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Biofuel Costs, Technologies and Economics in APEC Economies

Final Report

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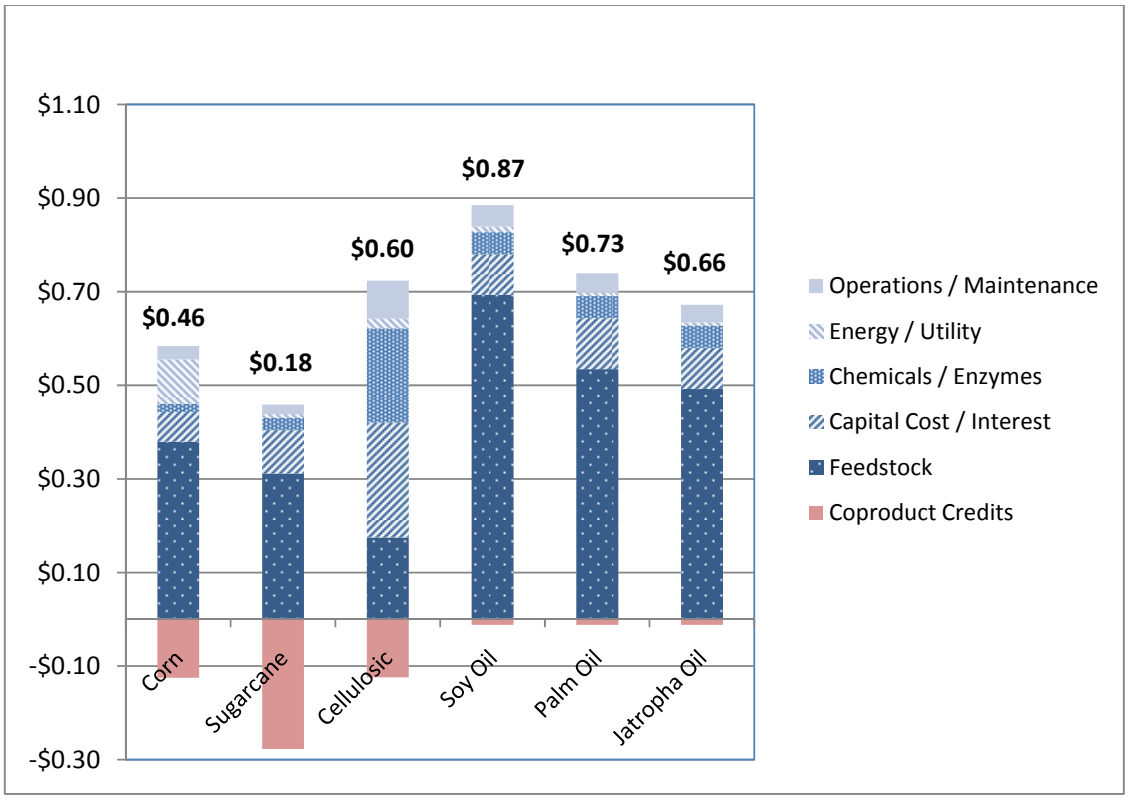
1. Executive Summary

The Asia-Pacific Economic Cooperation (APEC) Energy Working Group's Biofuels Task Force is interested in developing a consensus message on biofuel economics and trade. A central focus for the Task Force is to evaluate the potential of biofuels to cost-effectively displace the use of petroleum-based fuels in transport. The objective of this study is to analyze and compare the cost of production of various biofuels against the petroleum-based fuels they displace, factoring out the impact of subsidies wherever possible. The study expands and updates an analysis of biofuel economics that was presented by the Biofuels Task Force to the 8th Energy Ministers Meeting (EMM-8) in 2007.

This report incorporates assumptions from the 2007 analysis, with some deviations, and provides a means of comparison for standardised biofuel production scenarios by feedstock and country of origin. Figure 1 shows the summary of results for the standardised biofuel case modelling, with production costs broken down into subsections and co-product credits subtracted to produce a net production cost for each individual feedstock on a per liter basis. The greater co-product credits for ethanol compared to biodiesel reflect the fact that the ethanol processes produce more co-products, and these co-products generally have a higher value compared to crude glycerin.

Figure 1 - Biofuels Production Cost Comparison Summary



Additional detailed operating costs and production costs for each individual case study are given in sections 3 through 8. While these production costs represent a standard case to be used for comparison with petroleum based fuels, different factors such as plant and site specific synergies, economy of scale, and market availability for co-products can all have a large impact on overall production cost and hence commercial viability of a specific biorefinery.

Comparisons with calculated production costs for equivalent petroleum products are shown graphically in each of the sections 3-8 (Figures 10, 12, 14, 16, 18, 20). Visual comparison of the production costs indicates that a standardised biodiesel refinery using feedstocks of soy oil (U.S.), and crude palm oil (Malaysia) generally appear to have production costs historically above those of their corresponding petroleum products (Ultra Low Sulphur Diesel and Singapore Gasoil). These products may find it more difficult to compete without ongoing subsidies or government schemes that act to mandate a volumetric biofuel component in transport fuels. Reduced feedstock and capital costs anticipated for biodiesel utilising crude jatropha oil feedstock increase its competitiveness with petroleum products.

U.S. corn ethanol production costs for a standardised plant have been competitive with U.S. gasoline production costs at times over the 5 year period. Brazilian ethanol with attached co-generation facilities has been shown to consistently result in a production cost lower than its corresponding petroleum product, although this depends significantly upon net production costs due to an electricity co-product credit. Without this credit, the production cost would be on the order of US$0.46 per liter, but with the credit, costs are as low as US$0.18 per liter. A trend analysis of the difference in production costs also indicates that the production cost advantage for Brazilian sugar cane ethanol against gasoline production costs could increase in the future.

A modern cellulosic ethanol biorefinery, with capital costs and ethanol yields along the lines anticipated for commercial plants using the best available technologies, would historically have been cost competitive with petroleum at certain periods within the last five years. However, variability in cellulosic feedstock price over time cannot be estimated due to the lack of market information for such feedstocks at present. More importantly, the technologies that provide appropriate ethanol yields from cellulosic material by way of enzymatic hydrolysis have yet to be proven on a commercial scale.

It is important to note the wide variability in production costs for biofuels based on the location of a plant, along with periodic market conditions that impact feedstock and utility costs. Plant-specific synergies (one of the main drivers for the development of a competitive project) will also greatly impact production costs. Development of a standardised production cost for a specific biofuel feedstock and economy does not take any of these factors into account, resulting in estimated costs that may be higher than those which can be realised in real-world projects.

2. Methodology

2.1. Cost Components and Biofuels Evaluated

Biofuel costs are calculated in this study using a "cost of production" methodology. Direct or transparent financial incentives and subsidies are eliminated from calculations to every extent possible.

From the 2007 *Report of the APEC Biofuels Task Force Group on Biofuels Economics and Trade*, the calculated biofuel cost of production is equal to (1) the feedstock value over time plus (2) the calculated conversion cost minus (3) the co-product value over time (if applicable).

Major project comparisons that are presented in the report relate to the major biofuel producing APEC economies with the extra inclusion of a case for ethanol from Brazil, as this economy has a significant impact on both the U.S. and world biofuels markets. Table 1 shows the separate scenarios that are modelled for each of the biofuel types in the selected economies.

Table 1 - Project Comparison Scenarios

Wholesale Petrol		Wholesale Biofuels
U.S. gasoline	↔	U.S. corn ethanol
U.S. gasoline	↔	U.S. cellulosic ethanol
U.S. diesel	↔	U.S. soy biodiesel
U.S. gasoline	↔	Brazil ethanol
Singapore diesel	↔	Indonesia / Malaysia palm biodiesel
Singapore diesel	↔	Indonesia / Malaysia jatropha biodiesel

2.2. Biofuel Feedstock Production and Pricing

The most important variable to be considered when calculating biofuel production costs is the delivered cost of feedstock from which biofuel is produced. Production costs are extremely sensitive to biofuel feedstock costs, which in this report have been determined from feedstock commodity prices. Plant conversion costs are calculated using BBI International's modelling software that represents projects tailored to each specific biofuel feedstock. Local variables from each economy for labor rates, tax rates, and historical feedstock commodity prices from 2005-2009 have been gathered for each type of feedstock - with source data indicated in parentheses:

- U.S. Corn (USDA Economic Research Service)
- Brazilian Sugar (Brazilian Sugar Cane Industry Association)
- U.S. Soy oil (TNS Fats and Oils)
- Malaysian/Indonesian palm oil (TNS / Malaysian Palm Oil Board)
- Malaysian/Indonesian jatropha oil (*Calculated*)
- U.S. Biomass (*Calculated*)

While a five-year average has been used to calculate the standardised biofuel production costs (Figure 1), these historical data have also been used for a time series comparison between petroleum production costs and biofuel production costs over the last five years by breaking down the biofuel production costs into fixed cost and feedstock components.

BBI has estimated and analyzed the expected market value of cellulosic feedstock and crude jatropha oil feedstock as there are currently no established markets for these feedstocks. This methodology is further discussed in Section 3.2. BBI's biofuel production models have been used to evaluate a large number of potential projects based on a vast range of variables; these analyses demonstrate that feedstock costs and biofuel pricing have the greatest impact on commercial viability. The biofuel sales price becomes a non-factor when modelling each case presented in this report, as only production costs are considered in this study, rather than return on investment.

2.3. Energy Equivalency Factors

"Energy Equivalency Factors" were used in the 2007 *Report of the APEC Biofuels Task Force Task Group on Biofuel Economics and Trade* in an attempt to compare the biofuel to its corresponding petroleum-based fuel. In the Task Group report, the wholesale cost of conventional petroleum-based fuels was assumed to have two main components: (1) crude oil input and (2) refinery margins. The wholesale costs of conventional gasoline and diesel fuel were then converted to equivalent costs of ethanol and biodiesel by adjusting for the different energy densities of the fuels.

The 2007 report study took the approach that since biofuels do not have the same energy content as petroleum-based fuels, energy equivalency factors could be calculated solely on the energy content of the fuels at the lower heating value (LHV). The present study, however, uses volumetric conversion to determine equivalent biofuel costs rather than energy equivalency. The logic is that ethanol and biodiesel are largely used as a blending component, and are priced on that basis.

2.4. Biofuel Capital Costs

Capital costs for each type of biofuel plant are calculated using costing data obtained from leading technology providers in the biofuels industry. These costs are then scaled to match the production output required for each standardised biofuels plant. Locally specific variables such as land price, utility costs and labor rates are also adjusted to be consistent with each APEC economy.

EPC (Engineering Procurement and Construction) contracts from ethanol technology providers are used to provide a price estimate that can be used to calculate the feasibility of the project. While this estimate can still vary by plus or minus 30 percent, it is sufficient to calculate biofuel production costs as they are much less sensitive to changes in capital cost than to changes in other variables such as feedstock prices.

Typical EPC Contract Components for ethanol plants include:

- Engineering
- Milling / Crushing Components (Sugarcane)
- Cooking Tanks (Grain Ethanol)
- Fermentation Tanks
- Distillation & Evaporation Columns and Piping
- Dehydration (Molecular Sieve Technology)
- Centrifuges
- Drying Systems (for Distillers Grains) (Grain Ethanol)
- Boilers
- Thermal Oxidizers
- Ethanol Storage & Loadout
- Cooling Towers
- Wastewater Treatment/Digesters
- Makeup Water Treatment and Storage
- Electrical/Instrumentation/DCS (Distributed Control System)
- Plant Air
- Miscellaneous Plant Systems and Equipment
- Mobilization, Start-up, Overhead & Profit

Site development costs can include:

- Inventories
- Start-up Costs
- Administration Building and Furnishings
- Rolling Stock and Shop Equipment
- Organizational and Interim Costs
- Capitalised Fees and Interest
- Working Capital

Analogous costs would be incurred for biodiesel plants, with adjustments according to the type of process equipment.

Typically, technology providers will also include a contingency to cover any items that may come in over budget. Based on past project estimates for each individual feedstock, a contingency component of 3 to 5 percent has been added to each of the capital costs for ethanol plants, as outlined in Tables 2-4. Additional costing information from each of the financial models can be found in Appendix A.

2.4.1. Corn Ethanol

Table 2 - Corn Ethanol Capital Cost Breakdown (189 MLY Plant)

Financing Cost	$3,000,000
Total Operating Cost	$1,630,000
Total Land and Site Development & Office Building	$5,610,000
Total Plant Construction (EPC Contract)	$65,000,000
Total Working Capital, Inventory, Parts, Other	$9,485,000
Total Railroad & Rolling Stock	$1,950,000
Total Fire Protection/Water Supply	$2,050,000
Contingency	$2,661,000
Total Uses	**$91,386,000**

2.4.2. Sugarcane Ethanol

Table 3 - Brazilian Sugarcane Ethanol Capital Cost Breakdown (108 MLY Plant)

Total Land, Site Development & Office Building	$9,860,000
Total Plant Construction (EPC Contract) & Operating Costs	$55,057,000
Total Working Capital, Inventory, Parts, Other	$3,486,000
Total Railroad & Rolling Stock	$1,450,000
Total Start-up Costs	$704,000
Contingency	$3,415,000
Total Uses	**$73,972,000**

2.4.3. Cellulosic Ethanol

Table 4 - Cellulosic Ethanol Capital Cost Breakdown (76 MLY plant)

Financing Cost	$2,613,000
Total Operating Cost	$1,434,000
Total Land and Site Development & Office Building	$2,365,000
Total Plant Construction (EPC Contract)	$121,125,000
Total Working Capital, Inventory, Parts, Other	$6,934,000
Total Railroad & Rolling Stock	$2,083,000
Total Fire Protection/Water Supply	$1,310,000
Total Start-up Costs	$1,350,000
Contingency	$5,100,000
Total Uses	**$144,314,000**

2.4.4. Biodiesel

Table 5 shows the capital cost breakdown for each of the three biodiesel cases examined in this report. Extra infrastructure is needed to treat palm oil based biodiesel due to the high levels of FFA's (Free Fatty Acids) in the feedstock. Jatropha plant capital costs have been scaled across the board to account for the reduced capacity assumed in the standard plant assumptions (Section 2.6).

Table 5 - Biodiesel Capital Cost Breakdown

	Soy Oil 113 MLY	Palm 106 MLY	Jatropha 106 MLY
Site Development Costs	**$5,478,000**	**$5,478,000**	**$5,220,000**
Bulk Liquid Storage	$2,536,000	$2,536,000	$2,417,000
Receiving/Loadout Building	$3,547,000	$3,547,000	$3,380,000
High FFA Feedstock Prep	$0	$14,193,000	$0
Biodiesel	$5,817,000	$5,817,000	$5,543,000
Refinery	$2,614,000	$2,614,000	$2,491,000
Biodiesel / Refinery Piping	$1,910,000	$1,910,000	$1,820,000
Utility Building	$844,000	$844,000	$804,000
Utilities	$4,575,000	$4,575,000	$4,359,000
Rail Spur (Unit car loop)	$1,399,000	$1,399,000	$1,333,000
Office	$280,000	$280,000	$267,000
Electrical	$10,974,000	$10,974,000	$10,457,000
Equipment Rental	$1,928,000	$1,928,000	$1,837,000
Start-up & Training	$1,607,000	$1,607,000	$1,531,000
Other Permitting	$914,000	$914,000	$871,000
Environmental Permitting	$398,000	$398,000	$379,000
Consumables	$1,776,000	$1,776,000	$1,692,000
Construction Management	$2,664,000	$2,664,000	$2,538,000
Engineering	$5,771,000	$5,771,000	$5,499,000
Contingency	$2,664,000	$2,664,000	$2,538,000
Project Performance Bond	$810,000	$957,000	$771,000
TOTAL CONSTRUCTION	**$58,505,000**	**$72,845,000**	**$55,746,000**
Development Costs	$15,010,000	$14,095,000	$13,961,000
TOTAL USE OF FUNDS	**$73,516,000**	**$86,941,000**	**$69,708,000**

2.5. Financing and Depreciation Schedules

Depreciation is calculated according to the expected useful life of each key unit or system in the plant, including ancillary equipment and start-up expenditures. Table 6 outlines the schedules that are used in this project. Both straight line (SLN) and double-declining balance (DDB) methods are used, based upon industry convention and Generally Accepted Accounting Principles (GAAP).

Table 6 - Plant Depreciation Schedule

Depreciation Schedules	Calculation Method	Useful Life (Years)
Process Equipment	SLN	15
Process Buildings	DDB	30
Vehicles	DDB	5
Office Building	DDB	30
Office Equipment	DDB	5
Start-up Costs	DDB	20
Annual Capital Expenditures	SLN	10

The financial model used to calculate production costs takes into account a number of assumptions for financing each standardised biofuel case, as shown in Table 7. Common equity and debt at a fixed interest rate are used to calculate interest payments over the project lifetime once common equity has been exhausted. The model can then be used to calculate a potential return on investment for the project. Equity investment is provided in full in the first month of construction, and is distributed to cover various construction costs throughout the construction period.

Table 7 - Standardised Financing Parameters

Financial Parameter	Value
Senior Debt Principal	60%
Interest Rate	9%
Lender Fees (% of Principal)	1%
Amortisation Period	10 Years
Common Equity Investment	40%
Investment Interest	3%

The financial model used to calculate production costs takes into account a number of assumptions for financing each standardized biofuel case, as shown in Table 7. Common equity and debt at a fixed interest rate are used to calculate interest payments of the project lifetime. We assume a nominal interest rate of 9 percent on debt and a nominal return on equity of 3 percent. We further assume financing composed of 60 percent debt and 40 percent equity. With these assumptions, the weighted

cost of capital works out to 6.6 percent per annum. In a sensitivity case, the interest rate on debt is reduced to 5 percent, reducing the weighted cost of capital to 4.2 percent per annum.

The financial analysis further assumes an amortization period of 10 years for capital. This allows for the possibility that capital assets may become technologically obsolescent – and hence replaced by other capital assets – prior to their actual physical exhaustion. For example, buildings last 30 years and process equipment 15 years, but are paid off in the model in just 10 years – which tends to increase the capital cost component per annum and per litre of biofuel produced. The analysis may thus yield conservative results, in that biofuels would tend to be more competitive with fossil-fuelled alternatives than the model estimates if the useful lifetime of biorefineries approaches their physical lifetime.

The cost of capital actually has but a small effect on the overall production cost per liter, which is mainly influenced by the feedstock costs. Sensitivity analyses showed that reducing the amortization period of debt by three years would INCREASE the average production cost of biofuel by only 1.6 cents per liter. When the interest rate on debt is reduced from 9 to 5 percent (so the weighted cost of capital declines from 6.6 percent to 4.2 percent per annum), the production cost declines by just 1 to 3 cents per liter.

Each of the standardised biofuel cases uses the same underlying financial assumptions - the report does not take into account variations in securing equity or debt that might occur in different APEC economies. Analysis once again shows that the production costs calculated are largely independent of the financing arrangements, and instead are highly sensitive to the feedstock costs, overall capital costs and in some cases potential co-product benefits.

2.6. Standard Biofuels Plant Assumptions

U.S. Dry-Mill Ethanol Plant

- Scale: 189 million liters per year (50 million gallons per year)
- Feedstock: corn
- Location: Iowa
- Energy: Electricity @ 6.5¢/kWh
- Natural Gas @ 0.75¢/MJ
- Co-Products Credited: DDGS

U.S. Biodiesel Plant

- Scale: 113 million liters per year (30 million gallons per year)
- Feedstock: soy oil
- Location: Illinois
- Energy: Electricity @ 6.5¢/kWh
- Natural Gas @ 0.75¢/MJ
- Co-Products Credited: Glycerin

U.S. Cellulosic Ethanol Plant

- Scale: 76 million liters per year (20 million gallons per year)
- Feedstock: woody biomass
- Location: Iowa
- Energy: Self-Produced (lignin CHP)
- Co-Products Credited: Electricity

Brazilian Ethanol Plant

- Scale: 108 million liters per year (28.5 million gallons per year)
- Feedstock: Sugarcane
- Location: Sao Paulo
- Energy: Self-Produced (bagasse CHP)
- Co-Products Credited: Electricity

Indonesian / Malaysian Biodiesel Plant

- Scale: 106 million liters per year (28 million gallons per year) (100K tpy)
- Feedstock: Palm / Jatropha oil
- Location: Sabah, Malaysia
- Energy: Electricity @ 6.5¢/kWh
- Natural Gas @ 0.77¢/MJ
- Co-Products Credited: Glycerin

Although economy of scale has a large impact on production costs at a biorefinery, a standard benchmark that represents the average capacity for a plant in a specific economy used to compare biofuels and petroleum based production costs.

Fuel conversion plant costs for second generation biofuels are determined using data developed by the National Renewable Energy Laboratory (NREL) in the United States, as well as data and expertise

accumulated by BBI for leading cellulosic ethanol projects. Utility prices are representative multi-year average values in each jurisdiction.

2.7. Description of Economics Model Calculations

BBI's proprietary biofuels financial model was used to determine biofuel production costs for the various types of biofuels and APEC economies. The financial model incorporates material and energy balances to establish yields of products and co-products, and links that information to cost/price information to establish the economics of the process. Capital costs are established from known installed costs, modified as appropriate for each co-product scenario. The financial model includes the cost of all process inputs, the value of all products and co-products, utilities, debt servicing costs, depreciation, maintenance, and all personnel costs associated with operation and management (SG&A). The 10-year pro-forma income statement during plant operation was used as the basis for the cost calculations, incorporating pre-startup administrative expenses. Expenses in each category, including pre-startup expenses, were summed over a ten-year operating period and normalized relative to the total amount of biofuel produced over the same period.

The financial model results are presented via tables in Sections 4 to 9 of this report. For each case, a detailed table of production costs is presented representing the first full year of operation, and a summary table is also presented, wherein results from the detailed table are averaged over ten years of operation, and aggregated into a smaller set of operating cost categories. The detailed financial model data and resulting financial proformas for each case are presented in Appendix B, showing data over ten years of operation plus the pre-start (construction) year. The first two tables for each case contain the plant operations data and price/cost information for each category (e.g., feedstock, natural gas, electricity, etc.). The pro-forma income statement contains line items for each cost category; values on the income statement are calculated from the operations data and price/cost information described above.

The summary tables aggregate costs into the following categories:

Feedstock	Total cost of feedstock over 10 years
Capital Cost / Interest	Initial project investment plus interest costs over ten years of operation
Chemicals / Enzymes	Enzymes, yeast, and process chemicals
Co-product Credits	Value of DDGS, glycerin, electricity or other co-products
Energy / Utility	Natural gas, electricity, water, wastewater, denaturants
Operations / Maintenance	Production labor, administrative labor, maintenance labor, maintenance supplies, accounting and legal costs, office and laboratory costs, travel and administrative expenses, miscellaneous SG&A

3. Feedstock Costs

3.1. Conventional Feedstock Costs

3.1.1. Corn Ethanol Feedstock Costs

Markets and mechanisms for corn ethanol feedstock pricing in the United States are well established and documented. Figure 2 shows the historical delivered price trends of U.S. #2 yellow dent corn, corresponding to a 5-year average feedstock cost of $147 per tonne.

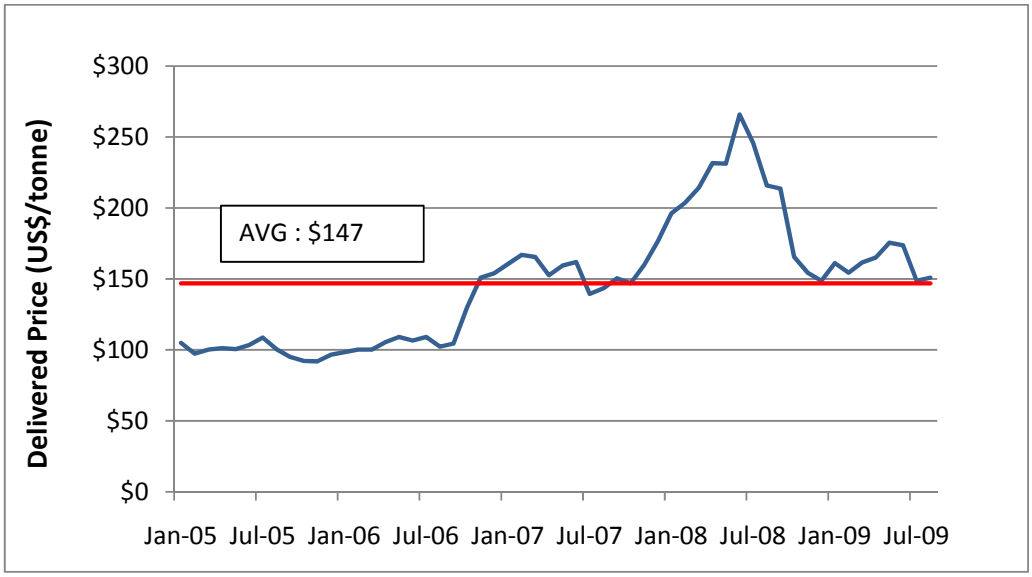


Figure 2 – Historical U.S. Corn Pricing - Chicago, Illinois

3.1.2. Soy Oil Biodiesel Feedstock Costs

The large amount of soybean production and usage for a variety of products in the United States has seen soy oil grow to be the predominant feedstock for biodiesel production, even though the low oil content of soybeans implies that they are not the most efficient crop in terms of biodiesel production per hectare. Many factors have contributed to the use of soybean oil as the dominant biodiesel feedstock in the United States, including wide availability, high levels of domestic production, and a history of subsidies and grants based on vegetable oils.

