PRODUCTION OF BIO-OIL FROM EMPTY FRUIT BUNCH (EFB) VIA PYROLYSIS PROCESS

MUHAMMAD SUHAIMI BIN MAN

MASTER OF CHEMICAL ENGINEERING WITH ENTREPRENEURSHIP

UNIVERSITY MALAYSIA PAHANG

SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the Master of Chemical Engineering and Entrepreneurship.

Signature	:	
Name of Supervisor	:	DR. RUZINAH ISHA
Position	:	SUPERVISOR
Date	:	AUGUST 2013

STUDENT'S DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

Signature	:	
Name	:	MUHAMMAD SUHAIMI BIN MAN
ID Number	:	KKE12014
Date	:	AUGUST 2013

ACKNOWLEDGEMENTS

I am grateful and would like to express my sincere gratitude to my supervisor Dr. Ruzinah Isha for her germinal ideas, invaluable guidance, continuous encouragement and constant support in making this research possible. She has always impressed me with his outstanding professional conduct, his strong conviction for science, and his belief that a master program is only a start of a life-long learning experience. I appreciate his consistent support from the first day I applied to graduate program to these concluding moments. I am truly grateful for his progressive vision about my training in science, his tolerance of my naïve mistakes, and his commitment to my future career. I also sincerely thanks for the time spent proofreading and correcting my many mistakes.

My sincere thanks go to all my labmates and members of the Faculty of Chemical and Natural Resources Engineering, UMP, who helped me in many ways and made my stay at UMP pleasant and unforgettable. Many special thanks go to member engine research group for their excellent co-operation, inspirations and supports during this study.

I acknowledge my sincere indebtedness and gratitude to my parents for their love, dream and sacrifice throughout my life. I cannot find the appropriate words that could properly describe my appreciation for their devotion, support and faith in my ability to attain my goals. Special thanks should be given to my committee members. I would like to acknowledge their comments and suggestions, which was crucial for the successful completion of this study.

EXECUTIVE SUMMARY

The world needs to transition from its current unsustainable energy paradigm to a future powered by entirely renewable energy supply. Only by making such a transition will we be able to avoid the very worst impacts of climate change. We have a lot of EFB produce in Malaysia and it is keep increasing throughout the year. The solution is by recycling the EFB as a raw material for Bio Oil.From the need we see the opportunity to do the bisness. So now we see the market survey of bio oil as a renewable energy. Energy from renewable resources can be increased from 10% today to 30% by 2050. World energy consumption 2005 is 240 Million Barrels of Oil Equivalent which is Biomass covered 10%.World energy consumption in 2050 around 380 Million Barrels of Oil Equivalent and Biomass covered 30%.The market for this industry is large in the future. Then we look to the process in producing of bio oil from Empty Fruit Bunch (EFB). In flash pyrolysis process, the biomass – Empty Fruit Bunches (EFB) was heating in the absence of air or O_2 at pyrolysis temperature. The initial products of pyrolysis were comprised of condensable gases and solid char. Then the condensable gases would breaking down further into noncondensable gases which were consisted of pyrolysis gases (CO, CO_2, CH_4 and NH_3), liquid (Bio Oil) and solid (Bio Char). The selected process had been discussed which included the raw material (EFB) availability in Malaysia, market survey from certain regions, justification of the pyrolysis process, plant feasibility, the suggested location and plant layout. Besides that the feasibility of the plant was analysed from the economic perspective. The economic evaluations which included the cost of major equipments utility cost and other costs are estimated. For the sale forecast we can see that the production unit of Bio Oil is 250 ton/month for first year. The revenue that we get for every month in first year is RM710, 250. Total revenue for first year is RM7, 102,500. For the second year, we increase the unit sale by 25% from the previous year which is 313 ton/month. Revenue for the first month is RM887813 and total annual revenue for second year is RM10, 653,750. In year three, after increase 25% the unit sale is 391 ton/month. Revenue for the first month is RM1,110,831 and total annual revenue for second year is RM13,329,972.In 4^{th} and 5^{th} years the total annual revenue are RM 16,670,988 and RM 20,830,212 respectively. For profit and lost

statement, there was no production in the first two month in year one due to startup period. The net profit in 1st, 2nd and 3rd year is RM 343,565, RM 1,114,669 and RM 1,663,204 continuously. For the 4^{th} and 5^{th} years total net profit is RM 2,391,698 and RM3, 305,567 respectively. Then cash flow shows a positive value from starting year until the 5^{th} year. It means the company does not need any external funding for continuing the business. Lastly in financial part is balance sheet. From the beginning until year five, total asset is same with liability and equity. The total Asset for the first year is RM 2,343,566. Total Asset for 2nd year is RM 3,158,241. Total Asset for 3rd year is RM 4,521,440.Total asset for 4^{th} and 5^{th} year is RM 6,613,138 and RM 9,618,705 respectively. For the capital requirement, after doing all the detail expanses in this plant, the total amount that required in this business is around RM2.3 million. From this amount, I will make loan from Bank Negara Malaysia is RM2 million. The balance from the amount we can get from the owners and investor around RM300, 000.So the total capital we get is around RM2.3 million. The payback period we can get in year 2.So as a conclusion this business is feasible to run.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

ha	Hectares
Kg	Kilogram
%	Percentage
MT	Metric Tonne
mL	Millilitre
GWh	Gigawatt hours
GJ/t	Gigajoule/tonne
TWh	Terawatt Hours
MW	Megawatts
T	Tonne

