a product.

6. Will their service handle variable feedstocks?
A key issue for us should be to ID a source of feedstock. It works if you can get feedstock. If we can beat the $2 dollar mark. If we can sell it close to a retail market, then we will be OK.

(Will they mail us some information on their tech)?
They want us to visit the Arkansas plant.

Processing Tech Phone Interview Questions
Today's date and time: 7.19.06 @ 2.20pm
Interviewer: Eric Bowman
Interviewee: Jamison Onstott
Interviewee's company: EPIC Modular Processing Systems @ 314.845.0077

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1. ID exactly what services are offered that would be relevant to OBC?
Specialize on modular design. Not specific to biodiesel work. They do ethanol and biodiesel. They do not own any tech. They have process capabilities in the companies. For example, they developed a process for a distillation company, i.e. vodka; to fire the boilers they wanted to burn non-ASTM and/or glycerin; therefore, they could develop that for cheaper then a provider.
We should seek to license a technology from someone else. We could go to someone and have them do a "turnkey" project. Having worked with a lot of those companies and he would recommend against is. Often they are offering it and they have never build it. Even the people who have been doing it for years are not good at putting it together.
$300,000 for tech, per plant: Lurgy PSI, Germany. They are great process engineers but not the best builders; they have a good technology. He has had a good experience with their ethanol processes.
They would build it modular and do the "design build."
From a non-process engineer technology stand point, it does not look like much for what you get from the $300,000 but you are getting a proven process.
"Turnkey" – he does not recommend this because of the expense
Being good at the detail design will save a lot of money. A turnkey provider will put 20% on the price of everything, like a general contractor. Keep an eye out for mark up. You get a single phone number in case of problems instead of 5 phone numbers but it costs.

- **High (Variable) Free Fatty Acids (over 20%)?**
- **Willingness to work or relevancy with small scale biodiesel producers (<.5MMgpy)**

Most economical is to get something "off the shelf." It will cost us $1,000
From detail engineering to field install. They can be involved in start up if they need that to guarantee that it works.

2. Cost estimations?
Turnkey - from $.80 per gal.
Batch – $.40 per gal.
Continuous - $.40 per gal.

3. What would this business relationship look like?

4. How flexible is their design to adding on more capacity later?

5. Batch or continuous?

6. Will their service handle variable feedstocks?
(Can we call you again if we have any other questions?) Yes.

APPENDIX IX – Pelly Model A Generic Bid

'Pelly Model A' Biodiesel Processor

August 24, 2006

The 'Pelly Model A' biodiesel processor is used for transesterifying, then washing/polishing vegetable oil or animal fat into biodiesel fuel. The finished fuel is suitable to burn in a diesel engine or oil burner type heating system. The 'Pelly Model A' processing system has the capability to be expanded to higher capacities with additional hardware as your biodiesel needs grow.

Specifications of the 'Pelly Model A5'

- Process 1000 gallons of vegetable oil into biodiesel per week. With capability of system expansion to capacities of over 6000 gallons per week
- Skid mounted 'Pelly Model A5' Biodiesel Processor incorporating innovative patent pending features coupled to a preheating, dewatering and reaction vessel(s) with built in safety, convenience and service features.
- System that is easy and predictable to operate, quick and inexpensive to clean and service.
- Will provide years of biodiesel production.
- 'Pelly Model A' processor has a fully enclosed vacuum sealed and easy to operate base catalyst and alcohol mixing system with alcohol reclamation.
- Alcohol can be pumped to processor from drum/tote or moved to processor via inert nitrogen gas under low pressure. Either option has built-in safety features designed to both improve safety and increase operator convenience.
- Hands-free microprocessor managed washing/polishing system with translucent polyethylene tanks. Wash system incorporates fine water misting, air bubbling, drying and filtration to clean up biodiesel product.
- Complete operator training (with quick on-the-fly operators tutorial) backed by ongoing technical support and a 12 months limited warranty from date of delivery.

Processor Description

Vegetable oil is heated with a thermostat controlled electric heater(s) overnight when electric-Utility rates are lowest. In morning water is removed from heated oil (important when using waste kitchen grease).

Operator next mixes oil blend prior to taking a sample for titration testing. The titration determines the amount of base catalyst necessary for a proper transesterification in any particular batch of oil.

Oil is mixed using processor. Transparent flexible plumbing lines aid in observing fluids and reaction progress. Measured amounts of base-catalyst beads or flakes are introduced into alcohol tank for mixing. The processor's skid-mounted Alcohol/Catalyst reaction vessel mixes the alcohol and base catalyst into solution prior to mixing this solution with the vegetable oil.

The next step of blending the catalyst solution with the vegetable oil is the actual transesterification step. Transesterification causes the vegetable oil to separate into biodiesel and glycerin. The 'Pelly Model A' series of processors will transesterify vegetable oil into biodiesel at a rate of about 200 gallons per hour.

After transesterification the glycerin separation is completed and crude biodiesel is pumped through a series of tanks for final washing, drying and polishing. After polishing stage the biodiesel is pumped through a filter and conveyed to a day tank or delivery truck. Glycerin by-product is conveyed into drums for shipping to secondary users.

Oil Feedstock and Yield

The 'Pelly Model A' Processors are sold and delivered complete with tank farms designed and sized for processing 1000 gallons of vegetable oil per week or more. The final percent yields of fuel and final completion times vary depending on the condition of vegetable oil or animal fat feedstocks used. Fresh oil will give the highest yield with the fastest washing time. Waste fryer oil works in this system but final biodiesel yields diminish depending on its degraded condition and concentrations of free fatty acids (FFA) suspended in oil. This system is recommended for oils with less than 5% FFA concentrations in order to achieve a high biodiesel % yield and quicker wash/polish times.