Figure 3 shows the historical delivered pricing trends of crude soybean oil, corresponding to a five-year average feedstock cost of $753 per tonne.

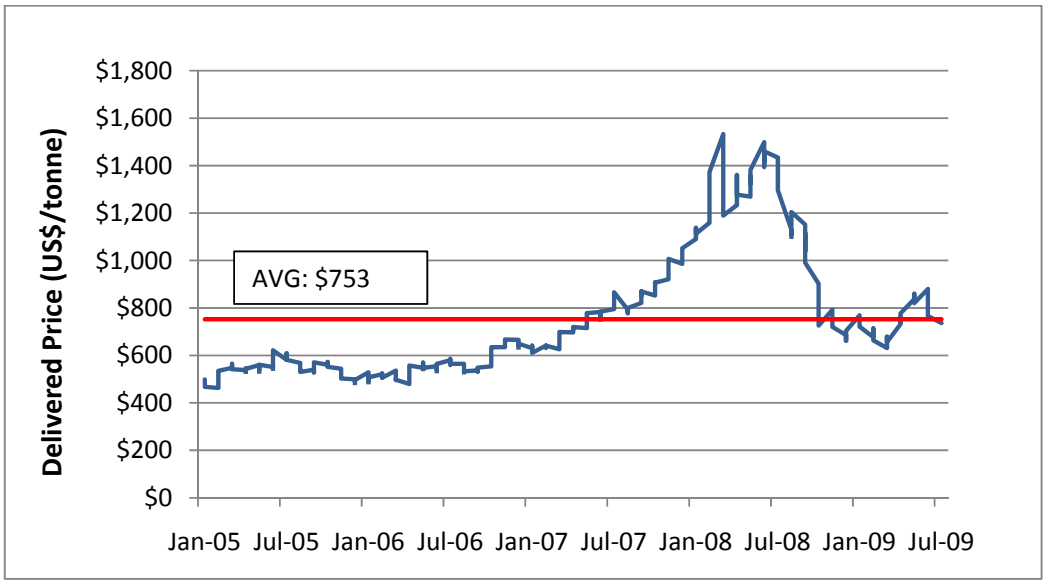


Figure 3 - Historical U.S. Crude Soybean Oil Pricing - Decatur, Illinois

3.1.3. Sugarcane Ethanol

Sugar and ethanol are produced on an integrated basis; the production distribution is constantly adjusted to maximise profit based on fluctuating world oil and sugar prices. In the 2007-08 Marketing Year (MY), the production ratio was 45.5 percent sugar to 54.5 percent ethanol For MY 2008-09, forecasts called for a ratio of 43.5 percent sugar to 56.5 percent ethanol. A continued trend toward increased ethanol share is expected due to strong demand for ethanol in the Brazilian domestic market.

While historical sugar price data are readily available for South America, it is necessary to estimate the delivered cane price per tonne as this dictates the overall production cost calculated from the financial model. An estimate of cane pricing as a function of the export sugar price has been calculated by using a data set of export sugar price plotted against the cane price in the Herbert region (Australian sugarcane industry), due to lack of available cane pricing data for South American mills.

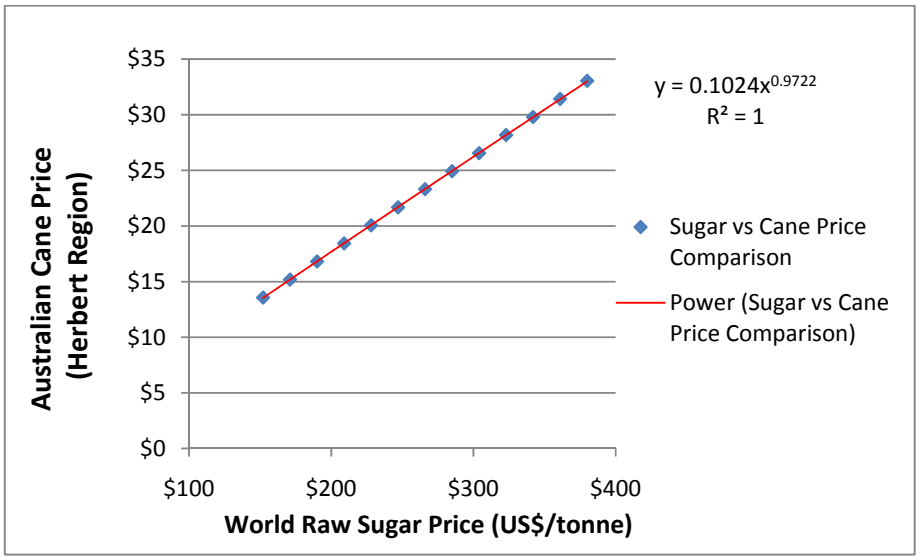


Figure 4 – Australian Cane Pricing vs. World Raw Sugar Price

Historical sugar pricing (FOB Brazil) combined with the Australian cane pricing function results in an estimated historical cane price (delivered) for a Brazilian ethanol plant. The price used to estimate typical ethanol production costs, as shown in cost breakdown tables, was taken as a five year average of the calculated historical cane price, US$24 per tonne.

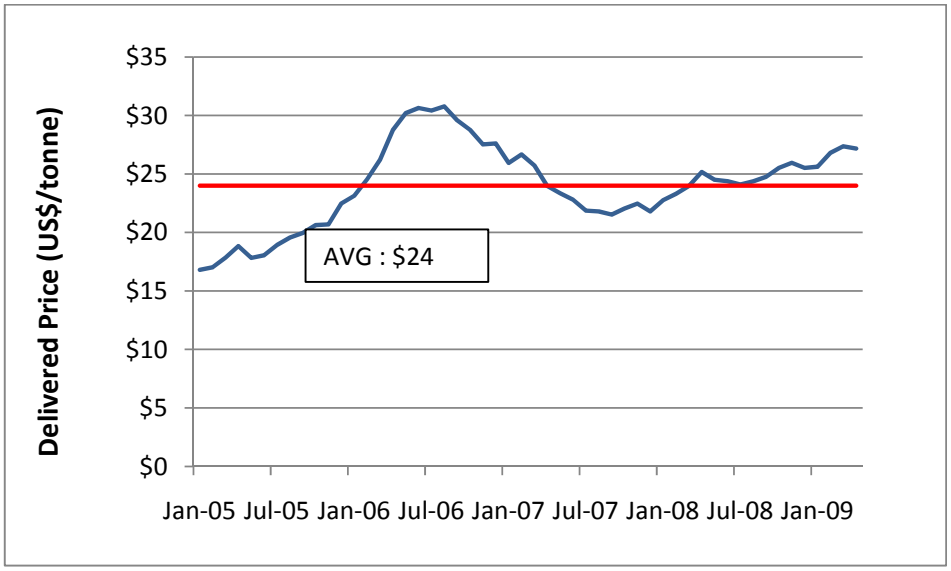


Figure 5 - Historical Calculated Brazilian Cane Price Based on Average Brazilian Sugar Price

3.1.4. Crude Palm Oil

The total area of oil palm planted in Malaysia increased by 4.5% in 2009, but crude palm oil production declined by 1% to 17.6 million tonnes due to less than ideal growing conditions for the season (Wahid, 2009). Figure 6 shows the historical crude palm oil price (including delivery costs),

from which a 5-year average of $597 was calculated and used to produce the detailed biofuel production cost tables.

Though crude palm oil prices have fallen dramatically from their 2008 records, the selling price of the product still appears to be well above estimated palm oil production costs, indicating that a healthy profit margin is being realised by palm oil producers. A drop in palm oil prices in the future will therefore not have a large impact on the viability of palm oil production in Malaysia.

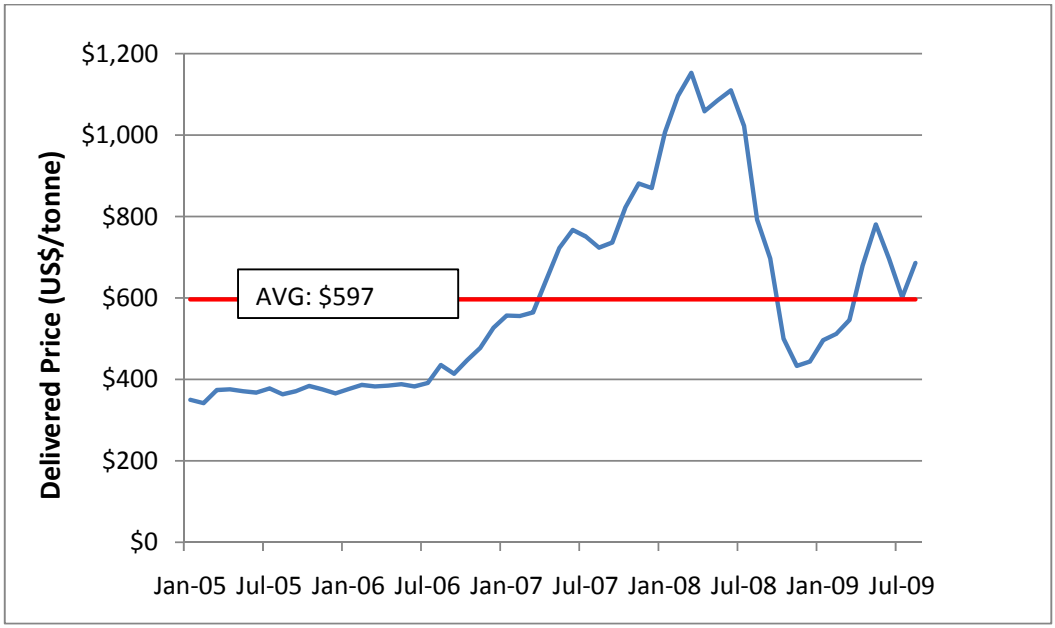


Figure 6 - Historical calculated Malaysian Crude Palm Oil Price

3.2. Lignocellulosic Biomass Pricing

3.2.1. Cellulosic Biomass: Introduction

The next-generation feedstocks for biofuels, such as farm and forest residues, have been considered in part from a sustainability standpoint, since they are not food products and the production process has low life-cycle carbon dioxide emissions. Production and markets are generally undeveloped since these next generation technologies have not yet been deployed at a commercial scale.

Since the markets for many of the next-generation biofuels are in their infancy, reliable price history databases for these feedstocks do not exist. As the production volumes expand and supply and market channels are developed, prices of these feedstocks will self-regulate. In the meantime, and for the purposes of this report, prices for next-generation feedstocks have to be calculated theoretically. Costs of cellulosic biomass, used for the production of ethanol, are analyzed in this section.

Cellulosic biomass used in the production of ethanol encompasses a wide variety of plant types and species. Farm residues, such as corn stover and wheat straw, and forest residues, such as un-merchantable wood products produced by logging activities, make up the largest volume of cellulosic biomass feedstock. Farm and forest residues are already produced in substantial volumes; harvesting, collection, and transport are the major costs of cellulosic biomass production. If the market price of the biomass exceeds the costs of production, market principles dictate that significant volumes of these feedstocks will become available to cellulosic biofuel producers.

Several factors affect the delivered cost of cellulosic biomass. These include availability of biomass within a given radius, cost to plant and harvest, and cost to transport. Where the market is currently small or non-existent, the market price has to be estimated. With new and emerging biomass feedstock markets, price will increase due to supply-demand economics as the market for them increases. All of these factors are taken into account when estimating the market price.

3.2.2. Forest Residues: Woody Biomass

The term 'woody biomass' encompasses all feedstocks derived from harvested trees. It includes the trunk and main stem of a tree, as well as the limbs and twigs usually left behind in timber harvesting operations. Limbs, branches, and irregular or crooked stems (known as logging residues), secondary mill by-products or residues, and, in certain isolated instances, harvested low-value tree species round out the majority of woody biomass feedstocks. Availability is a function of the type of wood being harvested, logging method (e.g., short wood vs. tree length) and harvest type (clear-cut or otherwise).

Logging and mill residues have been waste products, until recently. Harvesting methods, supply lines, and markets are still under development. A vertically integrated company with direct access to materials on the ground has the greatest chance of success in obtaining consistent supplies of residues at reasonable rates. Chipped wood fills a truck with approximately 23 tons of green material, only half of the fully loaded capacity of the truck. As a result, transportation costs of moving chipped material to a central processing facility are high, and local processing is most cost-effective.

Data sets regarding logging residue harvest and shipping costs are very limited, as logging residues and mill residues have until recently been under-utilized waste products. However, studies have been conducted to test the various harvesting methods and produce initial estimates of cost. Table 8 shows one such assessment conducted by the University of Minnesota's Center for Integrated Natural Resources & Agricultural Management (CINRAM). The report estimates that the total delivered cost of logging residues is currently between US$26 and US$32 per (wet) ton. The study assumes that harvest costs are allocated entirely to the merchantable wood, and are thus negligible for residues. The major costs relate to forwarding, chipping, and mill transport. Forwarding covers removal and

transport of the residue to the side of the logging road, while chipping covers costs for on-site conversion of logs and branches into smaller chips (e.g., 5cm x 5cm, or as specified by the end user), while mill transport covers costs to transport wood chips to the mill or biofuel production facility.

Other reports, including a study conducted for Minnesota's Presque Isle Power Plant, have concluded that a delivered price of ~$30/ton for feedstock could be expected. However, in the future as harvesting methods, supply lines, and established markets are developed, the equipment and labor costs are expected to go down, making logging residues a more attractive option. Note that logging residues are only considered from the local and county-regional area; logistical problems preclude harvesting and shipping of logging residues over long distances.

Table 8 - Estimated Harvest Costs for Logging Residues

Source	Yield (cord/acre) (Distribution %)	Yield (ton/acre)	Harvest ($/ton)	Forwarding ($/ton)	Chipping ($/ton)	Mill Transport ($/ton)	Stumpage ($/ton)	Price ($/ton)
Selective cut - Hardwood, small area of clearcut Aspen	14							
	75% - Hardwood							
	14% - Aspen							
	11% - Balsam	11	0	12.3	5	9	0	**26.3**
Land clearing, mainly hardwood	29							
	84% - Hardwood							
	16% - Pine/Fir	33	0	9.2	5	12	0	**26.2**
Shelterwood – Oak, Red and White pine left; Hardwood, Aspen, Jack pine cut	12							
	40% - Hardwood							
	41% - Aspen							
	19% - Jack pine	8	0	14.8	5	12	0	**31.8**

(Source: "Economics of Biomass Harvest" CINRAM University of Minnesota)

3.2.3. Farm Residues: Corn Stover

Almost every APEC economy with significant agricultural production has large amounts of lignocellulosic farm residues that could be applied to production of ethanol. A representative type of farm residue is corn stover, which consists of the cobs, stalks, shuck and leaves from a corn plant left over from the harvest of kernels. Corn stover is the most plentiful crop residue in the United States, making it an attractive feedstock there. Corn stover is being tested as both an input for heat and power applications as well as a feedstock for cellulosic ethanol. Corn stover could also potentially serve as a feedstock for a range of bio-based products. The National Renewable Energy Laboratory (NREL) conducted a life-cycle analysis of corn stover to ethanol and found an 80 percent reduction in greenhouse gas emissions by utilizing E85 (85 percent ethanol, 15 percent gasoline) instead of conventional gasoline.

There are two methods of stover collection: large rectangular bales and large round bales. Both types are baled in the field. A corn combine with its chopper off can be used to create rows of corn stover that can be processed by hay baling equipment. It is also possible to collect stover in silage and bring it to a facility for processing into bales, but this method is not likely to be the most economical. The bales will either be moved to the field edge or moved directly to a storage facility. Bales can be moved by tractor and bale wagons to the field edge for later collection and delivery to storage or a processing facility. Alternatively, a high-speed tractor, such as the JCB 3185, and a bale wagon can move the bales to storage location within a few miles of the field. Flatbed trucks have a capacity of 26 or 28 bales for square and round bales, respectively.

The expected harvest period is late October to mid-December with October being more advantageous due to weather conditions. This short harvesting season will require storage solutions for year-round use of corn stover. If the processing facility lacks the space to store a year's worth of feedstock, it is anticipated that distributed storage facilities will supply the facility. The size of a storage facility will be entirely dependent on the requirements of the processing facility and the number of storage facilities serving it. Oak Ridge National Laboratory (ORNL) assumes that 10 percent of corn stover is lost to decomposition and handling in the storage facility. As with most biomass materials that are bulky, it is advantageous to deliver corn stover to a facility within 50 miles (80 km) of the supply.

A recent University of Minnesota study, yet to be published, estimates the marginal cost for corn stover is $54 to $65 per dry ton. Iowa State University has developed a tool for pricing corn stover on the basis of nutrient values being removed (Iowa State University, 2009). Any processor using corn stover as a feedstock is likely to obtain a supply contract from a cooperative or group of farmers that covers the costs for baling, delivery, and farm profit. Corn stover suppliers can use this tool as a basis for pricing to ensure that collection and sales is financially viable.

Jim Crawford of the University of Missouri estimated a cost of $40 per ton for a farmer to collect stover. Additional fees payable to farmers must cover the costs of the nutrients removed from the land, plus some built-in profit. In areas with ample nutrient availability, $10 per ton is an acceptable rate. Where there are issues with phosphorus or potassium, the payment may be as high as $20 per ton. At this level, the prices are comparable to those in the University of Minnesota study cited previously.

Shipping costs from a storage facility to a processing facility approximately 50 miles away are estimated at $10 (ORNL cost estimate in 2002). If the storage facility is not owned by the processor, a storage fee will likely be charged. For the purpose of this analysis, the delivered cost of corn stover is conservatively estimated at $70 per ton, assuming $60 per ton for product ($40 for collection plus $20 for nutrient replacement) and $10 per ton for shipping.

3.2.4. Dedicated Energy Crops: Switchgrass

While no crops are yet grown specifically as a biofuel or bioenergy feedstock, several species are gaining interest as dedicated energy crops. Switchgrass is the most prominent of these, a native North American perennial grass tolerant of poor soils that also requires minimal fertilizer input. It is an often mentioned as a cellulosic feedstock for a host of alternative energy applications. As a dedicated energy crop, its utilization does not compete as a food or feed source. It has high cellulose content, which is desirable for ethanol production. There are two primary types of switchgrass: upland and lowland. Upland switchgrass grows to heights up to 6 feet (180 cm) and is best suited for the United States Midwest and semi-arid climates. The lowland variety grows up to 10 feet (3 meters) and is best adapted for the southern U.S. and wetter areas with heavy soil.

Switchgrass does not reach its full yield until the third year of production; it will reach about one third of its full yield in the first year, and two thirds in the second. According to the University of Tennessee, commercial yields are expected in the range of 6 to 8 tons per acre (13.5 to 18.0 tonnes/Ha) and may reach as high as 10 tons per acre (22 tonnes/Ha) (Garland, 2009). Iowa State test plots obtained yields ranging from 1 to 4 tons per acre (2.2 to 9.0 tonnes/Ha) (in Central Iowa, one harvest after frost) while Southern Iowa test plots achieved yields of 2 to 6 tons per acre (4.5 to 13.5 tonnes/Ha) (Iowa State University, 2009). The National Sustainable Agriculture Information Service has discovered a direct correlation between yield and the latitude of origin of the switchgrass type. Once established, switchgrass will continue to produce over 10 to 20 years. Greatest yields will be achieved in moderately well-drained soils of average fertility.

The primary costs for producing switchgrass include establishment costs, re-seeding costs, and production costs. Establishment costs consist of land preparation, seeds, herbicides/pesticides, and fertilizers (variable depending on quality of soil). Harvesting will generally not occur in the first year to allow for successful establishment. The primary establishment issues are weed competition and seed dormancy. Field trials in Southern Iowa experienced re-seeding percentages of 25 percent for frost seeding and 50 percent for spring seeding. Re-seeding costs are inclusive of seeds, fertilizer, and associated planting costs. After the crop has been established, harvest begins in year three. Production costs include ongoing fertilizer, pesticide, and herbicide costs where necessary and harvesting costs, which vary based on yield.

Table 9 estimates costs for various yields of switchgrass. It is expected that a farmer cooperative would supply a plant and that a profit-pricing scheme would be established to determine the delivered price of switchgrass to a cellulosic ethanol plant. Pricing is presented on a dry basis. There are

significant economies of scale, with production costs declining from $89 per ton when 2 tons are harvested per acre, to $74 per ton when 4 tons per acre are harvested, to $59 per ton with 6 tons per acre.

Table 9 - Switchgrass Establishment and Production Costs

Yield	Prorated costs ($/acre)		Annual Production Costs	Total Yearly Production Costs	
(tons/acre)	Establishment	Re-seeding	$/acre	$/acre	$/ton
2	23	9	209	241	89
4	23	9	236	268	74
6	23	9	289	321	59

Assumptions: Cave in Rock variety; 25% re-seeding year after establishment; land costs of $75 per acre; 10-year stand life; 9% interest rate on operating expenses; seeds $4 per ton; nitrogen fertilizer applied at 100 pounds per acre; 0.83 pounds of phosphorus and 18.92 pounds of potassium per ton of switchgrass; Phosphorus price = $0.27 per pound; Potassium price = $0.16 per pound.

(Source: Iowa State University Extension, 2002)

3.2.5. Cellulosic Feedstock Blend

For the purposes of the production cost analysis, an aggregate price is calculated for lignocellulosic biomass that is the average of the three primary biomass types: woody biomass, agricultural residues, and dedicated energy crops. Each type is given equal weight in the pricing average. According to the feedstock blends noted above, and the prices for various feedstock types presented in the previous sections, the aggregate price of lignocellulosic biomass feedstock is calculated at roughly $72 per dry ton. Table 10 and Figure 7 show the breakout of feedstock pricing per ton of feedstock.

Table 10 - Biomass Blend Feedstock Prices

Feedstock Type	$/ton As Received	$/ton Dry Basis
Agricultural Residues	$60	$70
Energy Crops	$71	$83
Woody Biomass	$32	$64
Feedstock Blend	**$54**	**$72**

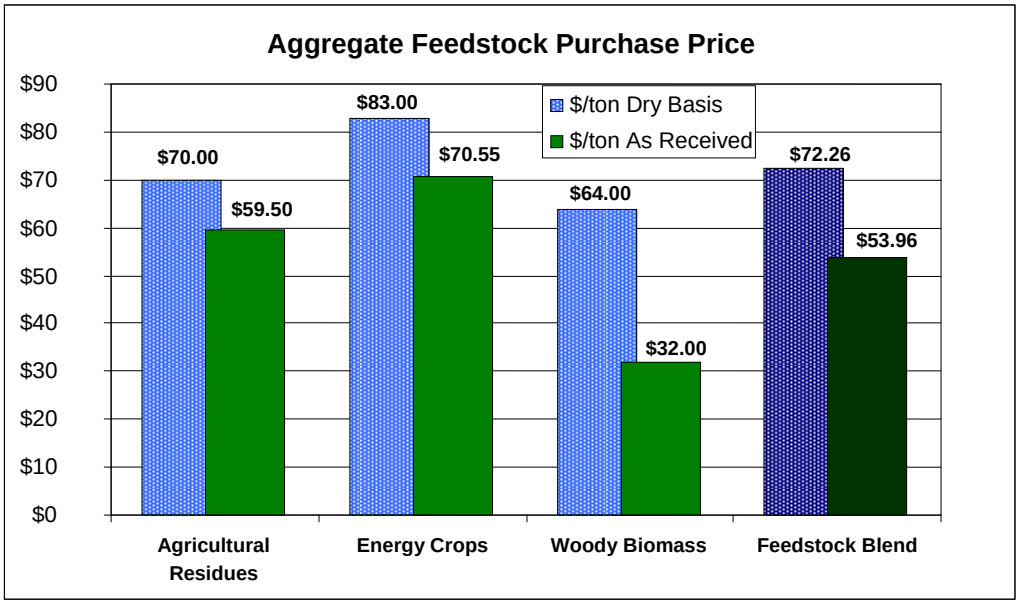


Figure 7 - Aggregate Feedstock Purchase Price

3.3. Jatropha Oil Pricing

Jatropha is quickly gaining recognition as a biodiesel feedstock. Jatropha curcas L., the predominant species, is a non-food oilseed able to grow in a variety of tropical and sub-tropical areas, on arid or otherwise marginal lands. Since jatropha can grow on poor land, its use as a biofuel feedstock should not generally compete with production of human food or animal feed. Test plots in Southeast Asia are already under cultivation, and the International Jatropha Organization predicts Asian economies will have over 30 million acres in jatropha production by 2017.

At present, jatropha is not grown and sold in substantial quantities. Because crude jatropha oil (CJO) is not a currently traded commodity, pricing data are not available to BBI. A hypothetical pricing structure has been generated, based on the similar commodities with established markets. Most non-mineral oil commodities follow the benchmark set by the two major oilseeds, soybeans and oil palm. As jatropha enters the market and stabilizes as a commodity, it is assumed to follow the established trends as well. Future CJO pricing may follow the closest similar pricing structure: that of crude palm oil. With a production cost relationship to the existing benchmark commodity, the value of CJO can be estimated with a certain degree of confidence.