LIST OF ABBREVIATIONS

MPOB	Malaysian Palm Oil Board
FFB	Fresh Fruit Brunch
RM	Ringgit Malaysia
FELDA	Federal Land Development Authority
FELCRA	Federal Land Consolidation and Rehabilitation Authority
CEO	Chief Executive Officer
EFB	Empty Fruit Bunches
RTP	Rapid Thermal Process
UOP	Universal Oil Products
CO_2	Carbon Dioxide
EU	European Union
PJ	Petajoule
HFO	Heavy Fuel Oil
COGS	Cost Of Goods Sold
ROA	Return on Assets
ROE	Return on Equity

CHAPTER 1

INTRODUCTION

1.1 INDUSTRIAL OVERVIEW

Bio Oil is the final result of the flash pyrolysis process of organic material. For the process all different types of organic waste materials can be used as well. It is a source of green energy due to the fact that Bio Oil is derived from renewable biomass as stated by Kyoto Agreement. Depending on the type of biomass, Bio Oil has a calorific value approximately half of diesel fuel.

Bio-oil is dark-brown liquid oil that contains high density oxygenated liquid that can be used as a substitute for liquid fossil fuels. Otherwise, it can be burned in diesel engines, turbines or boilers and can be used for the production of speciality chemicals, which currently mainly flavourings.

Pyrolysis decomposes the biomass primarily to produce both condensable gas (vapour) and noncondensable gas (primary gas). The vapour is consisted of heavier molecules. Then it is condensed upon cooling while the noncondensable gases mixture contains lower-molecular-weight gases like CO_2, CO, CH_4, C_2H_6 and C_2H_4. These gases

not condense upon cooling. The lower heating rate of primary gases is typically 11 MJ/Nm3 (P. Basu, 2010).

One of the products that produce in the pyrolysis process is char. Char is the dark grey solid mostly full with carbon which is 85%. It can also consist of oxygen and hydrogen. In fact, the lower heating rate of biomass is about 32 MJ/kg (Diebold and Bridgewater, 1997).

1.2 MARKET OVERVIEW

1.2.1 Global Biofuels Consumption

We are relating the global biofuels consumption with the production of bio oil in a way that bio oil acts not as an end-product but a bio-based raw material. The bio oil can be further processed into desired products like specialty chemicals, transportation fuels and also being used to generate electricity.

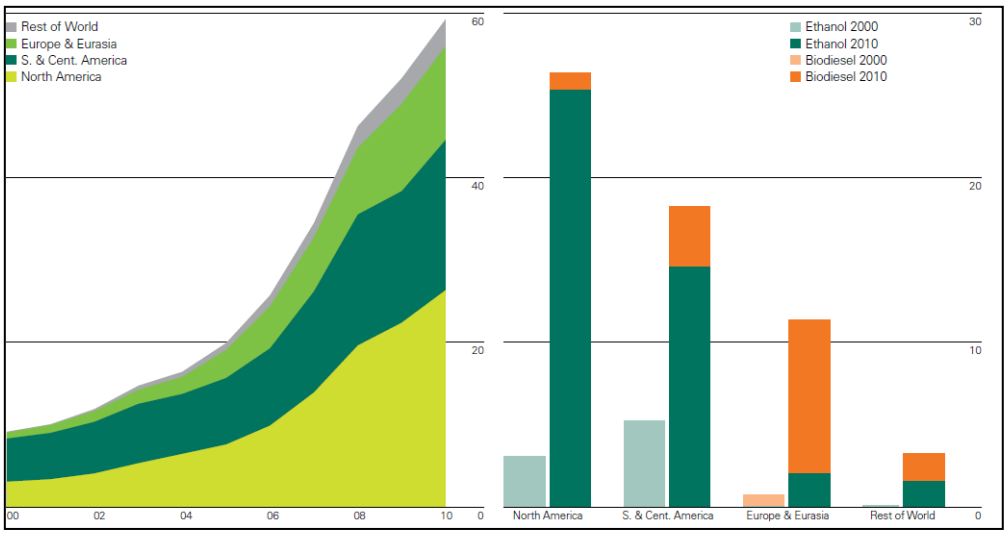

Figure 1.1: World Biofuels Production (Million Tonnes Equivalent)

(http://www.bp.com, accessed November)

Based on the figure 1.1, world biofuels production grew by 13.8% in 2010; biofuels accounted for 0.5% of global primary energy consumption. Growth was driven by North America (+17.7%) and South and Central America (+14.2%); these two regions accounted for three-quarters of global biofuels production. Ethanol accounts for nearly three-quarters of global biofuels production, and is dominant in North America and South and Central America; biodiesel is dominant in Europe and Eurasia. It can be concluded that the size of a country itself does affect the amount of biofuels produced to be consumed worldwide. Bigger countries obviously have more industrial activities thus involve more energy consumption than small countries.