FFAs occur when vegetable oils are heated in kitchen fryers. The longer and hotter that oil is heated, the greater the increase in concentrations of FFAs. Higher concentrations of FFAs will diminish the yield of the biodiesel and slow the final washing process.

Purchaser Responsibilities

It is the responsibility of the purchaser to:

- Determine and implement a proper and legal spill containment system for their processor site.
- Determine and implement a proper and legal wastewater treatment system.
- Responsibly handle and dispose of glycerin byproduct resulting from biodiesel production.
- Comply with all laws and regulations relating to the manufacture and sale of biodiesel fuel.
- The purchaser and operator(s) agree to sign and uphold to legal agreements safeguarding Mike Pelly's and Olympia Green Fuel's LLC intellectual, proprietary and trade secrets.

Building Site Specifications

In order for the 'Pelly Model A' processor to reliably meet the production quotas stated by Olympia Green Fuels LLC, purchaser must site the processor in a building that meets the following specs:

- Interior temperature of structure housing biodiesel processing equipment needs to be maintained at 60F degrees or greater year round.
- Building is wired with (220-volt 30 amp 60Htz) single phase AC and (110 volt) AC. (custom changes are available for foreign markets)
- Building must be plumbed with running water.
- An eyewash station and hand cleaning sink must be located in close proximity to processor.
- The roof of building must be able to accommodate an (inch and half) vent pipe installed through it at a point above processor.
- Floor of building is recommended to be sloped towards floor drain for easy washdown and cleaning of processor.
- A grease trap located in the building's drain system to handle wash water from processor washing system and other point sources.
- The building has a septic or drainage system capable of handling soapy waters similar to that of a Laundromat. We also offer a washless or low wash polishing system for circumstances using septic systems or where sewage permits might be a problem.
- An automatic dry-chemical fire sprinkler system installed over processor for oil or alcohol fire suppression along with a stand alone dry chemical fire extinguisher located nearby.
- The work area should have a lab bench used to store equipment needed for titrations, quality testing and note taking.
- A dry, secure, and fireproof storage facility with spill containment for storage of alcohol, catalyst and glycerin byproduct.

Tank Farm Specification

This system uses both custom manufactured steel tanks and plastic conical bottomed tanks in welded metal stands. The manufacturer of the plastic tanks have rated their tanks to a

maximum temp of 140F degrees and suitable for fluids with a specific gravity of 1.7 or less. The plastic tanks are used for washing and polishing the finished biodiesel fuel.

This system operates by heating the vegetable oil or animal fat in a conical bottom welded steel tank to no higher than 130F degrees (usually 120F degrees). The conical bottom steel Reaction Vessel works in concert with the Processor skid and has an airtight manhole for access to clean or inspect tank. Reaction vessel also has an explosion dampening relief vent to assure safe working conditions.

Beta Testing Agreements

Olympia Green Fuels LLC will work closely in consulting with our customers' ways to assure a safe and successful operation and strive to remedy any problems that might come up in a timely manner. We look forward to sharing with our customers any positive developments we or other customers discover that will enable every operation to run more efficiently. If future developments or improvements involve additional expenses the purchaser will cover these costs if they want these improvements incorporated in their operation.

Olympia Green Fuels has limited rights to manufacture and sell 'Pelly Model A' biodiesel processors using Mike Pelly's Patent Pending design. Purchaser will agree to recognize this property and sign written agreements to safeguard Pelly's intellectual property.

Our current asking price for our entry level 1000 gallons/week (50 thousand gallons/year) complete biodiesel processing system starts at $55 thousand US dollars plus shipping/setup expenses. A similar system engineered to process 300 thousand gallons per year has a current asking price of $170,000.

Olympia Green Fuels is currently in development of our industrial grade version called the 'Pelly Model A6'. This system is a similar design to the 'Model A5' but engineered to run around the clock and sustainably process ½ million to one million gallons of oil per year. The price range for this system is yet to be determined but will prove to be an affordable method for serious biodiesel production as well.

If you are interested in getting further updates, send us an email and we will work to get to you additional info via email as it develops.

Thank You for your interest in our products.

Sincerely, Mike Pelly President, Olympia Green Fuels

www.OlympiaGreenFuels.com

(This document is for discussion purposes only)

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Phone 360-866-4268

APPENDIX X - ASTM Specifications

What follows is a reprint from the National Biodiesel Board's website. Accessed October 2006: http://www.nbb.org/pdf_files/fuelfactsheets/BDSpec.PDF

Specification for Biodiesel (B100) – ASTM D6751 - 06

June 2006

Biodiesel is defined as the mono alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, for use in compression-ignition (diesel engines. This specification is for pure (100%) biodiesel prior to use or blending with diesel fuel.

Property	Limits	Units
Flash Point	130 min.	Degrees C
Water & Sediment	0.050 max	% vol.
Kinematic Viscosity, 40 C	1.9 – 6.0	$mm^2/sec.$
Sulfated Ash	0.020 max.	% mass
Sulfur; S 15 Grade	15 max.	pmm
Sulfur; S 500 Grade	500 max.	pmm
Copper Strip Corrosion	No. 3 max.	
Cetane	46 min.	
Cloud Point	Report	Degrees C
Carbon Residue; 100% Sample	0.050	% mass
Acid Number	0.50 max.	mg KOH/gm
Free Glycerin	0.020 max.	% mass
Total Glycerin	0.240 max.	% mass
Phosphorus Content	0.001 max.	% mass
Distillation Temp.; Atmospheric Equivalent Temp, 90% recovered	360 max.	Degrees C
Sodium/Potassium	5 max., combined	ppm