Jatropha production costs were analyzed by Indonesia's Bogor Agricultural University, and compared to oil palm production costs in a study by The Institute of Energy Economics, Japan (IEEJ). This study found that jatropha production costs were much lower than oil palm production costs, primarily

due to the reduced management requirements of jatropha ($250 per hectare versus $1,014 per hectare for oil palm). However, due to the reduced yield of jatropha (5 tons per hectare versus 18 tons per hectare for oil palm), the production cost of jatropha per ton of crude oil yield ($231.32) was approximately 80 percent of the production costs of oil palm ($290.82 per ton of crude)(Siang, 2009).

Applying this set of production cost relationships, the price of CJO in the commodities market is assumed to be 80% of the price of crude palm oil (CPO) going forward. Figure 8 depicts the five-year pattern of historical CJO prices, as calculated from the Malaysian CPO price. The five-year average price of CJO as calculated is $477 per tonne to produce the detailed production cost tables. In the absence of a stable jatropha trading market, this correlation to crude palm oil is the best available data to analyse. The above figures are the only point of reference available, and subsequently, the data are subject to a significant degree of error. Supply and demand forces will affect CJO pricing in future markets, especially considering the rapid expansion of jatropha cultivation efforts in Asia Pacific economies.

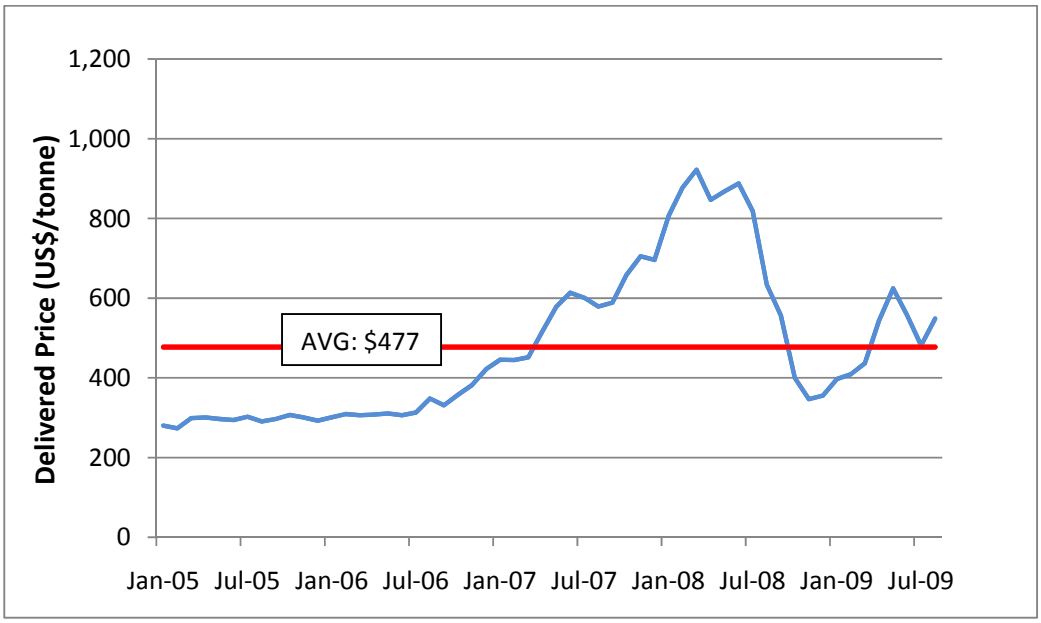


Figure 8 – 5-Year Crude Jatropha Oil Price, Malaysia (calculated)

3.4. Impact of Feedstock Cost on Biofuel Production Economics

The cost of feedstock is the major factor influencing the production cost for biofuels. Table 11 illustrates the cost of feedstock per liter of biofuel produced, for the six types of feedstocks and two types of biofuels considered in this study. The biodiesel yields vary slightly for the different feedstocks due to small differences in the feedstock density.

Table 11 – Contribution of Feedstock to Biofuel Production Cost

	Feedstock price, $/tonne	Yield, L/tonne	Feedstock Cost per Litre (anyhydrous)
Corn	147	410	0.359
Sugarcane	24	77	0.313
Cellulosic Ethanol	60	325	0.183
Soy Biodiesel	753	1087	0.693
Palm Biodiesel	597	1116	0.535
Jatropha Biodiesel	477	1077	0.443

4. U.S. Corn Ethanol Production Costs

4.1. Model Inputs for Corn Ethanol Costs

4.1.1. Feedstock Cost Assumptions

- As per the analysis in section 2.2, the corn price is determined from a 5-year average of the Chicago, IL #2 yellow dent corn price, about US$147 per tonne at field moisture.
- Grain procurement fees of US$0.03 per bushel are added to the feedstock cost.
- A 1 percent sales commission applies for feedstock procurement.
- No yield changes due to process improvements over the plant lifespan are assumed.

4.1.2. Capital Cost Assumptions

- Fixed Asset Purchases are calculated at 0.33 percent of total plant owners' costs applied per annum over the 10-year operating period.
- Organisational costs, construction insurance, inventories and contingencies are all included within the capital costing estimates.

4.1.3. Plant Total Cost Assumptions

- Annual Salaries are estimated from BBI International's experience in modelling ethanol projects, and scaled according to the local economy based on the U.S. Bureau of Statistics labor rates
- No annual inflation is considered over the 10-year period.

4.1.4. Co-Product Credits

- Distiller's Grains are sold in both wet and dry form from the plant, and while greater profits can be realised from selling the wet distiller's grains product, the standard plant model assumes that only dried distiller's grains will be produced and sold.
- Pricing of Distiller's Dried Grains and Solubles (DDGS) varies with the grain price, and is often equivalent to parent grain price. This is used as a conservative estimate, as DDGS contains greater protein and ME levels than the original feed corn feedstock.
- DDGS moisture content is 10 percent.
- A 4 percent sales commission applies to DDGS sales.
- No carbon dioxide capture or sales take place.
- No government incentives (tax credits or program payments) were included in the modelling.

4.2. Production Costs of Corn Ethanol

Table 12 outlines BBI's estimate of the production costs from a standard size corn ethanol plant located in the United States. Costs are averaged over 10 years, which takes into account the construction, commissioning and scale-up of production during the first year.

Table 12 - U.S. Corn Ethanol Production Costs over Ten Years

	$/Gallon	$/Liter
Feedstock	$1.44	$0.38
Capital Cost / Interest	$0.24	$0.06
Chemicals / Enzymes	$0.07	$0.02
Co-product Credits	-$0.47	-$0.13
Energy / Utility	$0.36	$0.09
Operations / Maintenance	$0.11	$0.03
TOTAL	**$1.74**	**$0.46**

Table 13 is an excerpt of the detailed operating expenses incurred in first year of full scale operation. These data have to be averaged over 10 years to generate the values in Table 12.

Table 13 - U.S. Corn Ethanol Sample Operating Expenses

Ethanol Production Operating Expenses - Operating Year 1		$/Liter
Feedstocks	$71,688,000	$0.378
Chemicals, Enzymes & Yeast	$3,333,000	$0.018
Natural Gas	$10,948,000	$0.058
Electricity	$2,321,000	$0.013
Denaturants	$4,286,000	$0.024
Makeup Water	$262,000	$0.003
Effluent Treatment & Disposal	$107,000	$0.000
Production Labor & Benefits	$1,086,000	$0.005
Total Production Costs	**$94,032,000**	**$0.497**
	Administrative & Operating Expenses	
Maintenance Materials & Services	$1,625,000	$0.008
Repairs & Maintenance, Wages & Benefits	$335,000	$0.003
Property Taxes & Insurance	$1,431,000	$0.008
Admin. Salaries, Wages & Benefits	$642,000	$0.003
Office/Lab Supplies & Miscellaneous	$416,000	$0.003
Total Administrative & Operating	**$4,449,000**	**$0.024**

Figure 9 shows the impact of each cost category on the overall production cost of ethanol. As the corn ethanol process is quite developed, the capital costs and operational costs are low, with the feedstock cost accounting for most of the ongoing operating expenses.

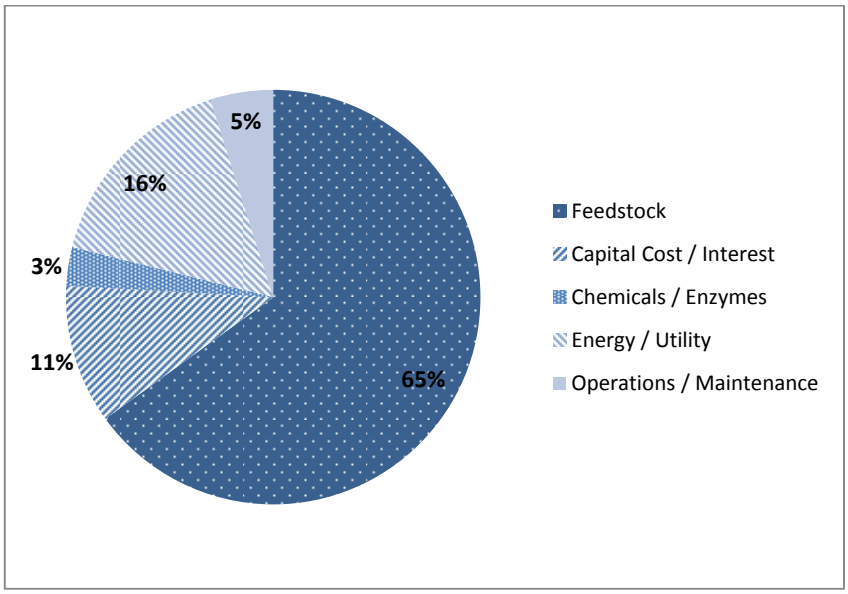


Figure 9 – U.S. Corn Ethanol Production Cost Breakdown

4.3. Cost Comparison of Corn Ethanol and Gasoline

Figure 10 compares the standard model corn ethanol biorefinery production cost to that of unleaded gasoline. Due to the established technologies present in the corn ethanol industry, production costs for ethanol are able to compete with those for gasoline. Feed corn prices are affected by crude oil prices as fuel is a cost input for the agriculture sector.

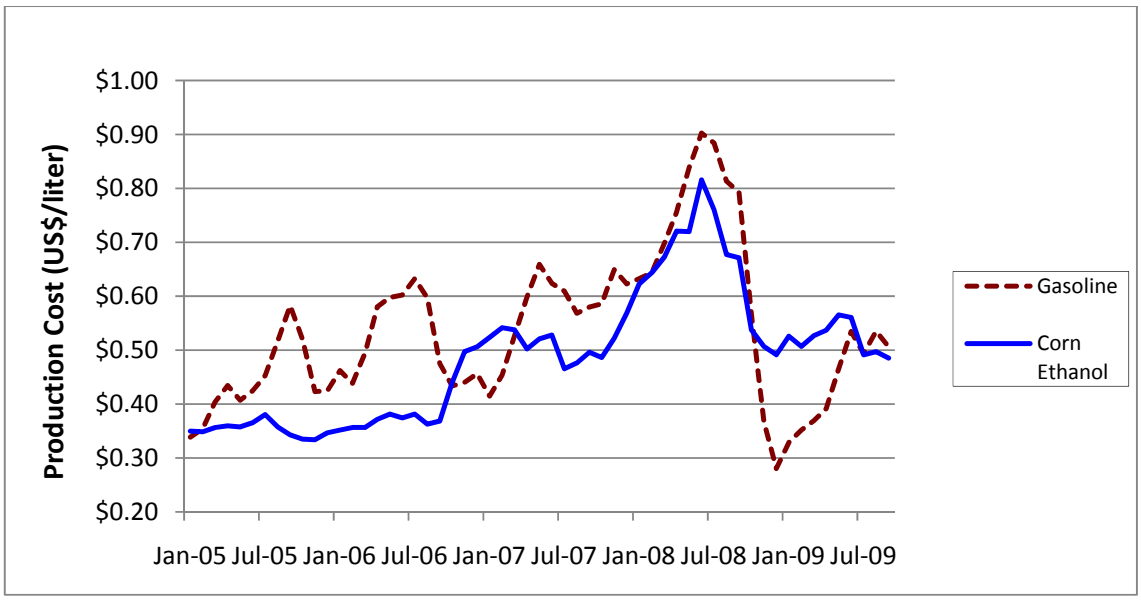


Figure 10 - U.S. Corn Ethanol vs. U.S. Gasoline

5. U.S. Biodiesel Production Costs

5.1. Model Inputs for Soy Biodiesel Costs

5.1.1. Feedstock Cost Assumptions

- The chosen feedstock for the standard biofuel plant model is soy oil.
- The soybean oil price was determined from a 5-year average of the crude soybean oil price taken from the trade news service, including a delivery cost of US$1.47 per pound.
- The 5-year average delivered soy oil price was calculated at US$753 per tonne.
- A 1 percent sales commission was applied for feedstock procurement.
- No yield changes due to process improvements over the plant lifespan are assumed.

5.1.2. Capital Cost Assumptions

- Crushing and feedstock preparation facilities such as high FFA pre-treatment systems are not included, as the plant is based upon soy oil.
- Fixed Asset Purchases are calculated at 0.33 percent of total plant owner's costs applied per annum over the 10-year operating period.
- Organisational costs, construction insurance, inventories and contingencies are all included within the capital costing estimates.

5.1.3. Plant Total Cost Assumptions

- Annual Salaries are estimated from BBI International's experience in modelling biodiesel projects, and scaled according to the local economy based on U.S. Bureau of Statistics labor rates.
- No annual inflation is considered over the 10-year period.

5.1.4. Co-Product Credits

- Crude Glycerin co-product is credited at a floor price of US$100 per tonne. Crude glycerin pricing can be highly variable. However, it is predicted that as biodiesel production increases, crude glycerin prices will decline over the next 5 years.
- No government incentives (tax credits or program payments) were included in the modelling.

5.2. Production Costs of Soy Biodiesel

Table 14 outlines BBI's estimate of the production costs for a standard size soy oil based biodiesel plant located in the United States. Costs are averaged over ten years, which takes into account the construction, commissioning and scale-up of production during the first year.

Table 14 - U.S. Soy Biodiesel Production Costs over Ten Years

	$/Gallon	$/Liter
Feedstock	$2.62	$0.69
Capital Cost / Interest	$0.32	$0.09
Chemicals / Enzymes	$0.18	$0.05
Co-product Credits	-$0.04	-$0.01
Energy / Utility	$0.05	$0.01
Operations / Maintenance	$0.17	$0.05
TOTAL	**$3.30**	**$0.87**

Table 15 summarizes the detailed operating expenses incurred in the first year of full scale operation. These values have to be averaged over ten years in order to generate the values presented in Table 14.

Table 15 - U.S. Soy Biodiesel Sample Operating Expenses

Biodiesel Production Operating Expenses – Operating Year 1		$/Liter
Feedstocks	$78,533,000	$0.69
Chemicals & Catalysts	$5,400,000	$0.05
Natural Gas	$1,159,000	$0.01
Electricity	$120,000	$0.00
Makeup Water	$90,000	$0.00
Effluent Treatment & Disposal	$8,000	$0.00
Direct Labor & Benefits	$854,000	$0.01
Total Production Costs	**$88,038,000**	**$0.78**
Administrative & Operating Expenses		
Maintenance Materials & Services	$878,000	$0.01
Repairs & Maintenance, Wages & Benefits	$321,000	$0.00
Property Taxes & Insurance	$584,000	$0.01
Admin. Salaries, Wages & Benefits	$557,000	$0.00
Office/Lab Supplies & Miscellaneous	$54,000	$0.00
Total Administrative & Operating Expenses	**$2,393,000**	**$0.02**

Figure 11 shows the impact of each major cost category on the overall production cost of biodiesel. Soy Oil Based biodiesel has the largest cost percentage dedicated to feedstock due to the high 5-year average price of soy oil, and the lower capital and operating costs associated with a developed commercial process.

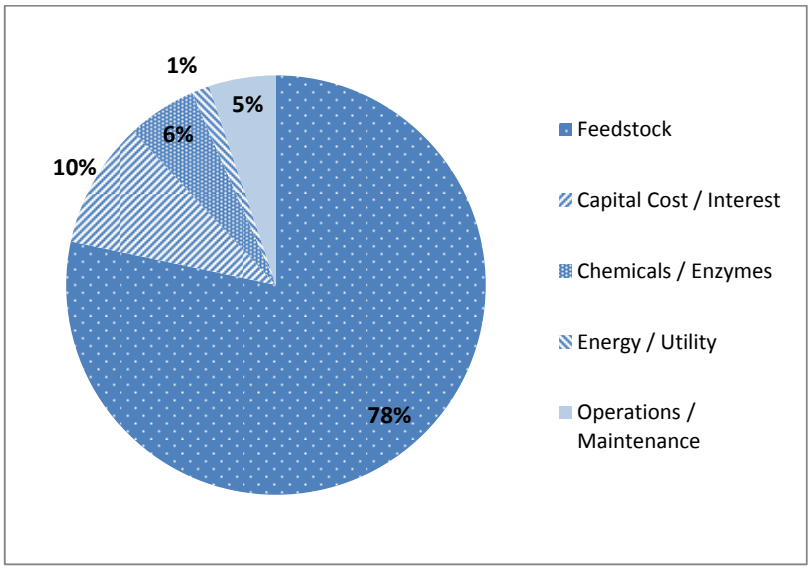


Figure 11 - U.S. Soy Biodiesel Production Cost Breakdown

5.3. Cost Comparison of Soy Biodiesel and Conventional Diesel Fuel

Figure 12 compares the production costs for Soy Oil based biodiesel and #2 Ultra-Low Sulfur Diesel (ULSD). At no point within the last five years has the production of soy-based biodiesel been competitive, as the changes in the commodity price for soy oil have closely mirrored changes in crude oil prices over this period.

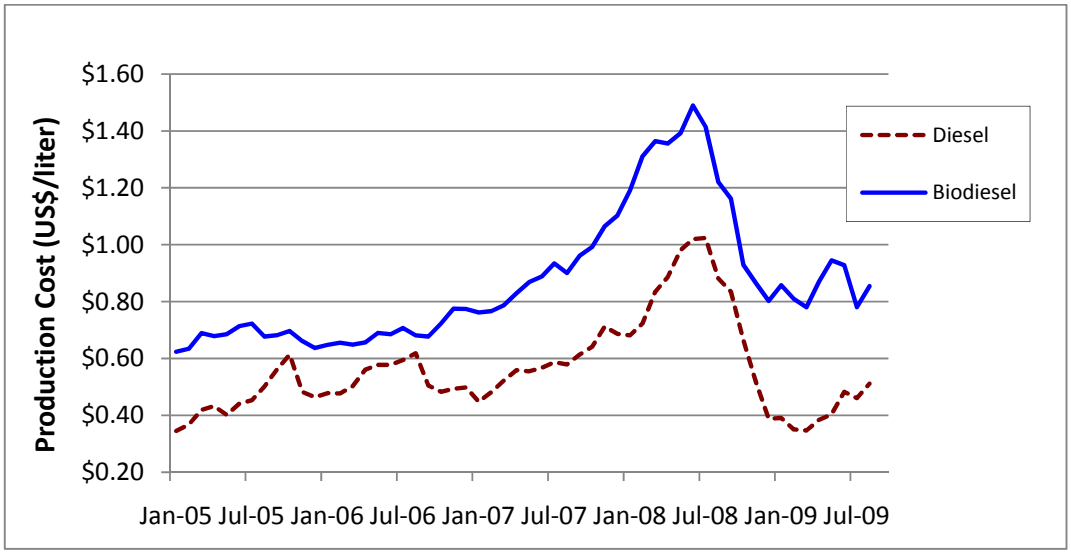


Figure 12 - U.S. Soy Biodiesel vs. U.S. Petroleum Diesel (#2 ULSD)

6. Brazilian Ethanol Production Costs

6.1. Model Inputs for Sugarcane Ethanol Costs

6.1.1. Feedstock Cost Assumptions

- An estimate of cane cost was calculated by scaling Brazilian FOB sugar prices using a relationship developed with data obtained from the Australian sugar industry (outlined in section 3.1.3). .The cane price calculated on a 5-year average is US$24 per tonne.
- A 1 percent sales commission applies for feedstock procurement.
- All cane is converted to ethanol with no crystal sugar production. While this will give the most competitive ethanol cost, generally a Brazilian plant will adjust the amount of cane that is converted to ethanol or sugar based on the fluctuating prices of both commodities, which may affect production costs (See Section 2.1.3). This also affects the value of the electricity co-product, because this credit should be proportionally allocated between sugar and ethanol production at the same mill.
- No yield changes due to process improvements over the plant lifespan.

6.1.2. Capital Cost Assumptions

- Fixed Asset Purchases are calculated at 0.33 percent of total plant owner's costs applied per annum over the 10-year operating period.
- Organisational costs, construction insurance, inventories, and contingencies are all included within the capital cost estimates.

6.1.3. Plant Total Cost Assumptions

- Annual salaries are estimated from BBI International's experience in modelling ethanol projects, and scaled according to the economy based on U.S. Bureau of Statistics labor rates.
- No annual inflation is considered over the 10-year period.

6.1.4. Co-Product Credits

- Co-product credits in the form of co-generated electricity can be realised, with a calculated 173 million kilowatt-hours (kWh) available for sale using current cogeneration technology.
- Electricity credits are calculated at the 2007 average rural supply rate of 174.68 Reales per megawatt-hour (MWh) (US$0.09 per kWh) (ANEEL, 2007) at an average exchange rate of 0.568 reales per U.S. dollar.
- No government incentives (tax credits or program payments) were included in the modelling.
- No carbon dioxide capture or sales take place.
- Mill mud and ash disposal are assumed to cost US$3 per tonne.

6.2. Production Costs of Sugarcane Ethanol

Table 16 outlines BBI's estimate of the production costs from a standard Brazilian ethanol plant with cogeneration facilities. Costs are averaged over ten years, which takes into account the construction, commissioning and scale-up of production during the first year.

Table 17 summarizes the detailed operating expenses incurred the first year of full scale operation. It should be noted that compared to the other cases, there is significantly greater uncertainty in the value of the electricity co-product credit from sugarcane ethanol production. This is due in part to the electricity price (discussed below), significant differences in biomass boiler efficiency and electricity generation efficiency between facilities, and the allocation of the credit against ethanol versus sugar production.

The value of the co-product credit cited here is based upon an electricity price of 9 cents per kilowatt-hour (kWh) and 100 percent utilization of residual bagasse for electricity production. If the price is reduced to 4 cents per kWh or if only half of the available bagasse is converted into electricity, the value of the credit falls to 12 cents per liter. Some publications peg the value of the co-product credit at less than 5 cents per liter, but BBI believes that this is an underestimate, considering the growing use of bagasse for electricity production in Brazil. Nonetheless, the net ethanol production costs shown in Tables 16 and 17 could be significantly higher.

Table 16 - Brazilian Sugarcane Ethanol Production Costs over Ten Years

	$/Gallon	$/Liter
Feedstock	$1.18	$0.31
Capital Cost / Interest	$0.35	$0.09
Chemicals / Enzymes	$0.10	$0.03
Co-product Credits	-$1.05	-$0.28
Energy / Utility	$0.03	$0.01
Operations / Maintenance	$0.08	$0.02
TOTAL	**$0.69**	**$0.18**

Table 17 - Brazilian Sugarcane Ethanol Sample Operating Expenses

Ethanol Production Operating Expenses – Operating Year 1		$/Liter
Feedstocks	$33,795,000	$0.310
Chemicals, Enzymes & Yeast	$2,851,000	$0.030
Electricity	$0	$0.000
Denaturants	$0	$0.000
Makeup Water	$441,000	$0.000
Effluent Treatment & Disposal	$36,000	$0.000
Boiler Ash Disposal	$422,000	$0.000
Direct Labor & Benefits	$118,000	$0.000
Total Production Costs	**$37,663,000**	**$0.350**
Administrative & Operating Expenses		
Maintenance Materials & Services	$1,101,000	$0.010
Repairs & Maintenance, Wages & Benefits	$90,000	$0.000
Property Taxes & Insurance	$683,000	$0.010
Admin. Salaries, Wages & Benefits	$67,000	$0.000
Office/Lab Supplies & Miscellaneous	$175,000	$0.000
Total Administrative & Operating Expenses	**$2,116,000**	**$0.020**

Figure 13 shows the impact of each major cost category on the overall production cost of ethanol from sugarcane in Brazil. It is noted that chemical and enzyme cost estimates provided by technology providers are higher than those for corn ethanol, which may be due to high purchase and transportation costs of chemicals such as limestone and ammonia.