1.3 RESOURCES AND RAW MATERIALS

The raw material which is going to be used in the production is the Empty Fruit Bunches (EFB) from the palm oil industry. Looking into the palm oil industry in Malaysia, the total oil palm planted area in the country currently is 4.98 million hectares in 2010.

Sabah is still the largest oil palm planted state, accounting for 1.4 million hectares, followed by Sarawak with 1.0 million hectares. While the remaining 2.55 million hectares of total oil palm planted area is in Peninsular Malaysia which was illustrated in Table 1.1 and Figure 1.2 (MPOB, 2011).

Table 1.1: Oil Palm Planted As At September 2011

Region	**Mature(ha)**	**%**	**Immature(ha)**	**%**	**Total(ha)**	**%**
Pennisular Malaysia	2,200,344	86.5	344,727	13.5	2,545,071	51.2
Sabah	1,271,480	89.3	152,173	10.7	1,423,653	28.6
Sarawak	792,537	78.7	214,513	21.3	1,007,050	20.2
Malaysia	**4,264,361**	**85.7**	**711,413**	**14.3**	**4,975,774**	**100.00**

Source: MPOB homepage at www.mpob.gov.my, accessed October 2011

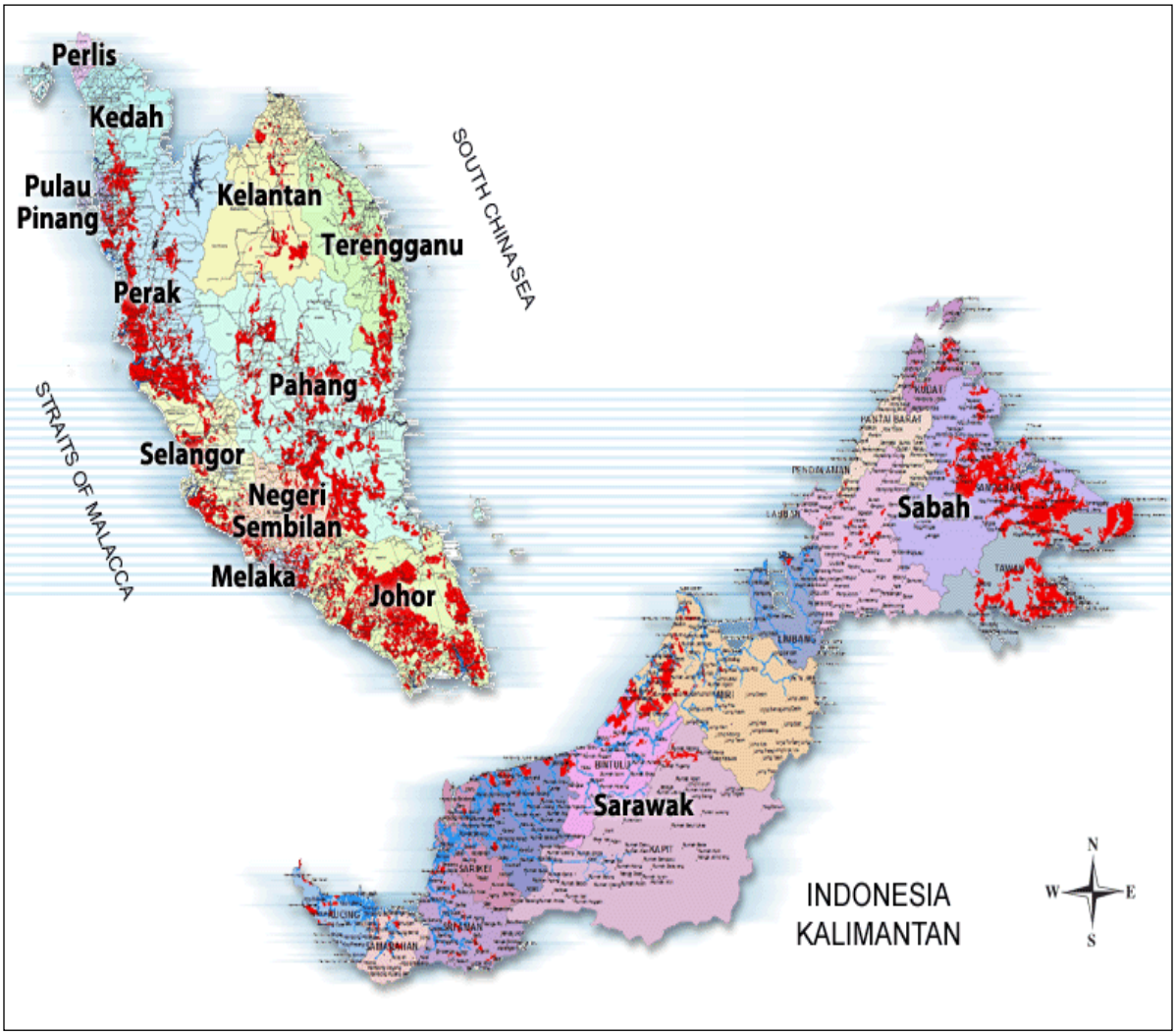

Figure 1.2: Distribution of palm oil plantations in Malaysia.

(Note: Plantation areas are shown in red (colour version) or dark grey (black and white version)) Source: MPOB homepage at www.mpob.gov.my, accessed October 2011)

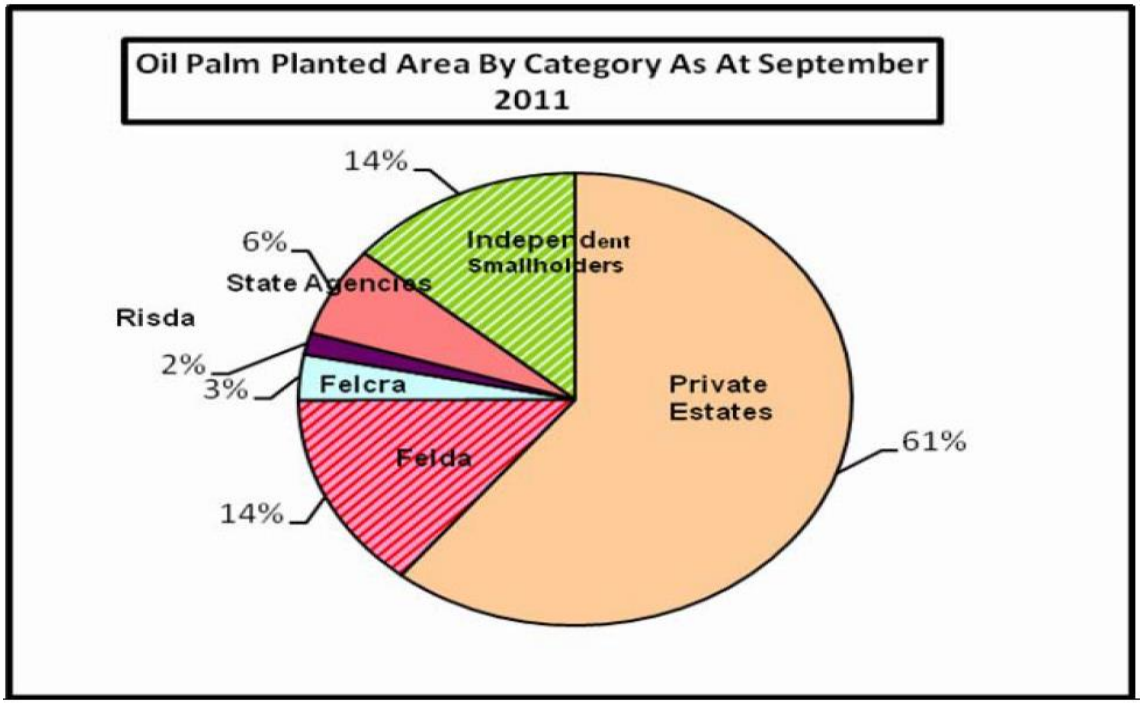

Figure 1.3: Oil Palm Planted Area by Category as At September 2011

(Source: MPOB homepage at www.mpob.gov.my, accessed October 2011)

As per pie chart in Figure 1.3, there are three main sources of palm oil fruits (commonly referred as Fresh Fruit Brunch – FFB). These are large estate owners, farmers in land development scheme such as FELDA/FELCRA as well as independent small holders. Fruits from large estates and land development scheme are processed in their own palm oil mills. Meanwhile the fruits from smallholders are usually sold to independent palm oil mills which have no plantation or one with limited size. Of all these mill owners, the independent palm oil millers are the ones that would have waste management issues in term of handling empty fruit bunches (EFB).

According to the latest recorded amount of palm mills operating throughout Malaysia, there are a total of 420 palm oil mills (see Table 1.2) catering the milling of the Fresh Fruit Bunches (FFB) produced by from these 4.98 million hectares of plantations (Abdullah and Gerhauser, 2007).