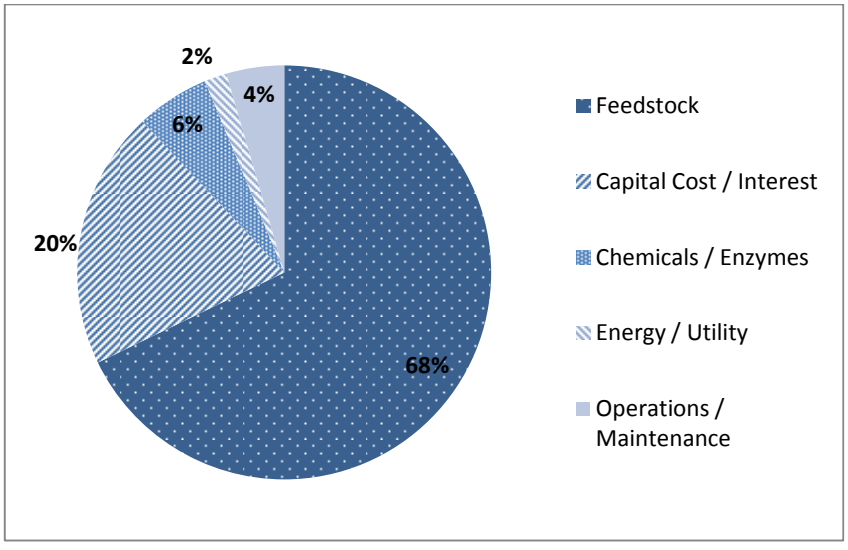


Figure 13 - Brazilian Sugarcane Ethanol Production Cost Breakdown

6.3. Cost Comparison of Sugarcane Ethanol and Gasoline

Figure 14 compares the production costs of Brazilian gasoline with projected production costs for sugarcane based ethanol. Even without co-generation credits included in the production cost of ethanol, the price of ethanol is competitive with that of gasoline. If a plant is fitted with the most modern boiler and co-generation equipment, and credited for energy production as calculated by the average supply rate, then production costs are lower than petroleum at all times, indicating an excellent case for modern sugarcane ethanol and co-generation to cost-effectively compete with U.S. petroleum production.

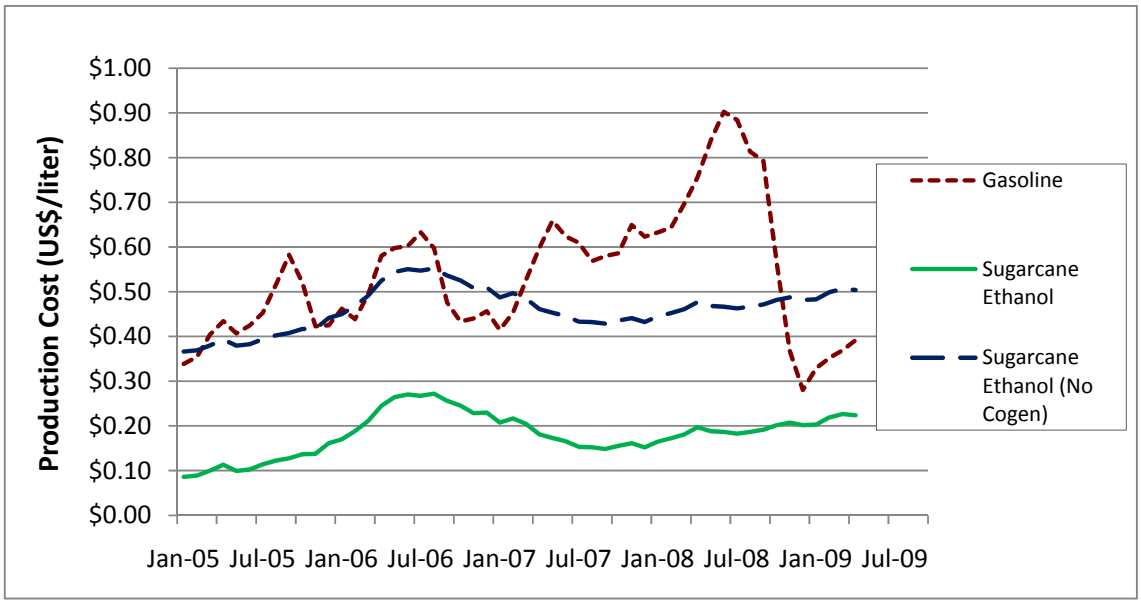


Figure 14 - Brazilian Sugarcane Ethanol vs. U.S. Gasoline

7. Malaysian Palm Biodiesel Production Costs

7.1. Model Inputs for Palm Biodiesel Costs

7.1.1. Feedstock Cost Assumptions

- The chosen feedstock for the standard biofuel plant model is palm oil, which has a high free fatty acid (FFA) content.
- As per the analysis in Section 3.1.4, the palm oil price was determined from a 5-year average delivered crude palm oil price of the Malaysian Palm Oil Board, equal to US$596 per tonne.
- A 1 percent sales commission applies for feedstock procurement.
- No yield changes due to process improvements over the plant lifespan are assumed.

7.1.2. Capital Costing Assumptions

- Due to the high FFA content of palm oil, additional pre-treatment steps are required, increasing the overall plant capital cost and operating cost.
- Fixed Asset Purchases are calculated at 0.33% of total plant owner's costs applied per annum over the 10-year operating period.
- Organisational costs, construction insurance, inventories and contingencies are all included within the capital cost estimates.

7.1.3. Plant Total Cost Assumptions

- Annual salaries are estimated from BBI International's experience in modelling ethanol projects, and scaled according to the local economy based on U.S. Bureau of Statistics labor rates.
- No annual inflation is considered over the 10-year period.

7.1.4. Co-Product Credits

- Crude Glycerin co-product is credited at a floor price of US$100 per tonne. Crude glycerin pricing can be highly variable; however, it is projected that as biodiesel production increases, crude glycerin prices will decline over the next 5 years.
- No government incentives (tax credits or program payments) were included in the modelling.

7.2. Production Costs of Biodiesel from Palm

Table 18 outlines BBI's estimate of the production costs from a standard Malaysian Palm Biodiesel plant. Costs are averaged over ten years, which takes into account the construction, commissioning and scale-up of production during the first year.

Table 18 - Malaysian Palm Biodiesel Production Costs over Ten Years

	$/Gallon	$/Liter
Feedstock	$2.02	$0.53
Capital Cost / Interest	$0.41	$0.11
Chemicals / Enzymes	$0.18	$0.05
Co-product Credits	-$0.04	-$0.01
Energy / Utility	$0.03	$0.01
Operations / Maintenance	$0.16	$0.04
TOTAL	**$2.75**	**$0.73**

Table 19 summarizes the detailed operating expenses incurred in the first year of full scale operation. It is noted that the administrative and operating expenses of Malaysian facilities are extremely low due to the low cost of labor in the country.

Table 19 - Malaysian Palm Biodiesel Sample Operating Expenses

Biodiesel Production Operating Expenses – Operating Year 1		$/Liter
Feedstocks	$56,509,000	$0.53
Chemicals & Catalysts	$5,040,000	$0.05
Natural Gas	$593,000	$0.01
Electricity	$103,000	$0.00
Makeup Water	$14,000	$0.00
Effluent Treatment & Disposal	$7,000	$0.00
Direct Labor & Benefits	$308,000	$0.00
Total Production Costs	**$64,449,000**	**$0.61**
Administrative & Operating Expenses		
Maintenance Materials & Services	$1,093,000	$0.01
Repairs & Maintenance, Wages & Benefits	$116,000	$0.00
Property Taxes & Insurance	$719,000	$0.01
Admin. Salaries, Wages & Benefits	$201,000	$0.00
Office/Lab Supplies & Miscellaneous	$54,000	$0.00
Total Administrative & Operating Expenses	**$2,182,000**	**$0.02**

Figure 15 shows the impact of each major cost category on the overall production cost of biodiesel from palm oil in Malaysia.

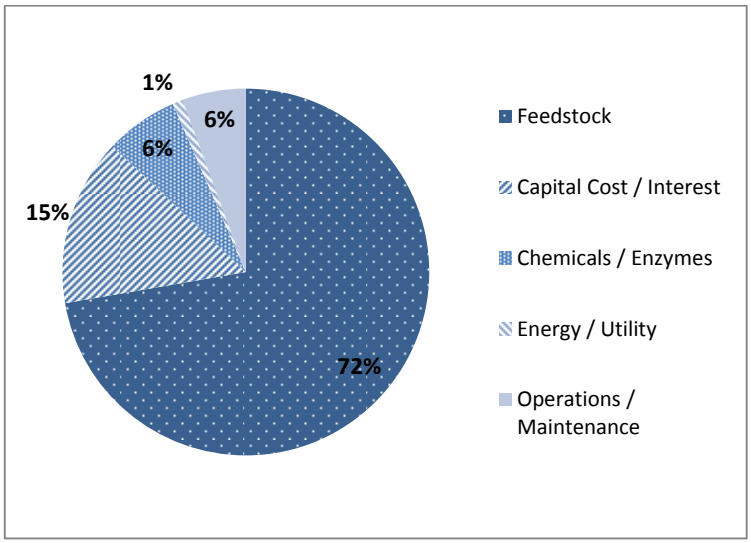


Figure 15 - Malaysian Palm Biodiesel Production Cost Breakdown

7.3. Cost Comparison of Palm Biodiesel and Conventional Diesel Fuel

Figure 16 compares the production cost of Malaysian palm based biodiesel with the corresponding diesel fuel, Singapore Gasoil. During certain brief periods, low crude palm oil prices and (comparatively) high diesel prices have allowed the biodiesel technologies to be cost competitive. However, the data also indicate that palm biodiesel is generally more expensive than gasoil, and thus, it seems difficult for a subsidy-free product to compete, in view of recent high palm oil prices.

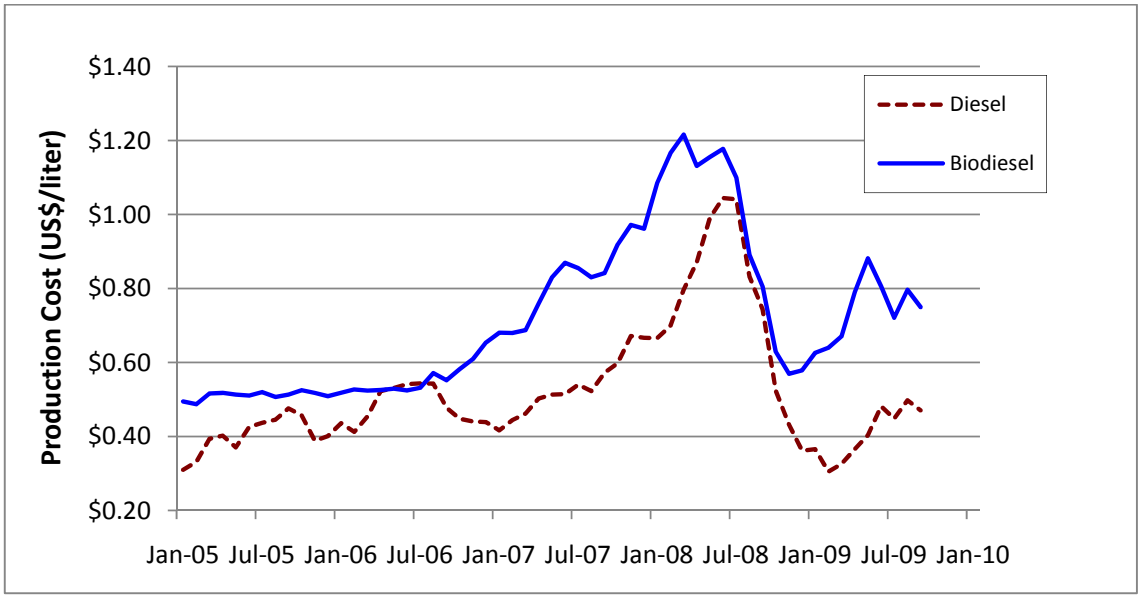


Figure 16 - Malaysian Palm Biodiesel vs. Singapore Gasoil

8. Malaysian Jatropha Biodiesel Production Costs

8.1. Model Inputs for Jatropha Biodiesel Costs

8.1.1. Feedstock Cost Assumptions

- Section 3.3 estimates the price of crude jatropha oil, with a 5-year average of US$477 per tonne used as an input to the financial model.
- No whole oilseeds are to be processed or stored at the facility – oil will be transported directly to the plant gate.
- No yield changes due to process improvements over the plant lifespan.

8.1.2. Capital Cost Assumptions

- Research shows that CJO has a low level of free fatty acids, which allows the plant to forgo pre-treatment facilities. Bean storage and crush plants are also not included in the capital cost for the standard plant.
- Fixed Asset Purchases are calculated at 0.33 percent of total plant owner's costs applied per annum over the 10 year operating period.

8.1.3. Plant Total Cost Assumptions

- Annual salaries are estimated from BBI International's experience in modelling biofuel projects, and scaled according to the local economy based on U.S. Bureau of Statistics labor rates.
- No annual inflation is considered over the 10-year period.
- Organisational costs, construction insurance, inventories and contingencies are all included within the capital cost estimates.

8.1.4. Co-Product Credits

- Crude Glycerin co-product is credited at a floor price of USD $100 per tonne. Crude glycerin pricing can be highly variable; however, it is projected that as biodiesel production increases, crude glycerin prices will decline over the next 5 years.
- No purified glycerin products are produced – 100 percent of co-product glycerin is sold as 80 percent crude.
- No government incentives (tax credits or program payments) were included in the modelling.

8.2. Production Costs of Biodiesel from Jatropha

Table 20 outlines BBI's estimate of the production costs from a standard Malaysian Jatropha oil biodiesel plant. Costs are averaged over ten years, which takes into account the construction, commissioning and scale-up of production during the first year.

Table 20 - Malaysian Jatropha Biodiesel Production Costs over Ten Years

	$/Gallon	$/Liter
Feedstock	$1.86	$0.49
Capital Cost / Interest	$0.33	$0.09
Chemicals / Enzymes	$0.18	$0.05
Co-product Credits	-$0.04	-$0.01
Energy / Utility	$0.03	$0.01
Operations / Maintenance	$0.14	$0.04
TOTAL	**$2.50**	**$0.66**

Table 21 summarizes the detailed operating expenses incurred in the first year of full scale operation. It is noted that the administrative and operating expenses of Malaysian facilities are extremely low due to the lower labor costs in the country.

Table 21 - Malaysian Jatropha Biodiesel Sample Operating Expenses

Biodiesel Production Operating Expenses - Year 2		$/Liter
Production & Operating Expenses		
Feedstocks	$52,063,000	$0.49
Chemicals & Catalysts	$5,040,000	$0.05
Natural Gas	$593,000	$0.01
Electricity	$103,000	$0.00
Makeup Water	$14,000	$0.00
Effluent Treatment & Disposal	$7,000	$0.00
Direct Labor & Benefits	$308,000	$0.00
Total Production Costs	**$60,003,000**	**$0.57**
Administrative & Operating Expenses		
Maintenance Materials & Services	$836,000	$0.01
Repairs & Maintenance, Wages & Benefits	$116,000	$0.00
Property Taxes & Insurance	$558,000	$0.01
Admin. Salaries, Wages & Benefits	$201,000	$0.00
Office/Lab Supplies & Miscellaneous	$54,000	$0.00
Total Administrative & Operating Expenses	**$1,765,000**	**$0.02**

Figure 17 shows the impact of each major cost category on the overall production cost of biodiesel from jatropha oil in Malaysia.

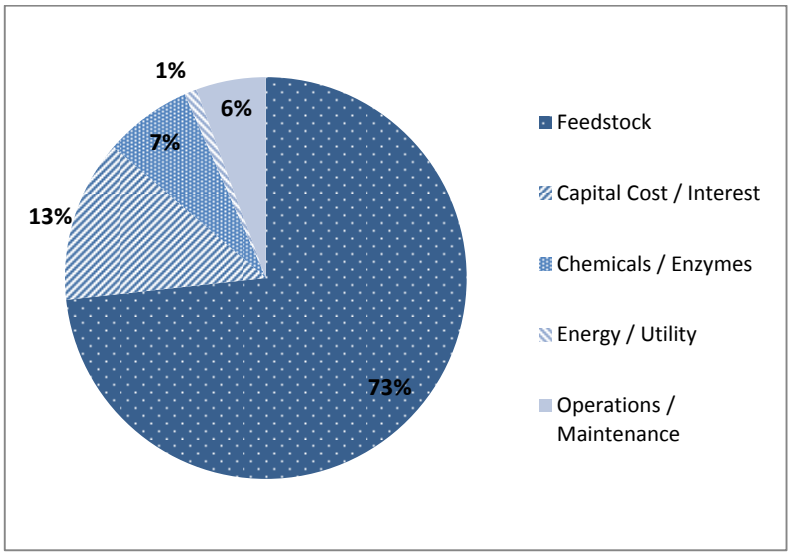


Figure 17 - Malaysian Jatropha Biodiesel Production Cost Breakdown

8.3. Cost Comparison of Jatropha Biodiesel and Conventional Diesel Fuel

Figure 18 examines the cost competitiveness of Malaysian biodiesel derived from Crude Jatropha Oil (CJO). The methodology outlined in Section 3.3 was used to estimate the purchase price for CJO, as markets do not yet exist for this feedstock. In addition to the lower feedstock purchase price projected for CJO, savings are realised in the capital cost of building a CJO biodiesel plant, which avoids a pre-treatment system to process high levels of free fatty acids. Based on these assumptions, production costs would be competitive at times. However, the crash in oil prices during 2008-09 resulted in a situation where fuels based on commodity feedstocks were unlikely to match the production costs of conventional diesel until oil prices recovered.

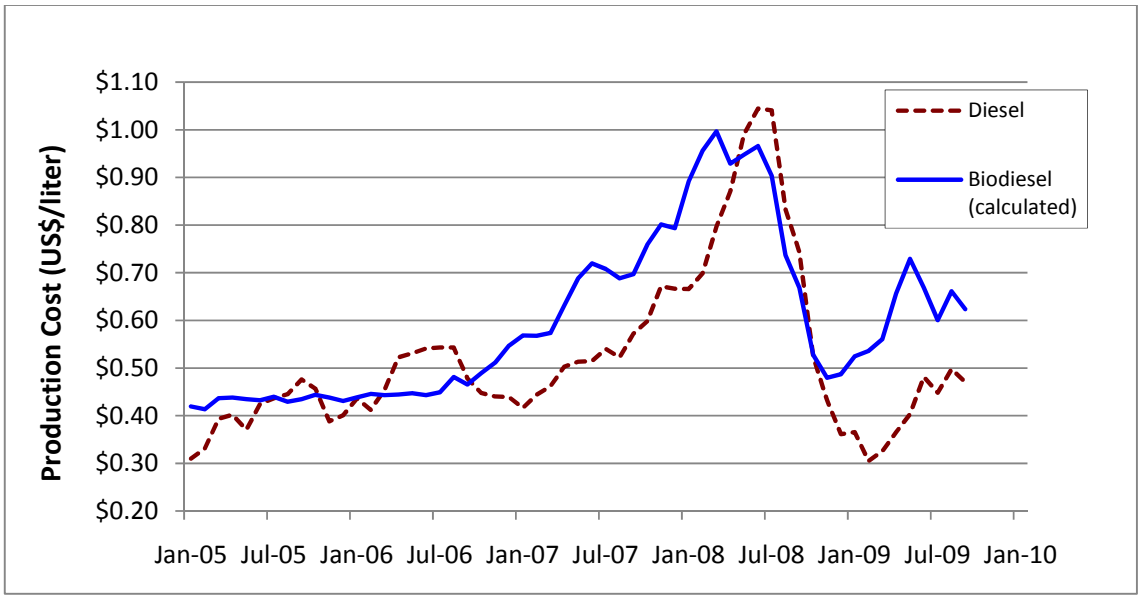


Figure 18 - Malaysian Jatropha Biodiesel vs. Singapore Gasoil

9. U.S. Cellulosic Ethanol Production

9.1. Model Inputs for Cellulosic Ethanol Costs

9.1.1. Feedstock Cost Assumptions

- Assumptions and calculations for feedstock cost are discussed at length in section 3.2.
- A blended feedstock with a calculated delivered purchase price of US$54. per tonne (as received) was used to model production costs.
- No yield changes due to process improvements over the plant lifespan.

9.1.2. Capital Cost Assumptions

- Capital costs were scaled from the BBI Biochemical conversion cellulosic model developed by BBI International, and benchmarked against industry information and projections where available.
- Fixed Asset Purchases are calculated at 0.33 percent of total plant owner's costs applied per annum over the 10-year operating period.
- The estimated cost for the biomass boiler for lignin combustion was scaled at US$950 per kilowatt (kW). Some recent reports cite higher capital costs on a per kW basis, but this is highly dependent upon the boiler technology and scale of operation.

9.1.3. Plant Total Cost Assumptions

- Annual salaries are estimated from BBI International's experience in modelling biofuel projects, and scaled according to the local economy based on U.S. Bureau of Statistics labor rates.
- No annual inflation is considered over the 10-year period.

9.1.4. Co-Product Credits

- The excess lignin separated from the cellulosic material is burned in a biomass boiler, and excess steam is used to run a turbine generating electricity. The price for base load electricity is assumed to be US$0.07 per kWh.
- The lignin yield is assumed to be 0.42 tonnes per tonne of feedstock (dry basis) with an energy content of 9500 British Thermal Units (BTU) per pound (dry).
- No carbon dioxide capture or sales are included.
- No government incentives (tax credits or program payments) were included in the modelling.

9.2. Production Costs of Cellulosic Ethanol

Table 22 outlines BBI's estimate of the production costs from a hypothetical U.S. cellulosic ethanol plant that includes lignin separation and combustion. Costs are averaged over 10 years, which takes into account the construction, commissioning and scale-up of production during the first year.

Table 22 - U.S. Cellulosic Ethanol Production Costs over Ten Years

	$/Gallon	$/Liter
Feedstock	$0.66	$0.17
Capital Cost / Interest	$0.93	$0.25
Chemicals / Enzymes	$0.76	$0.20
Co-product Credits	-$0.47	-$0.12
Energy / Utility	$0.08	$0.02
Operations / Maintenance	$0.31	$0.08
TOTAL	**$2.27**	**$0.60**

Table 23 summarizes the detailed operating expenses incurred in the first year of full scale operation for the standardised cellulosic ethanol production facility.

Table 23 - U.S. Cellulosic Ethanol Sample Operating Expenses

Ethanol Production Operating Expenses – Operating Year 1		$/Liter
Feedstocks	$13,202,434	$0.174
Chemicals, Enzymes & Yeast	$15,238,095	$0.201
Additional Feedstocks used for Fuel	$0	$0.000
Natural Gas	$0	$0.000
Denaturants	$1,500,000	$0.020
Makeup Water	$59,940	$0.001
Wastewater Disposal	$11,988	$0.000
Direct Labor & Benefits	$965,000	$0.013
Total Production Costs	**$30,977,458**	**$0.409**
Administrative & Operating Expenses		
Maintenance Materials & Services	$2,422,505	$0.032
Repairs & Maintenance, Wages & Benefits	$320,500	$0.004
Property Taxes & Insurance	$1,590,392	$0.021
Admin. Salaries, Wages & Benefits	$557,000	$0.007
Office/Lab Supplies & Miscellaneous	$356,000	$0.005
Total Administrative & Operating Expenses	**$5,246,397**	**$0.069**

Figure 19 shows the impact of each major cost category on the overall production cost cellulosic ethanol in the United States. The capital cost per installed liter is far above that of first generation (non-cellulosic) biofuels plants, as are the ongoing costs for chemicals, enzymes and maintenance. Feedstock costs, however, tend to be lower for cellulosic ethanol plants.

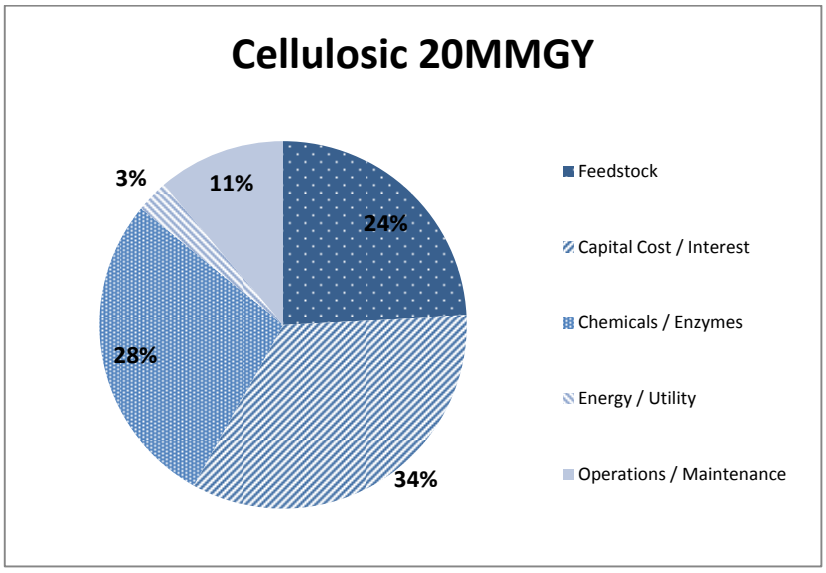


Figure 19 – U.S. Cellulosic Ethanol Production Cost Breakdown

9.3. Cost Comparison of Cellulosic Ethanol and Gasoline

The calculated cost of production for cellulosic ethanol cannot be modelled as a function of the historical feedstock cost due to the issues discussed in Section 3.2. However, the calculated production cost can still be compared with the price fluctuations of U.S. gasoline to evaluate whether ethanol production from cellulosic sources has the potential to partially displace the use of petroleum based products in transportation fuels.