Table 1.2: Number and Capacities of Palm Oil Sectors September 2011 (tonnes/year)

Sector	P. Malaysia		Sabah		Sarawak		Malaysia	
	No	Capacity In Operation	No	Capacity In Operation	No	Capacity In Operation	No	Capacity In Operation
FFB Mills	245	55,413,200	123	31,593,200	52	11,800,000	420	98,806,400
PK Crushers	26	3,952,800	13	2,273,200	4	583,200	43	6,809,200
Refineries	36	14,066,400	12	6,879,800	5	2,242,000	53	23,188,200
Oleochemicals	17	2,598,971	-	-	-	-	17	2,598,971

(Source: MPOB homepage at www.mpob.gov.my, accessed October 2011)

Malaysia produces 19.86 million metric tonnes of empty fruit bunches (EFB), 10.36 million metric tonnes of mesocarp and 4.32 million metric tonnes of shells average annually in the last 3 years (MPOB, 2011). These palm oil wastes are currently under-utilized and a large amount of it is either thrown away or mulched in the estates. Biomass is expected to generate incremental earnings for the planters. One metric tonne of FFB can produce approximately 23% of EFB, 12% of mesocarp and 5% of shells (Abdullah and Gerhauser, 2007).

CHAPTER 2

MARKET ANALYSIS

2.1 INTERNATIONAL/REGIONAL/LOCAL INDUSTRY DESCRIPTION

2.1.1 Current Pyrolysis Oil Production

Today, pyrolysis oil can be used for a range of applications which includes heat, power, transportation fuel and chemical.

Current focus for pyrolysis oil application is on small or large-scale combustion in natural gas, coal or heating oil fired boilers, furnaces and turbines. These systems are usually found in power plants where electricity, heat and steam are produced. Boilers, furnaces and turbines are also found at large industrial companies to foresee in their need for electricity, heat and steam themselves.

Canada is regarded as a leader in pyrolysis oil technology and development (Dominov, 2009). This is followed by current developments of other pyrolysis plants outside of Canada. Below is the list of existing and operating pyrolysis plants including in Malaysia is as follow:

i. DynaMotive Energy Systems (Ontario,Canada)

   a. World's Largest Pyrolysis Plant (200 tonnes/day) in Guelph (Shuit, 2009)

   b. Pyrolysis Plant in West Lorne, Ontario, Canada (130 tonnes/day) (Shuit, 2009)

ii. Premium Renewable Energy (Malaysia) SdnBhd

   a. A partner of Ensyn Technologies, Canada

   b. Using Ensyn's proven "Rapid Thermal Process" (RTP) technology to convert oil palm biomass to pyrolysis oil

   c. First RTP bio-oil plant in Malaysia

iii. Tolko Industries (High Level, Alberta) (Shuit, 2009)

   a. 400 tonnes/day RTP processing wood residues

   b. Outputs: electricity, heat, resins

   c. RTP + stationary diesel

   d. Engineering underway by UOP

   e. Ground-breaking end 2011

iv. Industria e Innovazione (Tuscany, Italy) (Shuit, 2009)

   a. Coll'Energia

   b. 150 tonnes/day RTP processing forest thinnings

   c. Outputs: electricity

   d. RTP + stationary diesel

   e. Engineering underway by UOP

   f. Ground-breaking 3rd Quarter of 2011

2.1.2 Assessment of Commercializing Bio-Oil in European Market

A 2004 analysis illustrates broad categories of uses for pyrolysis oil, shown in Figure 2.1. Pyrolysis oil ultimately has a whole suite of potential markets. Currently, applications are limited to the production of heat and power, while after some additional research pyrolysis oil will be a feedstock for transportation fuels and chemicals.

Pyrolysis oil is a suitable boiler fuel as long as it has consistent characteristics, provides acceptable emissions levels, and is economically feasible. An obvious choice is district heating to replace heavy fuel oil and gas. Other heat applications include greenhouses and sawmill dry kilns. Pyrolysis oil can replace natural gas in gas power stations, and since most of these stations have multi-fuel capability, it can be used as a back-up fuel also. Pyrolysis oil should also be able to co-fire in large coal power plants, though the results of such tests are not complete. Pyrolysis oil can also replace diesel in stationary industrial engines, but not in transportation owing to the requirement for fuel heating and specialized storage. Pyrolysis oil can be used in small turbines to make power, such as in remote, off-grid locations, but also in locations where there is sufficient biomass.