Figure 20 shows that a modern cellulosic ethanol biorefinery exhibiting an ethanol yield consistent with currently available technologies would historically have been cost competitive with petroleum during certain periods. However, it must be recognized that the likely variability in feedstock price cannot be included due to the lack of a current market for cellulosic feedstock. At present, the technologies that provide appropriate ethanol yields from cellulosic material by way of enzymatic hydrolysis have yet to be proven on a commercial scale.

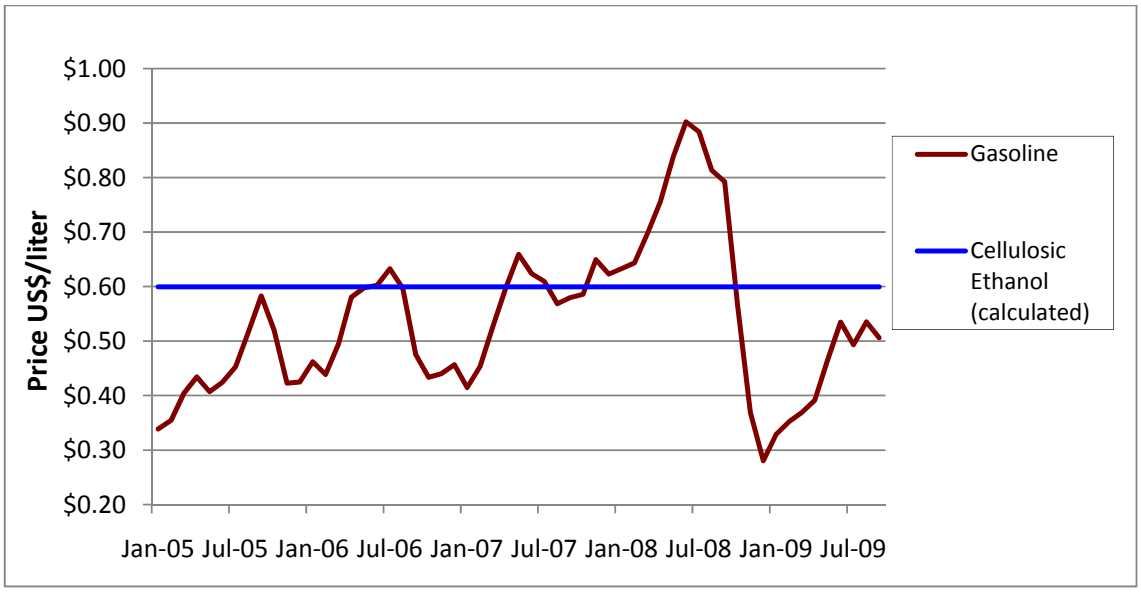


Figure 20 - Cellulosic Ethanol vs. U.S. Gasoline

Appendix A – Acronyms and Abbreviations

CHP	combined heat and power
kWH	kilowatt hours
MMGY	million US Gallons per year
MLY	million liters per year
MJ	Megajoule
ULSD	Ultra-low sulphur diesel

Appendix B – Detailed Financial Model Information

For each case, a set of financial tables is provided, including:

(1) a ten-year summary of inputs and outputs, inventory and financing assumptions,

(2) a detailed balance sheet,

(3) a detailed pro-forma income statement that determines overall revenues and expenses based on the plant operating, input and output data presented in item (1).

Corn Ethanol

Apec Corn Ethanol Production Cost Assessment - 50mmgy
Production Assumptions

Nameplate Denatured Fuel Ethanol (gal/year)	50,000,000
Anhydrous Ethanol Production (gal/year)	47,619,048
Operating Days Per Year	350

Total Production Cost Per gallon: $1.74

Feedstock ($/gal)	$1.44
Capital Cost ($/gal)	$0.24
Chemicals / Enzymes	$0.07
Coproduct Credits	-$0.47
Energy / Utility	$0.36
Operations / Maintenance	$0.11

Product Yields & Energy Consumption	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations	Annual Escalation
Ethanol Production Increase Over Previous Year	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Anhydrous Ethanol Yield (gal/bushel)	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	
Denatured Ethanol Sold (gal/year)	46,773,810	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	
Ethanol Price ($/gal)	$2.2500	$2.2500	$2.2500	$2.2500	$2.2500	$2.2500	$2.2500	$2.2500	$2.2500	$2.2500	0.00%
Ethanol Sales Commission (% of Ethanol Price)	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	0.00%
Ethanol Transportation ($/gal)	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	0.00%
Delivered Feedstock Price ($/bu)	$4.1100	$4.1100	$4.1100	$4.1100	$4.1100	$4.1100	$4.1100	$4.1100	$4.1100	$4.1100	0.00%
Feedstock Procurement Fees ($/bu)	$0.0300	$0.0300	$0.0300	$0.0300	$0.0300	$0.0300	$0.0300	$0.0300	$0.0300	$0.0300	0.00%
Feedstock Usage (bu/year)	16,594,517	17,316,017	17,316,017	17,316,017	17,316,017	17,316,017	17,316,017	17,316,017	17,316,017	17,316,017	
Grain Test Weight (lb/bu)	56.000	56.000	56.000	56.000	56.000	56.000	56.000	56.000	56.000	56.000	
DDGS Yield (lb/bu)	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	
DDGS Sold (ton/year)	142,950	155,844	155,844	155,844	155,844	155,844	155,844	155,844	155,844	155,844	
DDGS Price, FOB ($/ton)	$155.420	$155.420	$155.420	$155.420	$155.420	$155.420	$155.420	$155.420	$155.420	$155.420	0.00%
DDGS Transportation ($/ton)	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	0.00%
DDGS Sales Commission ($/ton)	$3.108	$3.108	$3.108	$3.108	$3.108	$3.108	$3.108	$3.108	$3.108	$3.108	0.00%
% DWG Sold	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
DWG Yield (lb/bu)	46.286	46.286	46.286	46.286	46.286	46.286	46.286	46.286	46.286	46.286	
DWG Sold (ton/year)	0	0	0	0	0	0	0	0	0	0	
DWG Price, FOB ($/ton)	$57.419	$57.419	$57.419	$57.419	$57.419	$57.419	$57.419	$57.419	$57.419	$57.419	0.00%
DWG Transportation ($/ton)	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	0.00%
DWG Sales Commission ($/ton)	$2.297	$2.297	$2.297	$2.297	$2.297	$2.297	$2.297	$2.297	$2.297	$2.297	0.00%
CO2 Yield (lb/gal)	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	
Percernt of CO2 Produced that is Sold	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
CO2 Sold (ton/year)	0	0	0	0	0	0	0	0	0	0	
CO2 Price ($/ton)	$8.000	$8.000	$8.000	$8.000	$8.000	$8.000	$8.000	$8.000	$8.000	$8.000	0.00%
Electricity Use (kWh/bu)	2.063	2.063	2.063	2.063	2.063	2.063	2.063	2.063	2.063	2.063	
Annual Electricity Use (million kWh/year)	34.226	35.714	35.714	35.714	35.714	35.714	35.714	35.714	35.714	35.714	
Electricity Price ($/kWh)	$0.0650	$0.0650	$0.0650	$0.0650	$0.0650	$0.0650	$0.0650	$0.0650	$0.0650	$0.0650	0.00%
Waste Heat Fuel Use (% of total energy use)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Waste Heat BTU per Pound (BTU/lb)	0	0	0	0	0	0	0	0	0	0	
Waste Heat Use (BTU/gal)	0	0	0	0	0	0	0	0	0	0	
Annual Waste Heat Use (MMBTU/year)	0	0	0	0	0	0	0	0	0	0	
Delivered Waste Heat Price ($/MMBTU)	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	0.00%
Delivered Waste Heat Price ($/MMBTU)	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	
Natural Gas Use (BTU/gal)	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	
Annual Natural Gas Use (MMBTU/year)	1,590,310	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	
Natural Gas Price ($/MMBTU)	$6.4400	$6.4400	$6.4400	$6.4400	$6.4400	$6.4400	$6.4400	$6.4400	$6.4400	$6.4400	0.00%
Fresh Water Use (1000 gal/bu)	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	
Annual Fresh Water Use (1000 gal/year)	199,134	207,792	207,792	207,792	207,792	207,792	207,792	207,792	207,792	207,792	
Fresh Water Price ($/1000 gal)	$1.2600	$1.2600	$1.2600	$1.2600	$1.2600	$1.2600	$1.2600	$1.2600	$1.2600	$1.2600	0.00%

Apec Corn Ethanol Production Cost Assessment - 50mmgy
Production Assumptions, continued

	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations	Annual Escalation
Effluent Water Disposal (1000 gal/bu)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
Annual Effluent Water Disposal (1000 gal/year)	39,827	41,558	41,558	41,558	41,558	41,558	41,558	41,558	41,558	41,558	
Effluent Water Disposal Price ($/1000 gal)	$2.5700	$2.5700	$2.5700	$2.5700	$2.5700	$2.5700	$2.5700	$2.5700	$2.5700	$2.5700	0.00%
Denaturant Use (% of ethanol sold)	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	
Annual Denaturant Use (gal/year)	2,261,746	2,380,952	2,380,952	2,380,952	2,380,952	2,380,952	2,380,952	2,380,952	2,380,952	2,380,952	
Denaturant Price ($/gal)	$1.8000	$1.8000	$1.8000	$1.8000	$1.8000	$1.8000	$1.8000	$1.8000	$1.8000	$1.8000	0.00%
Chemicals & Enzymes Cost ($/gal ethanol)	$0.0700	$0.0700	$0.0700	$0.0700	$0.0700	$0.0700	$0.0700	$0.0700	$0.0700	$0.0700	0.00%
Number of Employees	36	36	36	36	36	36	36	36	36	36	
Average Salary Including Benefits	$57,315	$57,315	$57,315	$57,315	$57,315	$57,315	$57,315	$57,315	$57,315	$57,315	0.00%
Maintenance Materials & Services (% of Capital Equ	2.500%	2.500%	2.500%	2.500%	2.500%	2.500%	2.500%	2.500%	2.500%	2.500%	0.00%
Property Tax & Insurance (% of Depreciated Proper	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	0.00%
Inflation for all other Administrative Expense Categories											0.00%

Financial Assumptions

USE OF FUNDS:	
Project Engineering & Construction Costs	
EPC Contract	$65,000,000
Site Development	$4,400,000
Rail	$1,950,000
Grain Receiving and Storage	$0
Waste Heat Steam Generator	$0
Construction Contingency	$2,000,000
Total Engineering and Construction Cost	$73,350,000
Development and Startup Costs	
Inventory - Feedstock	$2,000,000
Inventory - Chemicals/Yeast/Denaturant	$430,000
Inventory - Spare Parts	$400,000
Startup Costs	$3,500,000
Land	$800,000
Fire Protection & Potable Water	$2,050,000
Administration Building & Office Equipment	$500,000
Insurance & Performance Bond	$525,000
Rolling Stock and Shop Equipment	$675,000
Organizational Costs and Permits	$915,000
Capitalized Interest & Financing Costs	$1,820,000
Working Capital/Risk Management	$5,000,000
Total Development Costs	$18,615,000
TOTAL USES	**$91,965,000**

SOURCE OF FUNDS:		
Senior Debt		
Principal	$55,179,000	60.00%
Interest Rate	9.00%	fixed
Lender and Misc. Fees	$551,790	1.000%
Placement Fees	$0	0.000%
Amortization Period	10	years
Cash Sweep	0.000%	
Subordinate Debt		
Principal	$0	0.00%
Interest Rate	8.00%	interest only
Lender Fees	$0	0.000%
Placement Fees	$0	1.500%
Amortization Period	10	years
Equity Investment		
Total Equity Amount	$36,786,000	40.00%
Placement Fees	$0	0.000%
Common Equity	$36,786,000	100.000%
Preferred Equity	$0	0.000%
Grants		
Amount	$0	0.00%
TOTAL SOURCES	**$91,965,000**	

Investment Activities	
Income Tax Rate	0.00%
Investment Interest	3.00%
Operating Line Interest	8.00%
State Producer Payment	
Producer payment, $/gal	$0.000
Estimated annual payment	$0
Incentive duration, years	5
Other Incentive Payments	
Small Producer Tax Credit	no
% of CCC Payment	0%

Plant Operating Rate

Month	% of Nameplate
13	50.0%
14	100.0%
15	100.0%
16	100.0%
17	100.0%
18	100.0%
19	100.0%
20	100.0%
21	100.0%
22	100.0%
23	100.0%
24	100.0%

Accounts Payable, Receivable & Inventories	Receivable (# Days)	Payable (# Days)	Inventories (# Days)
Fuel Ethanol	14		8
Distillers Grain	14		8
Denaturants		10	15
Chemicals & Enzymes		15	20
Feedstock		10	10
Utilities		15	

Apec Corn Ethanol Production Cost Assessment - 50mmgy
Proforma Balance Sheet

	Construction (Year 0)	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations
ASSETS											
Current Assets:											
Cash & Cash Equivalents	0	23,876,763	48,376,897	73,179,597	98,077,099	123,067,345	148,148,828	173,323,537	198,587,124	223,939,041	249,378,825
Accounts Receivable - Trade	0	5,129,907	5,276,476	5,276,476	5,276,476	5,276,476	5,276,476	5,276,476	5,276,476	5,276,476	5,276,476
Inventories											
Feedstock	0	1,962,894	2,048,237	2,048,237	2,048,237	2,048,237	2,048,237	2,048,237	2,048,237	2,048,237	2,048,237
Chemicals, Enzymes & Yeast	0	250,000	190,476	190,476	190,476	190,476	190,476	190,476	190,476	190,476	190,476
Denaturant	0	183,673	183,673	183,673	183,673	183,673	183,673	183,673	183,673	183,673	183,673
Finished Product Inventory	0	2,049,355	2,149,294	2,149,294	2,149,294	2,149,294	2,149,294	2,149,294	2,149,294	2,149,294	2,149,294
Spare Parts	0	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000
Total Inventories	0	4,845,923	4,971,681	4,971,681	4,971,681	4,971,681	4,971,681	4,971,681	4,971,681	4,971,681	4,971,681
Prepaid Expenses	0	0	0	0	0	0	0	0	0	0	0
Other Current Assets	0	0	0	0	0	0	0	0	0	0	0
Total Current Assets	0	33,852,593	58,625,054	83,427,754	108,325,256	133,315,502	158,396,985	183,571,694	208,835,282	234,187,198	259,626,982
Land	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000
Property, Plant & Equipment											
Property, Plant & Equipment, at cost	67,510,000	76,175,000	76,475,000	76,775,000	77,075,000	77,375,000	77,675,000	77,975,000	78,275,000	78,575,000	78,875,000
Less Accumulated Depreciation & Amortization	0	5,435,224	10,620,551	15,660,648	20,597,846	25,459,710	30,420,997	35,164,934	39,881,366	44,574,747	49,249,172
Net Property, Plant & Equipment	67,510,000	70,739,776	65,854,449	61,114,352	56,477,154	51,915,290	47,254,003	42,810,066	38,393,634	34,000,253	29,625,828
Capitalized Fees & Interest	1,270,505	1,930,424	1,737,382	1,544,339	1,351,297	1,158,254	965,212	772,170	579,127	386,085	193,042
Total Assets	69,380,505	107,322,793	127,016,884	146,886,446	166,953,707	187,189,047	207,416,200	227,953,930	248,608,043	269,373,536	290,245,853
LIABILITIES & EQUITIES											
Current Liabilities:											
Accounts Payable	0	2,361,364	2,428,832	2,428,832	2,428,832	2,428,832	2,428,832	2,428,832	2,428,832	2,428,832	2,428,832
Notes Payable	0	0	0	0	0	0	0	0	0	0	0
Current Maturities of Senior Debt (incl. sweeps)	0	3,911,919	4,276,054	4,674,083	5,109,162	5,584,740	6,104,586	6,672,821	7,293,949	7,972,894	0
Current Maturities of Working Capital	0	0	0	0	0	0	0	0	0	0	0
Total Current Liabilities	0	6,273,283	6,704,885	7,102,914	7,537,993	8,013,571	8,533,417	9,101,652	9,722,781	10,401,726	2,428,832
Senior Debt (excluding current maturities)	34,677,885	47,688,288	43,412,234	38,738,151	33,628,990	28,044,250	21,939,664	15,266,843	7,972,894	0	0
Working Capital (excluding current maturities)	0	0	0	0	0	0	0	0	0	0	0
Deferred Income Taxes	0	0	0	0	0	0	0	0	0	0	0
Total Liabilities	34,677,885	53,961,571	50,117,119	45,841,066	41,166,983	36,057,821	30,473,081	24,368,496	17,695,675	10,401,726	2,428,832
Capital Units & Equities											
Common Equity	36,786,000	36,786,000	36,786,000	36,786,000	36,786,000	36,786,000	36,786,000	36,786,000	36,786,000	36,786,000	36,786,000
Preferred Equity	0	0	0	0	0	0	0	0	0	0	0
Grants (capital improvements)	0	0	0	0	0	0	0	0	0	0	0
Distribution to Shareholders	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-1,883,380	16,575,222	40,113,765	64,259,380	89,000,724	114,345,226	140,157,119	166,799,434	194,126,368	222,185,810	251,031,021
Total Capital Shares & Equities	34,902,620	53,361,222	76,899,765	101,045,380	125,786,724	151,131,226	176,943,119	203,585,434	230,912,368	258,971,810	287,817,021
Total Liabilities & Equities	69,380,505	107,322,793	127,016,884	146,886,446	166,953,707	187,189,047	207,416,200	227,953,930	248,608,043	269,373,536	290,245,853

Apec Corn Ethanol Production Cost Assessment - 50mmgy
Proforma Income Statement

	Construction (Year 0)	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations
Revenue											
Ethanol	0	101,195,137	106,175,000	106,175,000	106,175,000	106,175,000	106,175,000	106,175,000	106,175,000	106,175,000	106,175,000
DDGS	0	21,522,151	23,736,898	23,736,898	23,736,898	23,736,898	23,736,898	23,736,898	23,736,898	23,736,898	23,736,898
DWG	0	0	0	0	0	0	0	0	0	0	0
Carbon Dioxide	0	0	0	0	0	0	0	0	0	0	0
State Producer Payment	0	0	0	0	0	0	0	0	0	0	0
Federal Small Producer Tax Credit	0	0	0	0	0	0	0	0	0	0	0
USDA CCC Bioenergy Program	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	122,717,288	131,911,898	131,911,898	131,911,898	131,911,898	131,911,898	131,911,898	131,911,898	131,911,898	131,911,898
Production & Operating Expenses											
Feedstocks	0	68,701,299	71,688,312	71,688,312	71,688,312	71,688,312	71,688,312	71,688,312	71,688,312	71,688,312	71,688,312
Chemicals, Enzymes & Yeast	0	3,194,444	3,333,333	3,333,333	3,333,333	3,333,333	3,333,333	3,333,333	3,333,333	3,333,333	3,333,333
Waste Heat	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	0	9,992,222	10,948,000	10,948,000	10,948,000	10,948,000	10,948,000	10,948,000	10,948,000	10,948,000	10,948,000
Electricity	0	2,224,702	2,321,429	2,321,429	2,321,429	2,321,429	2,321,429	2,321,429	2,321,429	2,321,429	2,321,429
Denaturants	0	4,107,143	4,285,714	4,285,714	4,285,714	4,285,714	4,285,714	4,285,714	4,285,714	4,285,714	4,285,714
Makeup Water	0	250,909	261,818	261,818	261,818	261,818	261,818	261,818	261,818	261,818	261,818
Wastewater Disposal	0	102,355	106,805	106,805	106,805	106,805	106,805	106,805	106,805	106,805	106,805
Direct Labor & Benefits	181,035	1,086,210	1,086,210	1,086,210	1,086,210	1,086,210	1,086,210	1,086,210	1,086,210	1,086,210	1,086,210
Total Production Costs	181,035	89,659,285	94,031,621	94,031,621	94,031,621	94,031,621	94,031,621	94,031,621	94,031,621	94,031,621	94,031,621
Gross Profit	-181,035	33,058,013	37,880,277	37,880,277	37,880,277	37,880,277	37,880,277	37,880,277	37,880,277	37,880,277	37,880,277
Administrative & Operating Expenses											
Maintenance Materials & Services	0	1,557,232	1,625,000	1,625,000	1,625,000	1,625,000	1,625,000	1,625,000	1,625,000	1,625,000	1,625,000
Repairs & Maintenance - Wages & Benefits	55,913	335,475	335,475	335,475	335,475	335,475	335,475	335,475	335,475	335,475	335,475
Consulting, Management and Bank Fees	0	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Property Taxes & Insurance	275,240	1,366,200	1,450,796	1,353,089	1,258,267	1,145,543	1,054,306	961,080	872,201	783,873	696,005
Admin. Salaries, Wages & Benefits	334,193	641,655	641,655	641,655	641,655	641,655	641,655	641,655	641,655	641,655	641,655
Legal & Accounting/Community Affairs	755,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000
Office/Lab Supplies & Expenses	84,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Travel, Training & Miscellaneous	200,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Total Administrative & Operating Expenses	1,702,345	4,316,622	4,448,926	4,351,219	4,256,417	4,163,673	4,072,436	3,979,210	3,890,331	3,802,003	3,714,135
EBITDA	-1,883,380	28,741,392	33,431,352	33,529,058	33,623,860	33,716,604	33,807,841	33,901,067	33,989,946	34,078,274	34,166,142
Less:											
Interest - Operating Line of Credit	0	0	0	0	0	0	0	0	0	0	0
Interest - Senior Debt	0	4,847,365	4,514,439	4,150,305	3,752,275	3,317,196	2,841,619	2,321,772	1,753,537	1,132,409	453,464
Interest - Working Capital	0	0	0	0	0	0	0	0	0	0	0
Depreciation & Amortization	0	5,435,224	5,378,370	5,233,139	5,130,240	5,054,906	5,154,330	4,936,979	4,909,475	4,886,423	4,867,467

Soy Biodiesel

APEC Biodiesel Production Cost Assessment Production Assumptions		Projected Biofuel Production Costs $3.30		Feedstock ($/gal)	$2.62	785,333,333	
				Capital Cost ($/gal)	$0.32	$94,804,684	*Includes interest payments
				Chemicals / Enzymes	$0.18	54,000,000	
Nameplate Biodiesel Capacity (gal/year)	30,000,000			Coproduct Credits	-$0.04	-13,347,564	0.796392919
Biodiesel Production (gal/year)	30,000,000			Energy / Utility	$0.05	$13,763,036	
Operating Days Per Year	330			Operations / Maintenance	$0.17	51,559,213	

Product Yields & Energy Consumption	2008 1st Year Operations	2009 2nd Year Operations	2010 3rd Year Operations	2011 4th Year Operations	2012 5th Year Operations	2013 6th Year Operations	2014 7th Year Operations	2015 8th Year Operations	2016 9th Year Operations	2017 10th Year Operations	2018 Annual Escalation
Production Increase Over Nameplate	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Biodiesel Sold (gal/year)	29,272,727	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	
Biodiesel Price ($/gal)	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	0.00%
Sales Commission (% BiodieselPrice)	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.00%
Biodiesel Transportation ($/gal)	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	0.00%
Biodiesel Yield from Feedstock (gal/gal)	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	
Total Feedstock Usage (gal/yr)	30,303,030	30,303,030	30,303,030	30,303,030	30,303,030	30,303,030	30,303,030	30,303,030	30,303,030	30,303,030	
Feedstock Test Weight (lb/gal)	7.600	7.600	7.600	7.600	7.600	7.600	7.600	7.600	7.600	7.600	
Crude Soy Oil Purchase Price ($/lb)	0.341	0.341	0.341	0.341	0.341	0.341	0.341	0.341	0.341	0.341	0.00%
% of Crude Soy Oil in Total Feedstock	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Recycled Fats & Oils Purchase Price ($/lb)	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.00%
% of Fats & Oils in Total Feedstock	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Blended Feedstock Purchase Price ($/gal)	2.592	2.592	2.592	2.592	2.592	2.592	2.592	2.592	2.592	2.592	0.00%
% Biodiesel Produced from Oilseeds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
% Biodiesel Produced from Soy Oil	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Soy Oil Sold (gal/year)	0	0	0	0	0	0	0	0	0	0	
Soy Oil Price, FOB ($/gal)	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	0.00%
Soy OilTransportation ($/gal)	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	0.00%
Soy Oil Sales Commission ($/gal)	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	0.00%
Glycerin Yield (lb/gal biodiesel)	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	
Percernt of Glycerin Produced that is Sold	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Glycerin Sold (ton/year)	13,056	13,380	13,380	13,380	13,380	13,380	13,380	13,380	13,380	13,380	
Glycerin Price ($/ton)	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	0.00%
Electricity Use (kWh/gal biodiesel)	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	
Annual Electricity Use (million kWh/year)	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	
Electricity Price ($/kWh)	$0.0500	$0.0500	$0.0500	$0.0500	$0.0500	$0.0500	$0.0500	$0.0500	$0.0500	$0.0500	0.00%
Natural Gas Use (MMBTU/gal biodiesel)	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	
Annual Natural Gas Use (MMBTU/year)	154,500	154,500	154,500	154,500	154,500	154,500	154,500	154,500	154,500	154,500	
Natural Gas Price ($/MMBTU)	$7.5000	$7.5000	$7.5000	$7.5000	$7.5000	$7.5000	$7.5000	$7.5000	$7.5000	$7.5000	0.00%
Fresh Water Use (gal/gal biodiesel)	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	
Annual Fresh Water Use (1000 gal/year)	30,017	30,017	30,017	30,017	30,017	30,017	30,017	30,017	30,017	30,017	
Fresh Water Price ($/1000 gal)	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	0.00%
Effluent Water Disposal (gal/gal biodiesel)	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	
Annual Effluent Water Disposal (1000 gal/year)	7,504	7,504	7,504	7,504	7,504	7,504	7,504	7,504	7,504	7,504	
Effluent Water Disposal Price ($/1000 gal)	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	0.00%

APEC Biodiesel Production Cost Assessment Production Assumptions, continued	2008 1st Year Operations	2009 2nd Year Operations	2010 3rd Year Operations	2011 4th Year Operations	2012 5th Year Operations	2013 6th Year Operations	2014 7th Year Operations	2015 8th Year Operations	2016 9th Year Operations	2017 10th Year Operations	2018 Annual Escalation
Chemicals & Catalysts Cost ($/gal biodiesel)	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	0.00%
Number of Employees	31	31	31	31	31	31	31	31	31	31	
Average Salary Including Benefits	$55,839	$55,839	$55,839	$55,839	$55,839	$55,839	$55,839	$55,839	$55,839	$55,839	0.00%
Maintenance Materials & Services	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	0.00%
Insurance Rate	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	0.00%
Inflation for all other Administrative Expense Categories											0.00%
Property Tax Rate	0.50%	0.50%	0.50%	0.50%	0.50%	0.10%	0.20%	0.30%	0.40%	0.50%	
Property Tax Amount	$0	$0	$0	$0	$0	$43,609	$80,534	$110,767	$134,301	$156,576	

Financial Assumptions

USES OF FUNDS:	
Project Engineering & Construction Costs	
Biodiesel Plant Capital Cost	$57,246,000
Physical Refining to Edible Grade Oil	$0
Oilseed Extraction & Degumming Plant Capital Cost	$0
Recycled Oil Deacidification and Degumming	$0
USP Glycerine Distillation Capital Cost	$0
Total Engineering and Construction Cost	$57,246,000
Development Costs	
Inventory - Feedstocks	$2,380,000
Inventory - Chemicals & Catalysts	$0
Inventory - Biodiesel and Glycerin	$2,439,709
Inventory - Spare Parts	$125,000
Startup Costs	$350,000
Land	$347,000
Administration Building & Furnishing	$525,000
Rail Improvements	$150,000
Site Development Costs	$710,000
Rolling Stock and Shop Equipment	$180,000
Organizational & Interim Costs	$1,750,000
Capitalized Fees and Interest	$600,000
Working Capital	$4,250,000
Contingency	$1,203,500
Total Development Costs	$15,010,209
TOTAL USES	**$72,256,209**

SOURCE OF FUNDS:		
Senior Debt		
Principal	$43,353,725	60.00%
Interest Rate	9.0%	fixed
Lender and Misc. Fees	$433,537	1.000%
Placement Fees	$0	0.000%
Amortization Period	10	years
Cash Sweep	0.000%	
Subordinate Debt		
Principal	$0	0.00%
Interest Rate	9.00%	fixed rate
Lender Fees	$0	0.000%
Placement Fees	$0	0.000%
Amortization Period	10	years
Equity Investment		
Total Equity Amount	$28,902,484	40.00%
Placement Fees	$0	0.000%
Common Equity	$28,902,484	100.000%
Preferred Equity	$0	0.000%
Grants		
Amount	$0	0.00%
TOTAL SOURCES	**$72,256,209**	

Investment Activities	
Income Tax Rate	0.00%
Investment Interest	3.00%
Operating Line Interest	8.00%
State Producer Payment	
Producer payment, $/gal	$0.00
Estimated annual payment	$0
Incentive duration, years	0
Other Incentive Payments	
Small Producer Tax Credit	No

Plant Operating Rate

Month	% of Nameplate
13	100.0%
14	100.0%
15	100.0%
16	100.0%
17	100.0%
18	100.0%
19	100.0%
20	100.0%
21	100.0%
22	100.0%
23	100.0%
24	100.0%

Accounts Payable, Receivable & Inventories	Receivable (# Days)	Payable (# Days)	Inventories (# Days)
Biodiesel & Glycerin	10		8.0
Chemicals & Catalysts		15	0
Oilseeds		10	10.0
Recycled Oil Feedstocks		10	10
Utilities		15	

APEC Biodiesel Production Cost Assessment Proforma Balance Sheet	2008 Construction (Year 0)	2009 1st Year Operations	2010 2nd Year Operations	2011 3rd Year Operations	2012 4th Year Operations	2013 5th Year Operations	2014 6th Year Operations	2015 7th Year Operations	2016 8th Year Operations	2017 9th Year Operations	2018 10th Year Operations
ASSETS											
Current Assets:											
Cash & Cash Equivalents	0	4,654,522	8,221,495	11,852,449	15,517,460	19,216,552	22,906,142	26,592,228	30,281,527	33,980,763	37,680,326
Accounts Receivable - Trade	0	2,795,500	3,049,636	3,049,636	3,049,636	3,049,636	3,049,636	3,049,636	3,049,636	3,049,636	3,049,636
Inventories											
Feedstocks	0	2,380,000	2,379,798	2,379,798	2,379,798	2,379,798	2,379,798	2,379,798	2,379,798	2,379,798	2,379,798
Chemicals & Catalysts	0	0	0	0	0	0	0	0	0	0	0
Finished Product Inventory	0	2,439,709	2,439,709	2,439,709	2,439,709	2,439,709	2,439,709	2,439,709	2,439,709	2,439,709	2,439,709
Spare Parts	0	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000
Total Inventories	0	4,819,709	4,819,507	4,819,507	4,819,507	4,819,507	4,819,507	4,819,507	4,819,507	4,819,507	4,819,507
Prepaid Expenses	0	0	0	0	0	0	0	0	0	0	0
Other Current Assets	0	0	0	0	0	0	0	0	0	0	0
Total Current Assets	0	12,269,731	16,090,638	19,721,593	23,386,604	27,085,696	30,775,285	34,461,371	38,150,670	41,849,906	45,549,470
Land	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000
Property, Plant & Equipment											
Property, Plant & Equipment, at cost	60,364,500	60,489,500	60,539,500	60,589,500	60,639,500	60,689,500	60,739,500	60,789,500	60,839,500	60,889,500	60,939,500
Less Accumulated Depreciation & Amortization	0	3,599,675	7,052,815	10,508,455	13,966,594	17,427,234	20,819,374	24,214,013	27,611,153	29,921,305	32,233,957
Net Property, Plant & Equipment	60,364,500	56,889,825	53,486,685	50,081,045	46,672,906	43,262,266	39,920,126	36,575,487	33,228,347	30,968,195	28,705,543
Capitalized Fees & Interest	1,213,601	1,490,358	1,341,322	1,192,287	1,043,251	894,215	745,179	596,143	447,107	298,072	149,036
Total Assets	61,925,101	70,996,914	71,265,646	71,341,925	71,449,760	71,589,177	71,787,591	71,980,001	72,173,124	73,463,173	74,751,048
LIABILITIES & EQUITIES											
Current Liabilities:											
Accounts Payable	0	2,463,827	2,687,812	2,687,812	2,687,812	2,687,812	2,687,812	2,687,812	2,687,812	2,687,812	2,687,812
Notes Payable	0	0	0	0	0	0	0	0	0	0	0
Current Maturities of Long Term Debt	0	3,064,980	3,352,496	3,666,983	4,010,971	4,387,228	4,798,780	5,248,939	5,741,326	6,279,902	0
Current Maturities of Subordinated Debt	0	0	0	0	0	0	0	0	0	0	0
Total Current Liabilities	0	5,528,807	6,040,308	6,354,795	6,698,783	7,075,040	7,486,592	7,936,751	8,429,137	8,967,713	2,687,812
Long Term Debt (excluding current maturities)	34,318,532	37,486,625	34,134,129	30,467,146	26,456,175	22,068,947	17,270,166	12,021,227	6,279,902	0	0
Subordinated Debt (excluding current maturities)	0	0	0	0	0	0	0	0	0	0	0
Deferred Income Taxes	0	0	0	0	0	0	0	0	0	0	0
Total Liabilities	34,318,532	43,015,432	40,174,436	36,821,941	33,154,958	29,143,986	24,756,758	19,957,978	14,709,039	8,967,713	2,687,812
Capital Shares & Equities											
Preferred Shares	0	0	0	0	0	0	0	0	0	0	0
Common Shares	28,902,484	28,902,484	28,902,484	28,902,484	28,902,484	28,902,484	28,902,484	28,902,484	28,902,484	28,902,484	28,902,484
Grants	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-1,295,915	-921,002	2,188,725	5,617,500	9,392,319	13,542,707	18,128,349	23,119,539	28,561,602	35,592,976	43,160,753
Total Capital Shares & Equities	27,606,569	27,981,482	31,091,209	34,519,984	38,294,802	42,445,190	47,030,832	52,022,023	57,464,085	64,495,459	72,063,237
Total Liabilities & Equities	61,925,101	70,996,914	71,265,646	71,341,925	71,449,760	71,589,177	71,787,591	71,980,001	72,173,124	73,463,173	74,751,048

APEC Biodiesel Production Cost Assessment Protorma Income Statement	2008 Construction (Year 0)	2009 1st Year Operations	2010 2nd Year Operations	2011 3rd Year Operations	2012 4th Year Operations	2013 5th Year Operations	2014 6th Year Operations	2015 7th Year Operations	2016 8th Year Operations	2017 9th Year Operations	2018 10th Year Operations
Revenue											
Biodiesel	0	96,892,727	99,300,000	99,300,000	99,300,000	99,300,000	99,300,000	99,300,000	99,300,000	99,300,000	99,300,000
Glycerin	0	1,305,564	1,338,000	1,338,000	1,338,000	1,338,000	1,338,000	1,338,000	1,338,000	1,338,000	1,338,000
Small Producer Tax Credit	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	98,198,291	100,638,000	100,638,000	100,638,000	100,638,000	100,638,000	100,638,000	100,638,000	100,638,000	100,638,000
Production & Operating Expenses											
Feedstocks	0	78,533,333	78,533,333	78,533,333	78,533,333	78,533,333	78,533,333	78,533,333	78,533,333	78,533,333	78,533,333
Chemicals & Catalysts	0	5,400,000	5,400,000	5,400,000	5,400,000	5,400,000	5,400,000	5,400,000	5,400,000	5,400,000	5,400,000
Management and procurement fees	0	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000
Natural Gas	0	1,158,750	1,158,750	1,158,750	1,158,750	1,158,750	1,158,750	1,158,750	1,158,750	1,158,750	1,158,750
Electricity (Standby Charge)	0	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Makeup Water	0	90,050	90,050	90,050	90,050	90,050	90,050	90,050	90,050	90,050	90,050
Wastewater Disposal	0	7,504	7,504	7,504	7,504	7,504	7,504	7,504	7,504	7,504	7,504
Direct Labor & Benefits	169,500	853,500	853,500	853,500	853,500	853,500	853,500	853,500	853,500	853,500	853,500
Total Production Costs	169,500	88,038,137	88,038,137	88,038,137	88,038,137	88,038,137	88,038,137	88,038,137	88,038,137	88,038,137	88,038,137
Gross Profit	-169,500	10,160,154	12,599,863	12,599,863	12,599,863	12,599,863	12,599,863	12,599,863	12,599,863	12,599,863	12,599,863
Administrative & Operating Expenses											
Maintenance Materials & Services	0	858,690	858,690	858,690	858,690	858,690	858,690	858,690	858,690	858,690	858,690
Repairs & Maintenance - Wages & Benefits	64,771	320,500	320,500	320,500	320,500	320,500	320,500	320,500	320,500	320,500	320,500
Consulting Services	180,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Property Taxes & Insurance	121,423	607,115	572,368	538,337	504,280	470,199	479,702	483,206	479,992	470,055	469,728
Admin. Salaries, Wages & Benefits	278,479	557,000	557,000	557,000	557,000	557,000	557,000	557,000	557,000	557,000	557,000
Legal & Accounting/Community Affairs	137,000	11,417	11,417	11,417	11,417	11,417	11,417	11,417	11,417	11,417	11,417
Office/Lab Supplies & Expenses	245,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
Travel, Training & Miscellaneous	99,742	6,725	6,725	6,725	6,725	6,725	6,725	6,725	6,725	6,725	6,725
EBITDA	-1,295,915	7,762,707	10,237,163	10,271,195	10,305,251	10,339,332	10,329,829	10,326,326	10,329,539	10,339,477	10,339,803
Less:											
Interest - Operating Line of Credit	0	0	0	0	0	0	0	0	0	0	0
Interest - Senior Debt	0	3,788,119	3,525,261	3,237,744	2,923,257	2,579,269	2,203,012	1,791,460	1,341,301	848,914	310,338
Interest - Subordinated Debt	0	0	0	0	0	0	0	0	0	0	0
Depreciation & Amortization	0	3,599,675	3,602,175	3,604,675	3,607,175	3,609,675	3,541,175	3,543,675	3,546,175	2,459,188	2,461,688

Brazilian Sugarcane Ethanol

APEC Sugarcane Ethanol Production Cost Assessment
Production Assumptions

Nameplate Fuel Ethanol (L /year)	109,091,000
Anhydrous Ethanol Production (L /year)	108,000,000
Operating Days Per Year	330

Projected Biofuel Production Costs per litre
$0.18
$0.69 per gallon

Feedstock ($/L)	$0.31	328,414,681	
Capital Cost ($/L)	$0.09	$95,999,126	*Includes
Chemicals / Enzymes	$0.03	27,621,000	interest
Coproduct Credits	-$0.28		payments
Energy / Utility	$0.01	8,416,598	
Operations / Maintenance	$0.02	21,662,789	

Product Yields & Energy Consumption	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations	Annual Escalation
Ethanol Production Increase Over Nameplate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Anhydrous Ethanol Yield (L /ton mill-able cane)	76.6974	76.6974	76.6974	76.6974	76.6974	76.6974	76.6974	76.6974	76.6974	76.6974	
Fuel Ethanol Sold (L /year)	75,401,914	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	
Anhydrous Ethanol Sold (L/Year)	74,250,000	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	108,000,000	
Ethanol Price ($/L)	$0.6200	$0.6200	$0.6200	$0.6200	$0.6200	$0.6200	$0.6200	$0.6200	$0.6200	$0.6200	0.00%
Raw Sugar Sold (tonnes)	0	0	0	0	0	0	0	0	0	0	
Raw Sugar Price ($/tonne)	$300.0000	$300.0000	$300.0000	$300.0000	$300.0000	$300.0000	$300.0000	$300.0000	$300.0000	$300.0000	0.00%
Raw Sugar Sales Comission (%of sugar price)	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	
Ethanol Sales Commission (% of Ethanol Price)	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	0.00%
Ethanol Transportation ($/L)	$0.1050	$0.1050	$0.1050	$0.1050	$0.1050	$0.1050	$0.1050	$0.1050	$0.1050	$0.1050	0.00%
Delivered Cane Price ($/ton mill-able cane)	$24.0000	$24.0000	$24.0000	$24.0000	$24.0000	$24.0000	$24.0000	$24.0000	$24.0000	$24.0000	0.00%
Cane Handling Fee ($/ton mill-able cane)	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	0.00%
Cane Usage (mill-able tons/year)	968,090	1,408,130	1,408,130	1,408,130	1,408,130	1,408,130	1,408,130	1,408,130	1,408,130	1,408,130	
Cane Solids Content (%)	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	
Annual Electricity Use (million kWh/year)	44.550	64.800	64.800	64.800	64.800	64.800	64.800	64.800	64.800	64.800	
Total Electricity Production (million kWh / year)	141.694	206.100	206.100	206.100	206.100	206.100	206.100	206.100	206.100	206.100	
Electricity Cost ($/kWh)	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	0.00%
Electricity Avail for Sale (kwh/ton Bagasse)	881.11	881.11	881.11	881.11	881.11	881.11	881.11	881.11	881.11	881.11	
Surplus Elec Avail for Sale from Bagasse & Biogas (kWh)	97,143,761	141,300,016	141,300,016	141,300,016	141,300,016	141,300,016	141,300,016	141,300,016	141,300,016	141,300,016	
Electricity Sales Price ($/kWh)	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	$0.0900	0.00%
Annual Fresh Water Use (m3 /year)	1,147,684	1,669,358	1,669,358	1,669,358	1,669,358	1,669,358	1,669,358	1,669,358	1,669,358	1,669,358	
Fresh Water Price ($/m3)	$0.2640	$0.2640	$0.2640	$0.2640	$0.2640	$0.2640	$0.2640	$0.2640	$0.2640	$0.2640	0.00%
Annual Effluent Water Disposal (m3 /year)	185,625	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	
Effluent Water Disposal Price ($/m3)	$0.1320	$0.1320	$0.1320	$0.1320	$0.1320	$0.1320	$0.1320	$0.1320	$0.1320	$0.1320	0.00%

APEC Sugarcane Ethanol Production Cost Assessment
Production Assumptions, continued

Product Yields & Energy Consumption	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations	Annual Escalation
Chemicals & Enzymes Cost ($/L ethanol)	$0.0264	$0.0264	$0.0264	$0.0264	$0.0264	$0.0264	$0.0264	$0.0264	$0.0264	$0.0264	0.00%
Bagasse Use (tons/year)	271,065	394,276	394,276	394,276	394,276	394,276	394,276	394,276	394,276	394,276	
Mill Mud + Ash Produced (tons/year)		140,813	140,813	140,813	140,813	140,813	140,813	140,813	140,813	140,813	
Mill Mud + Ash Disposal Cost ($/ton)	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	$3.0000	0.00%
Number of Employees	38	38	38	38	38	38	38	38	38	38	
Average Salary Including Benefits	$7,227	$7,227	$7,227	$7,227	$7,227	$7,227	$7,227	$7,227	$7,227	$7,227	0.00%
Maintenance Materials & Services (% of Capital Equip. Cost	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	0.00%
Property Tax & Insurance (% of Depreciated Property, Plant	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	0.00%
Inflation for all other Administrative Expense Categories											0.00%

APEC Sugarcane Ethanol Production Cost Assessment
Financial Assumptions

Project Engineering & Construction Costs	
Biomass Boiler + Milling equip.	$55,057,000
Buildings and Roads	$0
Evaporators	$0
Field Fab Tanks	$0
Transformers & MCC's	$0
Engineering	$0
Total Project Engineering and Construction Costs	$55,057,000
Development Costs	
Inventory - Cane	$704,000
Inventory - Bagasse/Chemicals/Denaturant	$173,000
Inventory - Ethanol	$1,623,000
Inventory - Raw Sugar	$0
Spare Parts	$0
Land + Site Development Costs + Permitting	$9,860,000
Organizational Costs	$0
Financing Costs & Construction Insurance	$0
Startup Costs	$0
Locos, Rolling Stock and Shop Equipment	$1,450,000
Office, Shop and Lab Equipment	$0
Cane Unloading and Storage (incl bagasse)	$0
Administration Building & Furnishing	$200,000
Fire Protection and Potable Water	$0
Working Capital + Risk Management	$200,000
Capitalized Fees and Interest	$503,504
Contingency	$3,414,657
Total Development Costs	$18,128,251
Total Estimated Project Cost	$73,185,251

Accounts Payable, Receivable & Inventories	Receivable (# Days)	Payable (# Days)	Inventories (# Days)
Fuel Ethanol	10		8
Distillers Biomass	10		8
Denaturants		15	15
Bagasse, Chemicals & Enzymes		15	20
Biomass		10	10
Raw Sugar	10		10
Utilities		15	

Investment Activities	
Income Tax Rate	0.00%
Investment Interest	3.00%
Operating Line Interest	8.00%

Plant Operating Rate		
	Month	% of Nameplate
	13	0.0%
	14	0.0%
	15	0.0%
	16	50.0%
	17	75.0%
	18	100.0%
	19	100.0%
	20	100.0%
	21	100.0%
	22	100.0%
	23	100.0%
	24	100.0%

State Producer Payment		Other Incentive Payments	
Producer payment, $/gal	$0.0000	Small Producer Tax Credit	No
Annual payment cap	$0	CCC Bioenergy Program	No
Incentive duration, years	10		

Working Capital at Startup:		
Cash at Startup	-$51,803	(see Interim Funding Schedule (page 7), Construction Loan Balance in month 16)
Operating Line of Credit	$1,250,000	(50% of the value of inventory at startup)
Total Capital at Startup	$1,198,197	
Capital/ Litre of capacity	$0.011	(10¢/gal is the typical requirement for US Lenders)

Senior Debt (see note 1 below)		
Principal	$43,911,151	60.00%
Interest Rate	9.0% fixed	
Lender Fees	$439,112	1.000%
Placement Fees	$0	0.000%
Amortization Period	10 years	
Cash Sweep	0.000%	

Subordinated Debt		
Principal	$0	0.00%
Interest Rate	12.00%	fixed rate
Lender Fees	$0	2.000%
Placement Fees	$0	2.000%
Amortization Period	10 years	

Equity Investment			Grants
Total Equity Amount	$29,274,100	40.00%	Amount
Placement Fees	$292,741	1.000%	$0
Preferred Shares	$0	0.000%	0.00%
Common Shares	$29,274,100	100.000%	

APEC Sugarcane Ethanol Production Cost Assessment
Proforma Balance Sheet

	Construction (Year 0)	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations
ASSETS											
Current Assets:											
Cash & Cash Equivalents	0	11,915,907	53,934,093	96,293,628	138,684,216	181,105,947	223,558,912	266,043,202	308,558,908	351,106,120	393,674,607
Accounts Receivable - Trade	0	1,606,737	1,748,422	1,748,422	1,748,422	1,748,422	1,748,422	1,748,422	1,748,422	1,748,422	1,748,422
Inventories											
Feedstock	0	1,024,095	1,024,096	1,024,096	1,024,096	1,024,096	1,024,096	1,024,096	1,024,096	1,024,096	1,024,096
Chemicals, Enzymes & Yeast	0	172,800	172,800	172,800	172,800	172,800	172,800	172,800	172,800	172,800	172,800
Denaturant	0	0	0	0	0	0	0	0	0	0	0
Finished Product Inventory	0	646,390	913,037	913,037	913,037	913,037	913,037	913,037	913,037	913,037	913,037
Raw Sugar Inventory	0	0	0	0	0	0	0	0	0	0	0
Spare Parts	0	0	0	0	0	0	0	0	0	0	0
Total Inventories	0	1,843,285	2,109,933	2,109,933	2,109,933	2,109,933	2,109,933	2,109,933	2,109,933	2,109,933	2,109,933
Prepaid Expenses	0	0	0	0	0	0	0	0	0	0	0
Other Current Assets	0	0	0	0	0	0	0	0	0	0	0
Total Current Assets	0	15,365,928	57,792,447	100,151,983	142,542,570	184,964,301	227,417,266	269,901,556	312,417,262	354,964,475	397,532,962
Land	0	0	0	0	0	0	0	0	0	0	0
Property, Plant & Equipment											
Property, Plant & Equipment, at cost	56,275,326	69,981,657	70,163,346	70,345,034	70,526,723	70,708,412	70,890,101	71,071,790	71,253,478	71,435,167	71,616,856
Less Accumulated Depreciation & Amortization	0	1,724,254	5,002,100	8,239,031	11,585,047	14,890,147	18,204,331	21,527,600	24,859,953	27,169,072	29,487,275
Net Property, Plant & Equipment	56,275,326	68,257,403	65,161,246	62,056,003	58,941,677	55,818,265	52,685,770	49,544,190	46,393,525	44,266,095	42,129,581
Capitalized Fees & Interest	935,406	1,797,448	1,617,704	1,437,959	1,258,214	1,078,469	898,724	718,979	539,235	359,490	179,745
Total Assets	57,210,731	85,420,780	124,571,396	163,645,945	202,742,461	241,861,036	281,001,761	320,164,726	359,350,022	399,590,060	439,842,287
LIABILITIES & EQUITIES											
Current Liabilities:											
Accounts Payable	0	1,077,402	1,175,348	1,175,348	1,175,348	1,175,348	1,175,348	1,175,348	1,175,348	1,175,348	1,175,348
Notes Payable	0	0	0	0	0	0	0	0	0	0	0
Current Maturities of Long Term Debt	0	3,035,574	3,320,332	3,631,802	3,972,490	4,345,137	4,752,740	5,198,580	5,686,243	6,219,652	0
Current Maturities of Subordinated Debt	0	0	0	0	0	0	0	0	0	0	0
Total Current Liabilities	0	4,112,976	4,495,680	4,807,150	5,147,838	5,520,485	5,928,088	6,373,928	6,861,591	7,395,000	1,175,348
Long Term Debt (excluding current maturities)	28,839,881	38,770,997	35,450,665	31,818,864	27,846,374	23,501,237	18,748,497	13,549,917	7,863,674	1,644,022	1,644,022
Subordinated Debt (excluding current maturities)	0	0	0	0	0	0	0	0	0	0	0
Deferred Income Taxes	0	0	0	0	0	0	0	0	0	0	0
Total Liabilities	28,839,881	42,883,973	39,946,345	36,626,013	32,994,212	29,021,722	24,676,585	19,923,845	14,725,265	9,039,022	2,819,370
Capital Shares & Equities											
Preferred Shares	0	0	0	0	0	0	0	0	0	0	0
Common Shares	29,274,100	29,274,100	29,274,100	29,274,100	29,274,100	29,274,100	29,274,100	29,274,100	29,274,100	29,274,100	29,274,100
Grants	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-903,251	13,262,706	55,350,951	97,745,831	140,474,149	183,565,213	227,051,075	270,966,780	315,350,657	361,276,938	407,748,817
Total Capital Shares & Equities	28,370,850	42,536,807	84,625,051	127,019,931	169,748,249	212,839,314	256,325,175	300,240,881	344,624,758	390,551,038	437,022,917
Total Liabilities & Equities	57,210,731	85,420,780	124,571,396	163,645,945	202,742,461	241,861,036	281,001,761	320,164,726	359,350,022	399,590,060	439,842,287