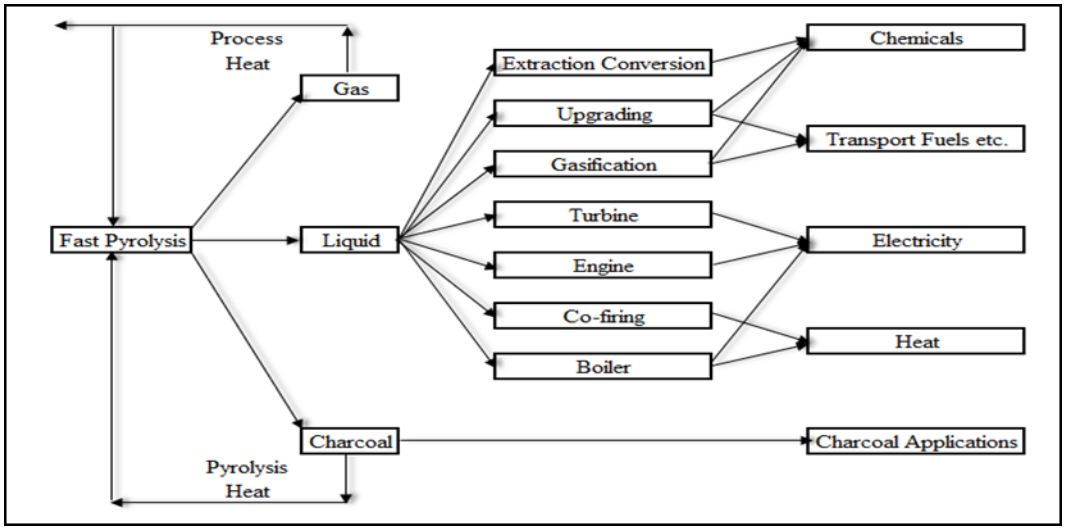

Figure 2.1: Uses of Fast Pyrolysis Product

According to Bradley (2006), there are nine potential markets in Europe that should consider bio-oil from pyrolysis process as a replacement for current fuel used:

a) Pulp Mill Lime Kilns

b) District Heating

c) Power Plants- Co-firing and Alternative Fuels

d) Greenhouses

e) Industrial Boilers

f) Industrial Diesel Engines

g) Turbines for Small Scale Power Blending with Diesel

h) Synfuel for Transportation Fuels

Focus of market survey is done more on pulp lime kiln industry and power plants in Europe.

2.1.2.1 Pulp Lime Kiln

The limekiln market is ideal for pyrolysis oil, since CO_2 neutral pyrolysis oil can be used with very little modification to burning systems. Limekilns use both oil and natural gas in both Finland and Canada, depending on fuel distribution systems and price. Tall oil, also used as a fuel in limekilns, can be directly replaced with Bio-Oil with no modifications to the system. Table 1.9 summarizes fuel use in limekilns in EU 25 plus Norway in 2005. 64% of EU pulp production is in Sweden and Finland, with a further 15% in Spain and Portugal.

Table 2.1: Fuel Consumption of Lime Sludge Reburning Kilns Europe (EU 25 + Norway) in 2005

Country	Bleached Pulp '000 t	Unbleached Pulp '000 t	Total '000 t	%	Fuel Consumption (PJ)	Bio Oil Potential 000 t	200 tpd Plants
Sweden	5,502	2,293	7,795	32.1	13.6	766	17
Finland	7,112	671	7,783	32.1	13.6	765	17
Portugal	286	1,555	1,841	7.6	3.2	181	4
Spain	1,540	240	1,780	7.3	3.1	175	4
France	946	434	1,380	5.7	2.4	136	3
Austria	331	496	827	3.4	1.4	81	2
Poland	360	431	791	3.3	1.4	78	2
Norway	384	169	553	2.3	1.0	54	1
Slovakia	402	0	402	1.7	0.7	40	1
Czeh Rep.	177	204	381	1.6	0.7	40	1
Belgium	360	0	360	1.5	0.6	35	1
Germany	310	0	310	1.3	0.5	30	1
Estonia	0	70	70	0.3	0.1	7	0
TOTAL	**17,710**	**6,563**	**24,274**		**42.5**	**2386**	**53**

Source: http://www.bioenergytrade.org, accessed November 2011

Sweden produces 7.8 million tonnes pulp annually, and limekilns consume 13.6 PJ of fuel, the equivalent of 766,000 tonnes bio-oil. Pulp mills have a number of options to fuel lime kilns (Shuit, 2009). Tall oil for example, a byproduct of the pulping process, is used in limekilns, but it is not believed that there is a surplus. Raw biomass or wood pellets are not used in lime kilns owing to carbon contamination. Direct gasification will be an option in the future, but this has not been proven economic at the commercial level yet.

Sweden and Finland have the greatest potential for substituting pyrolysis oil in limekilns, with 64% of European pulp production (Shuit, 2009). Limekilns generally are not able to burn raw biomass or pellets because of carbon contamination, so oil or natural gas is used.

Pyrolysis oil is a natural substitute and it has been tested, but it has to compete against alternatives, like palm oil, tall oil, and direct gasification of biomass. The price of palm oil fell briefly due to an oversupply situation in December 2005, but now it is again

expensive. A long-term price for palm oil is estimated at 80% of HFO, but if it is produced unsustainably then it may not be a competitive product to sustainable pyrolysis oil (Shuit, 2009).

Tall oil is a natural substitute in limekilns, but EU tall oil is being used elsewhere. Direct gasification of biomass is a possibility for the "pulp mill of the future", but it is not yet proven technology. In addition, the gaseous fuel cannot be transported but has to be used on site, so investing in gasification would only be viable if the pulp mill were large, new and competitive with third world pulp mills. Few northern pulp mills are in this category. So, limekilns should be excellent market pyrolysis oil.