APEC Sugarcane Ethanol Production Cost Assessment
Proforma Income Statement

	Construction (Year 0)	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations
Revenue											
Ethanol	0	38,364,494	57,697,920	57,697,920	57,697,920	57,697,920	57,697,920	57,697,920	57,697,920	57,697,920	57,697,920
Electricity Sales	0	8,742,939	31,266,003	31,266,003	31,266,003	31,266,003	31,266,003	31,266,003	31,266,003	31,266,003	31,266,003
Raw Sugar Sales	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	47,107,432	88,963,923	88,963,923	88,963,923	88,963,923	88,963,923	88,963,923	88,963,923	88,963,923	88,963,923
Ethanol Plant Production & Operating Expenses											
Feedstocks	0	24,258,267	33,795,157	33,795,157	33,795,157	33,795,157	33,795,157	33,795,157	33,795,157	33,795,157	33,795,157
Chemicals, Enzymes & Yeast	0	1,960,200	2,851,200	2,851,200	2,851,200	2,851,200	2,851,200	2,851,200	2,851,200	2,851,200	2,851,200
Natural Gas or Propane (Startup/Backup)	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	0	0	0	0
Denaturants	0	0	0	0	0	0	0	0	0	0	0
Makeup Water	0	302,989	440,711	440,711	440,711	440,711	440,711	440,711	440,711	440,711	440,711
Wastewater Disposal	0	24,502	35,640	35,640	35,640	35,640	35,640	35,640	35,640	35,640	35,640
Cogen Plant Production & Operating Expenses											
Bagasse Fuel (delivered)	0	0	0	0	0	0	0	0	0	0	0
Boiler Ash + Mud Disposal	0	0	422,439	422,439	422,439	422,439	422,439	422,439	422,439	422,439	422,439
Direct Labor & Benefits	0	117,625	117,625	117,625	117,625	117,625	117,625	117,625	117,625	117,625	117,625
Total Production Costs	0	26,663,583	37,662,772	37,662,772	37,662,772	37,662,772	37,662,772	37,662,772	37,662,772	37,662,772	37,662,772
Administrative & Operating Expenses											
Maintenance Materials & Services	0	757,034	1,101,140	1,101,140	1,101,140	1,101,140	1,101,140	1,101,140	1,101,140	1,101,140	1,101,140
Repairs & Maintenance - Wages & Benefits	0	89,750	89,750	89,750	89,750	89,750	89,750	89,750	89,750	89,750	89,750
Consulting Services	117,750	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
Property Taxes & Insurance	112,551	562,753	682,574	651,612	620,560	589,417	558,183	526,858	495,442	463,935	442,661
Admin. Salaries, Wages & Benefits	31,125	67,250	67,250	67,250	67,250	67,250	67,250	67,250	67,250	67,250	67,250
Legal & Accounting/Community Affairs	172,500	32,125	32,125	32,125	32,125	32,125	32,125	32,125	32,125	32,125	32,125
Office/Lab Supplies & Other Expenses	382,500	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000
Travel, Training & Miscellaneous	86,825	39,075	39,075	39,075	39,075	39,075	39,075	39,075	39,075	39,075	39,075
EBITDA	-903,251	18,791,862	49,185,237	49,216,199	49,247,251	49,278,395	49,309,629	49,340,954	49,372,369	49,403,876	49,425,150
Less:											
Interest - Operating Line of Credit	0	0	0	0	0	0	0	0	0	0	0
Interest - Senior Debt	0	2,901,651	3,639,401	3,354,643	3,043,173	2,702,485	2,329,838	1,922,234	1,476,394	988,732	455,323
Interest - Subordinated Debt	0	0	0	0	0	0	0	0	0	0	0
Depreciation & Amortization	0	1,724,254	3,457,591	3,466,676	3,475,760	3,484,845	3,493,929	3,503,014	3,512,098	2,488,864	2,497,948

Palm Biodiesel

APEC Biodiesel Production Cost Assessment Production Assumptions		Projected Biofuel Production Costs $2.74		Feedstock ($/gal)	$2.02	565,090,909	
				Capital Cost ($/gal)	$0.40	$112,418,626	*Includes interest payments
				Chemicals / Enzymes	$0.18	50,400,000	
Nameplate Biodiesel Capacity (gal/year)	28,000,000			Coproduct Credits	-$0.04	-12,457,726	0.737569261
Biodiesel Production (gal/year)	28,000,000			Energy / Utility	$0.03	$7,171,490	
Operating Days Per Year	330			Operations / Maintenance	$0.16	43,529,711	

Product Yields & Energy Consumption	2008 1st Year Operations	2009 2nd Year Operations	2010 3rd Year Operations	2011 4th Year Operations	2012 5th Year Operations	2013 6th Year Operations	2014 7th Year Operations	2015 8th Year Operations	2016 9th Year Operations	2017 10th Year Operations	2018 Annual Escalation
Production Increase Over Nameplate	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Biodiesel Sold (gal/year)	27,321,212	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	
Biodiesel Price ($/gal)	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	0.00%
Sales Commission (% BiodieselPrice)	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	0.00%
Biodiesel Transportation ($/gal)	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	0.00%
Biodiesel Yield from Feedstock (gal/gal)	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	
Total Feedstock Usage (gal/yr)	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	
Feedstock Test Weight (lb/gal)	7.400	7.400	7.400	7.400	7.400	7.400	7.400	7.400	7.400	7.400	
Crude Soy Oil Purchase Price ($/lb)	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.00%
% of Crude Soy Oil in Total Feedstock	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Recycled Fats & Oils Purchase Price ($/lb)	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.00%
% of Fats & Oils in Total Feedstock	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Blended Feedstock Purchase Price ($/gal)	1.998	1.998	1.998	1.998	1.998	1.998	1.998	1.998	1.998	1.998	0.00%
% Biodiesel Produced from Oilseeds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
% Biodiesel Produced from Soy Oil	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Soy Oil Sold (gal/year)	0	0	0	0	0	0	0	0	0	0	
Soy Oil Price, FOB ($/gal)	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	0.00%
Soy OilTransportation ($/gal)	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	0.00%
Soy Oil Sales Commission ($/gal)	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	0.00%
Glycerin Yield (lb/gal biodiesel)	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	
Percernt of Glycerin Produced that is Sold	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Glycerin Sold (ton/year)	12,185	12,488	12,488	12,488	12,488	12,488	12,488	12,488	12,488	12,488	
Glycerin Price ($/ton)	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	0.00%
Electricity Use (kWh/gal biodiesel)	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	
Annual Electricity Use (million kWh/year)	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	
Electricity Price ($/kWh)	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	0.00%
Natural Gas Use (MMBTU/gal biodiesel)	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	
Annual Natural Gas Use (MMBTU/year)	134,540	134,540	134,540	134,540	134,540	134,540	134,540	134,540	134,540	134,540	
Natural Gas Price ($/MMBTU)	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	0.00%
Fresh Water Use (gal/gal biodiesel)	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	
Annual Fresh Water Use (1000 gal/year)	28,015	28,015	28,015	28,015	28,015	28,015	28,015	28,015	28,015	28,015	
Fresh Water Price ($/1000 gal)	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	0.00%
Effluent Water Disposal (gal/gal biodiesel)	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	
Annual Effluent Water Disposal (1000 gal/year)	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	
Effluent Water Disposal Price ($/1000 gal)	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	0.00%

APEC Biodiesel Production Cost Assessment Production Assumptions, continued	2008 1st Year Operations	2009 2nd Year Operations	2010 3rd Year Operations	2011 4th Year Operations	2012 5th Year Operations	2013 6th Year Operations	2014 7th Year Operations	2015 8th Year Operations	2016 9th Year Operations	2017 10th Year Operations	2018 Annual Escalation
Chemicals & Catalysts Cost ($/gal biodiesel)	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	0.00%
Number of Employees	31	31	31	31	31	31	31	31	31	31	
Average Salary Including Benefits	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	0.00%
Maintenance Materials & Services	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	0.00%
Insurance Rate	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	0.00%
Inflation for all other Administrative Expense Categories											0.00%
Property Tax Rate	0.50%	0.50%	0.50%	0.50%	0.50%	0.10%	0.20%	0.30%	0.40%	0.50%	
Property Tax Amount	$0	$0	$0	$0	$0	$53,792	$99,252	$136,373	$165,148	$192,360	

Financial Assumptions

USES OF FUNDS:	
Project Engineering & Construction Costs	
Biodiesel Plant Capital Cost	$71,586,000
Physical Refining to Edible Grade Oil	$0
Oilseed Extraction & Degumming Plant Capital Cost	$0
Recycled Oil Deacidification and Degumming	$0
USP Glycerine Distillation Capital Cost	$0
Total Engineering and Construction Cost	$71,586,000
Development Costs	
Inventory - Feedstocks	$1,712,000
Inventory - Chemicals & Catalysts	$0
Inventory - Biodiesel and Glycerin	$2,192,145
Inventory - Spare Parts	$125,000
Startup Costs	$350,000
Land	$347,000
Administration Building & Furnishing	$525,000
Rail Improvements	$150,000
Site Development Costs	$710,000
Rolling Stock and Shop Equipment	$180,001
Organizational & Interim Costs	$1,750,000
Capitalized Fees and Interest	$600,000
Working Capital	$4,250,000
Contingency	$1,203,500
Total Development Costs	$14,094,646
TOTAL USES	$85,680,646

SOURCE OF FUNDS:		
Senior Debt		
Principal	$51,408,388	60.00%
Interest Rate	9.0%	fixed
Lender and Misc. Fees	$514,084	1.000%
Placement Fees	$0	0.000%
Amortization Period	10	years
Cash Sweep	0.000%	
Subordinate Debt		
Principal	$0	0.00%
Interest Rate	9.00%	fixed rate
Lender Fees	$0	0.000%
Placement Fees	$0	0.000%
Amortization Period	10	years
Equity Investment		
Total Equity Amount	$34,272,259	40.00%
Placement Fees	$0	0.000%
Common Equity	$34,272,259	100.000%
Preferred Equity	$0	0.000%
Grants		
Amount	$0	0.00%
TOTAL SOURCES	$85,680,646	

Investment Activities	
Income Tax Rate	0.00%
Investment Interest	3.00%
Operating Line Interest	8.00%
State Producer Payment	
Producer payment, $/gal	$0.00
Estimated annual payment	$0
Incentive duration, years	0
Other Incentive Payments	
Small Producer Tax Credit	No

Plant Operating Rate	
Month	% of Nameplate
13	100.0%
14	100.0%
15	100.0%
16	100.0%
17	100.0%
18	100.0%
19	100.0%
20	100.0%
21	100.0%
22	100.0%
23	100.0%
24	100.0%

Accounts Payable, Receivable & Inventories	Receivable (# Days)	Payable (# Days)	Inventories (# Days)
Biodiesel & Glycerin	10		8.0
Chemicals & Catalysts		15	0
Oilseeds		10	10.0
Recycled Oil Feedstocks		10	10
Utilities		15	

APEC Biodiesel Production Cost Assessment Proforma Balance Sheet	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Construction (Year 0)	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations
ASSETS											
Current Assets:											
Cash & Cash Equivalents	0	16,706,737	32,603,053	48,605,874	64,650,988	80,738,419	96,814,401	112,886,581	128,963,322	145,052,996	161,143,606
Accounts Receivable - Trade	0	2,511,833	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182
Inventories											
Feedstocks	0	1,712,000	1,712,397	1,712,397	1,712,397	1,712,397	1,712,397	1,712,397	1,712,397	1,712,397	1,712,397
Chemicals & Catalysts	0	0	0	0	0	0	0	0	0	0	0
Finished Product Inventory	0	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062
Spare Parts	0	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000
Total Inventories	0	3,989,062	3,989,459	3,989,459	3,989,459	3,989,459	3,989,459	3,989,459	3,989,459	3,989,459	3,989,459
Prepaid Expenses	0	0	0	0	0	0	0	0	0	0	0
Other Current Assets	0	0	0	0	0	0	0	0	0	0	0
Total Current Assets	0	23,207,632	39,332,693	55,335,514	71,380,628	87,468,060	103,544,042	119,616,221	135,692,962	151,782,636	167,873,247
Land	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000
Property, Plant & Equipment											
Property, Plant & Equipment, at cost	74,704,501	74,829,501	74,879,501	74,929,501	74,979,501	75,029,501	75,079,501	75,129,501	75,179,501	75,229,501	75,279,501
Less Accumulated Depreciation & Amortization	0	4,462,696	8,739,456	13,018,716	17,300,475	21,584,735	25,800,495	30,018,754	34,239,514	37,104,411	39,971,808
Net Property, Plant & Equipment	74,704,501	70,366,805	66,140,045	61,910,785	57,679,026	53,444,766	49,279,006	45,110,747	40,939,987	38,125,090	35,307,693
Capitalized Fees & Interest	1,554,743	1,884,361	1,695,925	1,507,489	1,319,053	1,130,617	942,181	753,745	565,308	376,872	188,436
Total Assets	76,606,244	95,805,799	107,515,663	119,100,789	130,725,707	142,390,442	154,112,229	165,827,712	177,545,258	190,631,598	203,716,375
LIABILITIES & EQUITIES											
Current Liabilities:											
Accounts Payable	0	1,809,578	1,974,085	1,974,085	1,974,085	1,974,085	1,974,085	1,974,085	1,974,085	1,974,085	1,974,085
Notes Payable	0	0	0	0	0	0	0	0	0	0	0
Current Maturities of Long Term Debt	0	3,634,420	3,975,354	4,348,270	4,756,167	5,202,328	5,690,343	6,224,136	6,808,003	7,446,641	0
Current Maturities of Subordinated Debt	0	0	0	0	0	0	0	0	0	0	0
Total Current Liabilities	0	5,443,998	5,949,439	6,322,355	6,730,252	7,176,414	7,664,428	8,198,221	8,782,088	9,420,726	1,974,085
Long Term Debt (excluding current maturities)	43,330,746	44,451,242	40,475,888	36,127,619	31,371,451	26,169,123	20,478,780	14,254,644	7,446,641	-0	-0
Subordinated Debt (excluding current maturities)	0	0	0	0	0	0	0	0	0	0	0
Deferred Income Taxes	0	0	0	0	0	0	0	0	0	0	0
Total Liabilities	43,330,746	49,895,240	46,425,327	42,449,973	38,101,704	33,345,537	28,143,208	22,452,865	16,228,729	9,420,726	1,974,085
Capital Shares & Equities											
Preferred Shares	0	0	0	0	0	0	0	0	0	0	0
Common Shares	34,272,259	34,272,259	34,272,259	34,272,259	34,272,259	34,272,259	34,272,259	34,272,259	34,272,259	34,272,259	34,272,259
Grants	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-996,761	11,638,300	26,818,078	42,378,557	58,351,744	74,772,647	91,696,762	109,102,589	127,044,270	146,938,614	167,470,032
Total Capital Shares & Equities	33,275,497	45,910,558	61,090,336	76,650,815	92,624,003	109,044,905	125,969,020	143,374,847	161,316,529	181,210,872	201,742,290
Total Liabilities & Equities	76,606,244	95,805,799	107,515,663	119,100,789	130,725,707	142,390,442	154,112,229	165,827,712	177,545,258	190,631,598	203,716,375

APEC Biodiesel Production Cost Assessment Proforma Income Statement	2008 Construction (Year 0)	2009 1st Year Operations	2010 2nd Year Operations	2011 3rd Year Operations	2012 4th Year Operations	2013 5th Year Operations	2014 6th Year Operations	2015 7th Year Operations	2016 8th Year Operations	2017 9th Year Operations	2018 10th Year Operations
Revenue											
Biodiesel	0	87,015,328	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200
Glycerin	0	1,218,526	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800
Small Producer Tax Credit	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	88,233,855	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000
Production & Operating Expenses											
Feedstocks	0	56,509,091	56,509,091	56,509,091	56,509,091	56,509,091	56,509,091	56,509,091	56,509,091	56,509,091	56,509,091
Chemicals & Catalysts	0	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000
Management and procurement fees	0	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000
Natural Gas	0	593,321	593,321	593,321	593,321	593,321	593,321	593,321	593,321	593,321	593,321
Electricity (Standby Charge)	0	102,816	102,816	102,816	102,816	102,816	102,816	102,816	102,816	102,816	102,816
Makeup Water	0	14,008	14,008	14,008	14,008	14,008	14,008	14,008	14,008	14,008	14,008
Wastewater Disposal	0	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004
Direct Labor & Benefits	61,125	307,875	307,875	307,875	307,875	307,875	307,875	307,875	307,875	307,875	307,875
Total Production Costs	61,125	64,449,115	64,449,115	64,449,115	64,449,115	64,449,115	64,449,115	64,449,115	64,449,115	64,449,115	64,449,115
Gross Profit	-61,125	23,784,740	25,976,885	25,976,885	25,976,885	25,976,885	25,976,885	25,976,885	25,976,885	25,976,885	25,976,885
Administrative & Operating Expenses											
Maintenance Materials & Services	0	1,073,790	1,073,790	1,073,790	1,073,790	1,073,790	1,073,790	1,073,790	1,073,790	1,073,790	1,073,790
Repairs & Maintenance - Wages & Benefits	23,396	115,750	115,750	115,750	115,750	115,750	115,750	115,750	115,750	115,750	115,750
Consulting Services	180,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Property Taxes & Insurance	150,103	750,515	707,138	664,870	622,578	580,260	591,709	595,512	590,951	578,018	577,081
Admin. Salaries, Wages & Benefits	100,396	200,875	200,875	200,875	200,875	200,875	200,875	200,875	200,875	200,875	200,875
Legal & Accounting/Community Affairs	137,000	11,417	11,417	11,417	11,417	11,417	11,417	11,417	11,417	11,417	11,417
Office/Lab Supplies & Expenses	245,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
Travel, Training & Miscellaneous	99,742	6,725	6,725	6,725	6,725	6,725	6,725	6,725	6,725	6,725	6,725
EBITDA	-996,761	21,589,668	23,825,190	23,867,458	23,909,751	23,952,068	23,940,619	23,936,816	23,941,378	23,954,311	23,955,247
Less:											
Interest - Operating Line of Credit	0	0	0	0	0	0	0	0	0	0	0
Interest - Senior Debt	0	4,491,911	4,180,217	3,839,283	3,466,367	3,058,470	2,612,308	2,124,294	1,590,501	1,006,634	367,996
Interest - Subordinated Debt	0	0	0	0	0	0	0	0	0	0	0
Depreciation & Amortization	0	4,462,696	4,465,196	4,467,696	4,470,196	4,472,696	4,404,196	4,406,696	4,409,196	3,053,333	3,055,833

Jatropha Biodiesel

APEC Biodiesel Production Cost Assessment Production Assumptions		Projected Biofuel Production Costs $2.49		Feedstock ($/gal)	$1.86	520,630,303	
				Capital Cost ($/gal)	$0.32	$89,886,524	*Includes interest payments
				Chemicals / Enzymes	$0.18	50,400,000	
Nameplate Biodiesel Capacity (gal/year)	28,000,000			Coproduct Credits	-$0.04	-12,457,726	0.748931255
Biodiesel Production (gal/year)	28,000,000			Energy / Utility	$0.03	$7,171,490	
Operating Days Per Year	330			Operations / Maintenance	$0.14	39,533,751	

Product Yields & Energy Consumption	2008 1st Year Operations	2009 2nd Year Operations	2010 3rd Year Operations	2011 4th Year Operations	2012 5th Year Operations	2013 6th Year Operations	2014 7th Year Operations	2015 8th Year Operations	2016 9th Year Operations	2017 10th Year Operations	2018 Annual Escalation
Production Increase Over Nameplate	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Biodiesel Sold (gal/year)	27,321,212	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	28,000,000	
Biodiesel Price ($/gal)	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	$3.3100	0.00%
Sales Commission (% BiodieselPrice)	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	0.00%
Biodiesel Transportation ($/gal)	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	$0.0920	0.00%
Biodiesel Yield from Feedstock (gal/gal)	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	
Total Feedstock Usage (gal/yr)	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	28,282,828	
Feedstock Test Weight (lb/gal)	7.670	7.670	7.670	7.670	7.670	7.670	7.670	7.670	7.670	7.670	
Crude Soy Oil Purchase Price ($/lb)	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.00%
% of Crude Soy Oil in Total Feedstock	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Recycled Fats & Oils Purchase Price ($/lb)	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.00%
% of Fats & Oils in Total Feedstock	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Blended Feedstock Purchase Price ($/gal)	1.841	1.841	1.841	1.841	1.841	1.841	1.841	1.841	1.841	1.841	0.00%
% Biodiesel Produced from Oilseeds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
% Biodiesel Produced from Soy Oil	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Soy Oil Sold (gal/year)	0	0	0	0	0	0	0	0	0	0	
Soy Oil Price, FOB ($/gal)	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	$1.597	0.00%
Soy OilTransportation ($/gal)	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	0.00%
Soy Oil Sales Commission ($/gal)	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	0.00%
Glycerin Yield (lb/gal biodiesel)	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	
Percernt of Glycerin Produced that is Sold	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Glycerin Sold (ton/year)	12,185	12,488	12,488	12,488	12,488	12,488	12,488	12,488	12,488	12,488	
Glycerin Price ($/ton)	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00	0.00%
Electricity Use (kWh/gal biodiesel)	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	
Annual Electricity Use (million kWh/year)	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	2.240	
Electricity Price ($/kWh)	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	0.00%
Natural Gas Use (MMBTU/gal biodiesel)	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	
Annual Natural Gas Use (MMBTU/year)	134,540	134,540	134,540	134,540	134,540	134,540	134,540	134,540	134,540	134,540	
Natural Gas Price ($/MMBTU)	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	$4.4100	0.00%
Fresh Water Use (gal/gal biodiesel)	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	
Annual Fresh Water Use (1000 gal/year)	28,015	28,015	28,015	28,015	28,015	28,015	28,015	28,015	28,015	28,015	
Fresh Water Price ($/1000 gal)	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	$0.5000	0.00%
Effluent Water Disposal (gal/gal biodiesel)	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	
Annual Effluent Water Disposal (1000 gal/year)	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	
Effluent Water Disposal Price ($/1000 gal)	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	$1.0000	0.00%

APEC Biodiesel Production Cost Assessment

Production Assumptions, continued	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations	Annual Escalation
Chemicals & Catalysts Cost ($/gal biodiesel)	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	$0.1800	0.00%
Number of Employees	31	31	31	31	31	31	31	31	31	31	
Average Salary Including Benefits	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	$20,145	0.00%
Maintenance Materials & Services	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	1.500%	0.00%
Insurance Rate	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	0.00%
Inflation for all other Administrative Expense Categories											0.00%
Property Tax Rate	0.50%	0.50%	0.50%	0.50%	0.50%	0.10%	0.20%	0.30%	0.40%	0.50%	
Property Tax Amount	$0	$0	$0	$0	$0	$41,696	$77,020	$105,962	$128,517	$149,871	

Financial Assumptions

USES OF FUNDS:	
Project Engineering & Construction Costs	
Biodiesel Plant Capital Cost	$54,547,000
Physical Refining to Edible Grade Oil	$0
Oilseed Extraction & Degumming Plant Capital Cost	$0
Recycled Oil Deacidification and Degumming	$0
USP Glycerine Distillation Capital Cost	$0
Total Engineering and Construction Cost	$54,547,000
Development Costs	
Inventory - Feedstocks	$1,578,000
Inventory - Chemicals & Catalysts	$0
Inventory - Biodiesel and Glycerin	$2,192,145
Inventory - Spare Parts	$125,000
Startup Costs	$350,000
Land	$347,000
Administration Building & Furnishing	$525,000
Rail Improvements	$150,000
Site Development Costs	$710,000
Rolling Stock and Shop Equipment	$150,001
Organizational & Interim Costs	$1,750,000
Capitalized Fees and Interest	$600,000
Working Capital	$4,250,000
Contingency	$1,203,500
Total Development Costs	$13,960,646
TOTAL USES	**$68,507,646**