2.1.2.2 Power Plants

Pyrolysis oil can be co-fired in oil plants, or in natural gas plants that are already configured to burn oil as an alternate, or with coal. Pyrolysis oil also can be used as a startup fuel or back up fuel for these facilities. As shown in Table 1.10, in 2003, 27% of European power production (860,000 GWh) was from coal, 19% from natural gas, and 5% from oil. At 38% efficiency, coal produces 2.9MWhe/t, thus 297 million tonnes coal was used to generate power. Even to replace 10% of the coal, 30 million tonnes, it would require approximately 45 million tonnes pyrolysis oil (17.8 GJ/t) or 28 million tonnes of char (28 GJ/t).

Table 2.2: Europe Electricity Production in 2003

Source of Power	Power Production			Efficiency		Fuel
	GW/h	%	GJ/tone	MWhe/t	%	MT
Coal	860,301	27	27	2.9	38	296.7
Oil	161,779	5	42	4.9	42	33.0
Natural Gas	605,992	19	50	7.6	55	79.7
Bio Mass	38.061	1				
All Other	1,530,530	48				
TOTAL	**3,196,663**					

Source: http://www.bioenergytrade.org, accessed November 2011

With 860 TWh of power from coal, 162 TWh from oil and 606 TWh from natural gas, substitution of pyrolysis oil or char for these fuels should be a huge market in Europe. Power plants are tied into emission reduction programs. To co-fire on average 10%, the 70 odd coal- fired power plants on coasts or inland waterways would need 4.7 million tonnes pyrolysis oil, or 2.9 million tonnes char, or some combination thereof. Assuming a similar proportion of oil power plants near coasts and 20% co-firing, oil plants would need 3.1 million tonnes pyrolysis oil. (Shuit, 2009).

Many natural gas power plants are configured already to run on alternate fuels. Netherlands has strongly supported co-firing, but budgeting and sustainability issues led to a drop in feed-in-tariffs for all fuels except pellets. It is surmised that current efforts to develop sustainability criteria, looming Kyoto targets, and proof of sustainability and operational performance of pyrolysis oil and char will result in a meaningful feed-in-tariff for these fuels.

Germany currently has considerable opposition to co-firing, and can be discounted as a major market thrust until pyrolysis production exceeds demand in other markets. Spain, Denmark and Finland are major users of coal for power, and should be early markets for competitive char and later pyrolysis oil if penalties for non-compliance on EU targets loom.

2.2 TARGET MARKET INFORMATION

Bio-oil can be used as a replacement for numerous applications where fuel oil is used, including fuelling space heaters, furnaces, and boilers. Additionally, these biofuels can be used to fuel some combustion turbines and reciprocating engines, and as a source to create several chemicals. If bio-oil is used without modification, care must be taken to prevent emissions of black carbon and other particulates. Syngas and bio-oil can also be "upgraded" to transportation fuels like biodiesel and gasoline substitutes. If biochar is used for the production of energy rather than as a soil amendment, it can be directly substituted for any application that uses coal. Pyrolysis also may be the most cost-effective way of producing electrical energy from biomaterial. Syngas can be burned directly, used as a fuel for gas engines and gas turbines, converted to clean diesel fuel through the Fischer–Tropsch process or potentially used in the production of methanol and hydrogen.

Bio-oil has a much higher energy density than the raw biomass material. Mobile pyrolysis units can be used to lower the costs of transportation of the biomass itself if the biochar is returned to the soil and the syngas stream is used to power the process. Bio-oil contains organic acids which are corrosive to steel containers, has a high water vapor content which is detrimental to ignition, and, unless carefully cleaned, contains some biochar particles which can block injectors. The greatest potential for bio-oil seems to be its use in a bio-refinery, where compounds that are valuable chemicals, pesticides, pharmaceuticals or food additives are first extracted, and the remainder is either upgraded to fuel or reformed to syngas.

2.2.1 Heat and Steam Production

Bio Oil is an effective substitute for light fuel oil, heavy fuel oil, or natural gas in industrial, commercial burners and boilers. This is relatively simple applications requiring modifications to fuel nozzles and handling systems. Other applications include industrial kilns, district heating, commercial heating systems, and other industrial energy systems.

2.2.2 Power Generation

Bio Oil can be effectively used in power generation, and combined heat and power applications. After the world's first commercial scale run of a gas turbine using Bio Oil produced from pyrolysis, Dynamotive and Magellan Aerospace jointly announced, in March 2004, that Bio Oil can effectively replace fossil fuels, including natural gas, in gas turbines for combined heat and power generation (Mohan, 2006).

2.2.3 Industrial fuel, Cogeneration

Commercial applications of Bio Oil as a clean burning fuel to replace natural gas, diesel and other liquid fossil fuels in the multi-billion dollar industrial boilers and kiln markets.