SOURCE OF FUNDS:		
Senior Debt		
Principal	$41,104,588	60.00%
Interest Rate	9.0%	fixed
Lender and Misc. Fees	$411,046	1.000%
Placement Fees	$0	0.000%
Amortization Period	10	years
Cash Sweep	0.000%	
Subordinate Debt		
Principal	$0	0.00%
Interest Rate	9.00%	fixed rate
Lender Fees	$0	0.000%
Placement Fees	$0	0.000%
Amortization Period	10	years
Equity Investment		
Total Equity Amount	$27,403,059	40.00%
Placement Fees	$0	0.000%
Common Equity	$27,403,059	100.000%
Preferred Equity	$0	0.000%
Grants		
Amount	$0	0.00%
TOTAL SOURCES	**$68,507,646**	

Investment Activities	
Income Tax Rate	0.00%
Investment Interest	3.00%
Operating Line Interest	8.00%
State Producer Payment	
Producer payment, $/gal	$0.00
Estimated annual payment	$0
Incentive duration, years	0
Other Incentive Payments	
Small Producer Tax Credit	No

Plant Operating Rate	
Month	% of Nameplate
13	100.0%
14	100.0%
15	100.0%
16	100.0%
17	100.0%
18	100.0%
19	100.0%
20	100.0%
21	100.0%
22	100.0%
23	100.0%
24	100.0%

Accounts Payable, Receivable & Inventories	Receivable (# Days)	Payable (# Days)	Inventories (# Days)
Biodiesel & Glycerin	10		8.0
Chemicals & Catalysts		15	0
Oilseeds		10	10.0
Recycled Oil Feedstocks		10	10
Utilities		15	

APEC Biodiesel Production Cost Assessment Proforma Balance Sheet	2008 Construction (Year 0)	2009 1st Year Operations	2010 2nd Year Operations	2011 3rd Year Operations	2012 4th Year Operations	2013 5th Year Operations	2014 6th Year Operations	2015 7th Year Operations	2016 8th Year Operations	2017 9th Year Operations	2018 10th Year Operations
ASSETS											
Current Assets:											
Cash & Cash Equivalents	0	23,529,151	45,843,028	68,264,117	90,717,706	113,203,820	135,680,787	158,154,297	180,630,754	203,116,571	225,602,586
Accounts Receivable - Trade	0	2,511,833	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182	2,740,182
Inventories											
Feedstocks	0	1,578,000	1,577,668	1,577,668	1,577,668	1,577,668	1,577,668	1,577,668	1,577,668	1,577,668	1,577,668
Chemicals & Catalysts	0	0	0	0	0	0	0	0	0	0	0
Finished Product Inventory	0	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062	2,277,062
Spare Parts	0	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000
Total Inventories	0	3,855,062	3,854,729	3,854,729	3,854,729	3,854,729	3,854,729	3,854,729	3,854,729	3,854,729	3,854,729
Prepaid Expenses	0	0	0	0	0	0	0	0	0	0	0
Other Current Assets	0	0	0	0	0	0	0	0	0	0	0
Total Current Assets	0	29,896,046	52,437,939	74,859,028	97,312,617	119,798,731	142,275,699	164,749,208	187,225,665	209,711,482	232,197,498
Land	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000	347,000
Property, Plant & Equipment											
Property, Plant & Equipment, at cost	57,665,501	57,790,501	57,840,501	57,890,501	57,940,501	57,990,501	58,040,501	58,090,501	58,140,501	58,190,501	58,240,501
Less Accumulated Depreciation & Amortization	0	3,436,100	6,733,615	10,033,630	13,336,145	16,641,160	19,877,675	23,116,690	26,358,205	28,563,338	30,770,972
Net Property, Plant & Equipment	57,665,501	54,354,401	51,106,886	47,856,871	44,604,356	41,349,341	38,162,826	34,973,811	31,782,296	29,627,163	27,469,529
Capitalized Fees & Interest	1,164,376	1,410,849	1,289,765	1,128,680	987,595	846,510	705,425	564,340	423,255	282,170	141,085
Total Assets	59,176,877	86,008,297	105,181,590	124,191,578	143,251,567	162,341,581	181,490,949	200,634,359	219,778,216	239,967,815	260,155,112
LIABILITIES & EQUITIES											
Current Liabilites:											
Accounts Payable	0	1,686,076	1,839,356	1,839,356	1,839,356	1,839,356	1,839,356	1,839,356	1,839,356	1,839,356	1,839,356
Notes Payable	0	0	0	0	0	0	0	0	0	0	0
Current Maturities of Long Term Debt	0	2,905,972	3,178,572	3,476,744	3,802,887	4,159,624	4,549,826	4,976,631	5,443,473	5,954,108	0
Current Maturities of Subordinated Debt	0	0	0	0	0	0	0	0	0	0	0
Total Current Liabilities	0	4,592,049	5,017,929	5,316,101	5,642,243	5,998,980	6,389,182	6,815,987	7,282,829	7,793,464	1,839,356
Long Term Debt (excluding current maturities)	32,736,501	35,541,865	32,363,293	28,886,548	25,083,661	20,924,037	16,374,211	11,397,581	5,954,108	0	0
Subordinated Debt (excluding current maturities)	0	0	0	0	0	0	0	0	0	0	0
Deferred Income Taxes	0	0	0	0	0	0	0	0	0	0	0
Total Liabilities	32,736,501	40,133,914	37,381,221	34,202,649	30,725,904	26,923,017	22,763,393	18,213,568	13,236,937	7,793,464	1,839,356
Capital Shares & Equities											
Preferred Shares	0	0	0	0	0	0	0	0	0	0	0
Common Shares	27,403,059	27,403,059	27,403,059	27,403,059	27,403,059	27,403,059	27,403,059	27,403,059	27,403,059	27,403,059	27,403,059
Grants	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-962,683	18,471,324	40,377,310	62,585,871	85,122,604	108,015,505	131,324,497	155,017,733	179,138,220	204,771,292	230,912,697
Total Capital Shares & Equities	26,440,375	45,874,383	67,780,369	89,988,930	112,525,663	135,418,564	158,727,556	182,420,791	206,541,279	232,174,351	258,315,755
Total Liabilities & Equities	59,176,877	86,008,297	105,181,590	124,191,578	143,251,567	162,341,581	181,490,949	200,634,359	219,778,216	239,967,815	260,155,112

APEC Biodiesel Production Cost Assessment Proforma Income Statement	2008 Construction (Year 0)	2009 1st Year Operations	2010 2nd Year Operations	2011 3rd Year Operations	2012 4th Year Operations	2013 5th Year Operations	2014 6th Year Operations	2015 7th Year Operations	2016 8th Year Operations	2017 9th Year Operations	2018 10th Year Operations
Revenue											
Biodiesel	0	87,015,328	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200	89,177,200
Glycerin	0	1,218,526	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800	1,248,800
Small Producer Tax Credit	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	88,233,855	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000	90,426,000
Production & Operating Expenses											
Feedstocks	0	52,063,030	52,063,030	52,063,030	52,063,030	52,063,030	52,063,030	52,063,030	52,063,030	52,063,030	52,063,030
Chemicals & Catalysts	0	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000	5,040,000
Management and procurement fees	0	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000	1,875,000
Natural Gas	0	593,321	593,321	593,321	593,321	593,321	593,321	593,321	593,321	593,321	593,321
Electricity (Standby Charge)	0	102,816	102,816	102,816	102,816	102,816	102,816	102,816	102,816	102,816	102,816
Makeup Water	0	14,008	14,008	14,008	14,008	14,008	14,008	14,008	14,008	14,008	14,008
Wastewater Disposal	0	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004	7,004
Direct Labor & Benefits	61,125	307,875	307,875	307,875	307,875	307,875	307,875	307,875	307,875	307,875	307,875
Total Production Costs	61,125	60,003,054	60,003,054	60,003,054	60,003,054	60,003,054	60,003,054	60,003,054	60,003,054	60,003,054	60,003,054
Gross Profit	-61,125	28,230,800	30,422,946	30,422,946	30,422,946	30,422,946	30,422,946	30,422,946	30,422,946	30,422,946	30,422,946
Administrative & Operating Expenses											
Maintenance Materials & Services	0	818,205	818,205	818,205	818,205	818,205	818,205	818,205	818,205	818,205	818,205
Repairs & Maintenance - Wages & Benefits	23,396	115,750	115,750	115,750	115,750	115,750	115,750	115,750	115,750	115,750	115,750
Consulting Services	180,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Property Taxes & Insurance	116,025	580,125	547,014	514,539	482,039	449,514	458,660	462,118	459,171	449,810	449,612
Admin. Salaries, Wages & Benefits	100,396	200,875	200,875	200,875	200,875	200,875	200,875	200,875	200,875	200,875	200,875
Legal & Accounting/Community Affairs	137,000	11,417	11,417	11,417	11,417	11,417	11,417	11,417	11,417	11,417	11,417
Office/Lab Supplies & Expenses	245,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
Travel, Training & Miscellaneous	99,742	6,725	6,725	6,725	6,725	6,725	6,725	6,725	6,725	6,725	6,725
EBITDA	-962,683	26,461,704	28,686,960	28,719,435	28,751,935	28,784,461	28,775,314	28,771,856	28,774,804	28,784,164	28,784,362
Less:											
Interest - Operating Line of Credit	0	0	0	0	0	0	0	0	0	0	0
Interest - Senior Debt	0	3,591,596	3,342,374	3,069,774	2,771,602	2,445,460	2,088,722	1,698,521	1,271,716	804,874	294,238
Interest - Subordinated Debt	0	0	0	0	0	0	0	0	0	0	0
Depreciation & Amortization	0	3,436,100	3,438,600	3,441,100	3,443,600	3,446,100	3,377,600	3,380,100	3,382,600	2,346,219	2,348,719

US Cellulosic Ethanol

Apec Cellulosic Production Cost Assessment
Production Assumptions

Nameplate Denatured Fuel Ethanol (gal/year)	20,000,000
Anhydrous Ethanol Production (gal/year)	19,047,619
Operating Days Per Year	350

Projected Biofuel Production Costs
$2.27

Feedstock ($/gal)	$0.66	130,374,040	
Capital Cost ($/gal)	$0.93	$182,951,850	***Includes**
Chemicals / Enzymes	$0.76	150,476,190	**interest**
Coproduct Credits	-$0.47		**payments**
Energy / Utility	$0.08	-77,029,546	
Operations / Maintenance	$0.31	60,370,549	

Product Yields & Energy Consumption	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations	Annual Escalation
Ethanol Production Increase Over Previous Year	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Anhydrous Ethanol Yield (gal/dry ton)	86.50	86.50	86.50	86.50	86.50	86.50	86.50	86.50	86.50	86.50	
Denatured Ethanol Sold (gal/year)	17,042,857	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	
Ethanol Price ($/gal)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	0.00%
Ethanol Sales Commission (% of Ethanol Price)	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	1.000%	0.00%
Ethanol Transportation ($/gal)	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	0.00%
Feedstock Usage (ton/year)	214,087	244,671	244,671	244,671	244,671	244,671	244,671	244,671	244,671	244,671	
Feedstock Moisture Content (%)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	
Feedstock Usage (dry ton/year)	192,678	220,204	220,204	220,204	220,204	220,204	220,204	220,204	220,204	220,204	
Feedstock Price ($/ton)	$53.96	$53.96	$53.96	$53.96	$53.96	$53.96	$53.96	$53.96	$53.96	$53.96	0.00%
Feedstock Price ($/dry ton)	$59.96	$59.96	$59.96	$59.96	$59.96	$59.96	$59.96	$59.96	$59.96	$59.96	0.00%
Electricity Use (kWh/ton)	-618.243	-540.963	-540.963	-540.963	-540.963	-540.963	-540.963	-540.963	-540.963	-540.963	
Annual Electricity Use (million kWh/year)	-132.358	-132.358	-132.358	-132.358	-132.358	-132.358	-132.358	-132.358	-132.358	-132.358	
Electricity Price ($/kWh)	$0.0699	$0.0699	$0.0699	$0.0699	$0.0699	$0.0699	$0.0699	$0.0699	$0.0699	$0.0699	0.00%
Fresh Water Use (1000 gal/ton)	0.544	0.544	0.544	0.544	0.544	0.544	0.544	0.544	0.544	0.544	
Annual Fresh Water Use (1000 gal/year)	104,895	119,880	119,880	119,880	119,880	119,880	119,880	119,880	119,880	119,880	
Fresh Water Price ($/1000 gal)	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	0.00%

Apec Cellulosic Production Cost Assessment
Production Assumptions, continued

	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations	Annual Escalation
Effluent Water Disposal (1000 gal/ton)	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	
Annual Effluent Water Disposal (1000 gal/year)	10,490	11,988	11,988	11,988	11,988	11,988	11,988	11,988	11,988	11,988	
Effluent Water Disposal Price ($/1000 gal)	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	0.00%
Denaturant Use (% of ethanol sold)	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	5.000%	
Annual Denaturant Use (gal/year)	925,926	1,058,201	1,058,201	1,058,201	1,058,201	1,058,201	1,058,201	1,058,201	1,058,201	1,058,201	
Denaturant Price ($/gal)	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	0.00%
Chemicals & Enzymes Cost ($/gal ethanol)	$0.8000	$0.8000	$0.8000	$0.8000	$0.8000	$0.8000	$0.8000	$0.8000	$0.8000	$0.8000	0.00%
Number of Employees	33	33	33	33	33	33	33	33	33	33	
Average Salary Including Benefits	$55,833	$55,833	$55,833	$55,833	$55,833	$55,833	$55,833	$55,833	$55,833	$55,833	0.00%
Maintenance Materials & Services (% of Capital Equipr	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	2.000%	0.00%
Property Tax & Insurance (% of Depreciated Property, F	1.300%	1.300%	1.300%	1.300%	1.300%	1.300%	1.300%	1.300%	1.300%	1.300%	0.00%
Inflation for all other Administrative Expense Categories											0.00%

Financial Assumptions

USE OF FUNDS:	
Project Engineering & Construction Costs	
EPC Contract	$121,125,258
Site Development	$1,475,000
Rail	$1,602,500
Barge Unloading	$0
Additional Grain Storage	$0
Contingency	$4,200,000
Total Engineering and Construction Cost	$128,402,758
Development and Start-up Costs	
Inventory - Feedstock	$339,000
Inventory - Chemicals, Yeast, Denaturant	$914,000
Inventory - Spare Parts	$300,000
Start-up Costs	$1,350,000
Land	$300,000
Fire Protection & Potable Water	$1,310,000
Administration Building & Office Equipment	$440,000
Insurance & Performance Bond	$325,000
Rolling Stock & Shop Equipment	$480,000
Organizational Costs & Permits	$1,259,000
Capitalized Interest & Financing Costs	$2,428,000
Working Capital/Risk Management	$5,381,253
Total Development Costs	$14,826,253
TOTAL USES	**$143,229,010**

SOURCE OF FUNDS:		
Senior Debt		
Principal	$85,937,406	60.00%
Interest Rate	8.00%	fixed
Lender and Misc. Fees	$859,374	1.000%
Placement Fees	$0	0.000%
Amortization Period	10	years
Cash Sweep	0.000%	
Subordinate Debt		
Principal	$0	0.00%
Interest Rate	9.00%	interest only
Lender Fees	$0	0.000%
Placement Fees	$0	1.500%
Amortization Period	10	years
Equity Investment		
Total Equity Amount	$57,291,604	40.00%
Placement Fees	$0	0.000%
Common Equity	$57,291,604	100.000%
Preferred Equity	$0	0.000%
Grants		
Amount	$0	0.00%
TOTAL SOURCES	**$143,229,010**	

Investment Activities	
Income Tax Rate	0.00%
Investment Interest	3.00%
Operating Line Interest	8.00%
State Producer Payment	
Producer payment, $/gal	$0.000
Estimated annual payment	$0
Incentive duration, years	5
Other Incentive Payments	
Small Producer Tax Credit	No
% of CCC Payment	0%

Plant Operating Rate	
Month	% of Nameplate
13	0.0%
14	50.0%
15	100.0%
16	100.0%
17	100.0%
18	100.0%
19	100.0%
20	100.0%
21	100.0%
22	100.0%
23	100.0%
24	100.0%

Accounts Payable, Receivable & Inventories	Receivable (# Days)	Payable (# Days)	Inventories (# Days)
Fuel Ethanol	14		8
Coproducts	14		8
Denaturants		10	15
Chemicals & Enzymes		15	20
Feedstock		10	10
Utilities		15	

Apec Cellulosic Production Cost Assessment
Proforma Balance Sheet

	Construction (Year 0)	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations
ASSETS											
Current Assets:											
Cash & Cash Equivalents	0	18,531,312	37,839,751	57,329,350	76,917,874	96,604,275	116,387,748	136,268,811	156,245,701	176,318,082	196,485,683
Accounts Receivable - Trade	0	2,310,000	2,376,000	2,376,000	2,376,000	2,376,000	2,376,000	2,376,000	2,376,000	2,376,000	2,376,000
Inventories											
Feedstock	0	330,061	377,212	377,212	377,212	377,212	377,212	377,212	377,212	377,212	377,212
Chemicals, Enzymes & Yeast	0	914,000	870,748	870,748	870,748	870,748	870,748	870,748	870,748	870,748	870,748
Denaturant	0	61,224	61,224	61,224	61,224	61,224	61,224	61,224	61,224	61,224	61,224
Finished Product Inventory	0	410,053	496,586	496,586	496,586	496,586	496,586	496,586	496,586	496,586	496,586
Spare Parts	0	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Total Inventories	0	2,015,338	2,105,772	2,105,772	2,105,772	2,105,772	2,105,772	2,105,772	2,105,772	2,105,772	2,105,772
Prepaid Expenses	0	0	0	0	0	0	0	0	0	0	0
Other Current Assets	0	0	0	0	0	0	0	0	0	0	0
Total Current Assets	0	22,856,650	42,321,523	61,811,122	81,399,646	101,086,046	120,869,520	140,750,582	160,727,473	180,799,854	200,967,454
Land	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Property, Plant & Equipment											
Property, Plant & Equipment, at cost	116,837,482	130,632,758	131,105,414	131,578,069	132,050,725	132,523,381	132,996,037	133,468,692	133,941,348	134,414,004	134,886,660
Less Accumulated Depreciation & Amortization	0	8,594,931	16,785,224	24,867,474	32,869,081	40,808,921	48,788,406	56,632,433	64,450,516	72,247,774	80,028,963
Net Property, Plant & Equipment	116,837,482	122,037,827	114,320,190	106,710,595	99,181,644	91,714,460	84,207,631	76,836,260	69,490,832	62,166,230	54,857,697
Capitalized Fees & Interest	2,117,193	3,120,410	2,808,369	2,496,328	2,184,287	1,872,246	1,560,205	1,248,164	936,123	624,082	312,041
Total Assets	119,254,675	148,314,887	159,750,081	171,318,044	183,065,576	194,972,752	206,937,355	219,135,006	231,454,428	243,890,165	256,437,192
LIABILITIES & EQUITIES											
Current Liabilities:											
Accounts Payable	0	604,105	679,707	679,707	679,707	679,707	679,707	679,707	679,707	679,707	679,707
Notes Payable	0	0	0	0	0	0	0	0	0	0	0
Current Maturities of Senior Debt (incl. sweeps)	0	6,347,437	6,870,670	7,437,034	8,050,085	8,713,671	9,431,958	10,209,454	11,051,042	11,962,003	0
Current Maturities of Working Capital	0	0	0	0	0	0	0	0	0	0	0
Total Current Liabilities	0	6,951,543	7,550,378	8,116,742	8,729,793	9,393,379	10,111,665	10,889,162	11,730,749	12,641,711	679,707
Senior Debt (excluding current maturities)	64,121,841	73,725,918	66,855,248	59,418,214	51,368,128	42,654,457	33,222,499	23,013,045	11,962,003	0	0
Working Capital (excluding current maturities)	0	0	0	0	0	0	0	0	0	0	0
Deferred Income Taxes	0	0	0	0	0	0	0	0	0	0	0
Total Liabilities	64,121,841	80,677,461	74,405,626	67,534,955	60,097,921	52,047,836	43,334,165	33,902,207	23,692,752	12,641,711	679,707
Capital Units & Equities											
Common Equity	57,291,604	57,291,604	57,291,604	57,291,604	57,291,604	57,291,604	57,291,604	57,291,604	57,291,604	57,291,604	57,291,604
Preferred Equity	0	0	0	0	0	0	0	0	0	0	0
Grants (capital improvements)	0	0	0	0	0	0	0	0	0	0	0
Distribution to Shareholders	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-2,158,770	10,345,822	28,052,851	46,491,485	65,676,051	85,633,312	106,311,586	127,941,195	150,470,071	173,956,850	198,465,880
Total Capital Shares & Equities	55,132,834	67,637,426	85,344,455	103,783,089	122,967,655	142,924,916	163,603,191	185,232,799	207,761,676	231,248,455	255,757,485
Total Liabilities & Equities	119,254,675	148,314,887	159,750,081	171,318,044	183,065,576	194,972,752	206,937,355	219,135,006	231,454,428	243,890,165	256,437,192

Apec Cellulosic Production Cost Assessment
Proforma Income Statement

	Construction (Year 0)	1st Year Operations	2nd Year Operations	3rd Year Operations	4th Year Operations	5th Year Operations	6th Year Operations	7th Year Operations	8th Year Operations	9th Year Operations	10th Year Operations
Revenue											
Ethanol	0	50,617,286	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000
Gypsum	0	0	0	0	0	0	0	0	0	0	0
Carbon Dioxide	0	0	0	0	0	0	0	0	0	0	0
Cellulosic Producer Tax Credit	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	50,617,286	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000	59,400,000
Production & Operating Expenses											
Feedstocks	0	11,552,130	13,202,434	13,202,434	13,202,434	13,202,434	13,202,434	13,202,434	13,202,434	13,202,434	13,202,434
Chemicals, Enzymes & Yeast	0	13,333,333	15,238,095	15,238,095	15,238,095	15,238,095	15,238,095	15,238,095	15,238,095	15,238,095	15,238,095
Natural Gas	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	-9,251,805	-9,251,805	-9,251,805	-9,251,805	-9,251,805	-9,251,805	-9,251,805	-9,251,805	-9,251,805	-9,251,805
Denaturants	0	1,278,214	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Makeup Water	0	52,448	59,940	59,940	59,940	59,940	59,940	59,940	59,940	59,940	59,940
Wastewater Disposal	0	10,490	11,988	11,988	11,988	11,988	11,988	11,988	11,988	11,988	11,988
Direct Labor & Benefits	160,833	965,000	965,000	965,000	965,000	965,000	965,000	965,000	965,000	965,000	965,000
Total Production Costs	160,833	17,939,810	21,725,653	21,725,653	21,725,653	21,725,653	21,725,653	21,725,653	21,725,653	21,725,653	21,725,653
Gross Profit	-160,833	32,677,476	37,674,347	37,674,347	37,674,347	37,674,347	37,674,347	37,674,347	37,674,347	37,674,347	37,674,347
Administrative & Operating Expenses											
Maintenance Materials & Services	0	2,119,692	2,422,505	2,422,505	2,422,505	2,422,505	2,422,505	2,422,505	2,422,505	2,422,505	2,422,505
Repairs & Maintenance - Wages & Benefits	43,104	320,500	320,500	320,500	320,500	320,500	320,500	320,500	320,500	320,500	320,500
Consulting, Management and Bank Fees	0	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Property Taxes & Insurance	304,557	1,522,787	1,590,392	1,490,062	1,391,138	1,293,261	1,196,188	1,098,599	1,002,771	907,281	812,061
Admin. Salaries, Wages & Benefits	290,875	557,000	557,000	557,000	557,000	557,000	557,000	557,000	557,000	557,000	557,000
Legal & Accounting/Community Affairs	1,109,000	84,000	84,000	84,000	84,000	84,000	84,000	84,000	84,000	84,000	84,000
Office/Lab Supplies & Expenses	50,400	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Travel, Training & Miscellaneous	200,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Total Administrative & Operating Expenses	1,997,937	4,875,979	5,246,397	5,146,068	5,047,143	4,949,267	4,852,193	4,754,604	4,658,777	4,563,286	4,468,066
EBITDA	-2,158,770	27,801,497	32,427,950	32,528,280	32,627,204	32,725,081	32,822,154	32,919,743	33,015,571	33,111,061	33,206,281
Less:											
Interest - Operating Line of Credit	0	0	0	0	0	0	0	0	0	0	0
Interest - Senior Debt	0	6,701,974	6,218,587	5,695,354	5,128,990	4,515,939	3,852,354	3,134,067	2,356,570	1,514,983	604,021
Interest - Working Capital	0	0	0	0	0	0	0	0	0	0	0
Depreciation & Amortization	0	8,594,931	8,502,334	8,394,291	8,313,648	8,251,880	8,291,526	8,156,068	8,130,124	8,109,299	8,093,230
Pre-Tax Income	-2,158,770	12,504,592	17,707,029	18,438,634	19,184,566	19,957,261	20,678,275	21,629,608	22,528,877	23,486,779	24,509,030
Current Income Taxes	0	0	0	0	0	0	0	0	0	0	0
Net Earnings (Loss) for the Year	-2,158,770	12,504,592	17,707,029	18,438,634	19,184,566	19,957,261	20,678,275	21,629,608	22,528,877	23,486,779	24,509,030
Pre-Tax Return on Investment	-3.8%	21.8%	30.9%	32.2%	33.5%	34.8%	36.1%	37.8%	39.3%	41.0%	42.8%
11-Year Average Annual Pre-Tax ROI	31.5%										