2.2.4 Boilers

Bio Oil is an effective substitute for diesel, heavy fuel oil, light fuel oil, or natural gas in essentially any type of boiler where these fuels are fired or contemplated to be fired. These are relatively simple applications requiring basic modifications limited mainly to fuel nozzles and transport systems.

2.2.5 Mobile Fuels

Bio Oil can be further refined to transport fuel quality by undergoing hydro-reforming and hydro-treatment processes.

2.2.6 Gasses

Pyrolysis gas oil is used as a fuel component for heating oil and as a component in vessel fuels. The pyrolysis gas is been used for the drying process by using the recycle steam and also can be used to heat the rotary kiln.

2.3 COMPETITOR EVALUATION

The bio-oils currently produced are suitable for use in boilers or in turbines designed to burn heavy oils for electricity generation. There is currently ongoing research and development to upgrade bio-oil into transportation fuels. There are many companies in the bio-oil business, including DynaMotive Energy Systems; Esyn Group; BTG Technology Group; ABRI TECH, Inc.; Renewable Oil International; and Renewable Fuel

Technologies. Additional information about DynaMotive and Ensyn Group, both with commercial fast pyrolysis bio-oil facilities, follows.

DynaMotive Energy Systems is commercializing a proprietary fast pyrolysis process that converts forest and agricultural residue (non-food crops) into liquid bio-oil and char. The company opened their first bio-oil cogeneration facility in West Lorne, Ontario, in collaboration with Erie Flooring and Wood Products Company. The flooring company provides the wood residue and Dynamotive's 2.5-megawatt plant uses its fast pyrolysis technology and a gas turbine to supply power to the wood product company's mills and lumber kilns. A 200 ton-per-day plant in Guelph, Ontario was completed in 2007, along with a new pilot plant and test plant nearby.

Ensyn Group Inc. has commercialized a fast pyrolysis technology under the name of Rapid Thermal Processing RTP[tm]. This technology is based on the biomass refining concept, where value added chemicals are produced in addition to a consistent quality bio-oil. Ensyn has RTP[tm] facilities in commercial operation. Four of the commercial facilities are in Wisconsin and one is near Ottawa, Canada. The largest of these facilities processes about 75 green tons per day of mixed hardwood wastes. Commercial demonstration facilities in Belridge, California, and a Feedstock Test Facility in San Antonio, Texas, help the company continue research for future renewable fuels. Ensyn has several international projects as well – using pine residues in Italy and palm residues in Malaysia. A recent alliance with UOP (a Honeywell Company) is also expected to further the technologies to produce renewable liquid fuels for heat, power, and transport fuels.

In table 2.3, there are 7 companies which operate biomass converting it into energy. They also use EFB in order to produce electricity.

Table 2.3: List of Biomass Operators in Malaysia

	Operator	**Location**	**Capacity**	**Source**
1	Bumibiopower Sdn Bhd	Pantati Remis, Perak	6MW	EFB
2	Jana Landfill Sdn Bhd	Seri Kembangan, Selangor	2MW	Biogas
3	TSH Bio Energy Sdn Bhd	Tawau, Sabah	14MW	EFB
4	Potensi Gaya Sdn Bhd	Tawau, Sabah	7MW	EFB
5	Alaf Ekspresi Sdn Bhd	Tawau, Sabah	8MW	EFB
6	Ilaluri Ventures Sdn Bhd	Pasir Gudang, Johor	12MW	EFB
7	Seguntor Bioenergy Sdn Bhd	Sandakan, Sabah	11.5MW	EFB
8	Kina Biopower Sdn Bhd	Sandakan, Sabah	11.5MW	EFB
9	Recycle Energy Sdn Bhd	Semenyih, Selangor	8.9MW	Refuse-derived fuel

(Source: MIDF Research Article: Equity Beat, published on 24 June 2011)

CHAPTER 3

COMPANY DESCRIPTION

3.1 BIO OIL SDN BHD BUSINESS

The mission this company is to produce, economically, substantial amounts of Bio Oil and to offer a realistic alternative to natural gas and light oil usage in existing industrial boilers and combined heat and power generation units.

To further develop pyrolysis Bio Oil product in order to produce value added chemicals (such as glue) or transportation (automotive) fuel.

Bio Oil Sdn Bhd aim is to develop and commercialize environmentally friendly energy (Bio Oil also known as pyrolysis oil) from biomass and organic waste materials and to provide the worldwide energy market with substantial amounts of this valuable energy resource.

Bio Oil Sdn Bhd has worked to improve and develop fast pyrolysis technology and to use it to transfer organic waste materials into renewable, storable and transportable energy being Bio Oil.

Improvement of the quality of environment together with alternative energy production in a realistic and profitable way is desirable and the goal of Bio Oil Sdn Bhd. The company philosophy is to produce green energy in environmentally friendly way mainly from waste materials. One of our main advantages is that we are the only company that uses flash-pyrolysis to transfer various waste materials into green energy in the form of Bio Oil.

3.2 COMPANY ORGANIZATION

3.2.1 Roles of People in Organizations

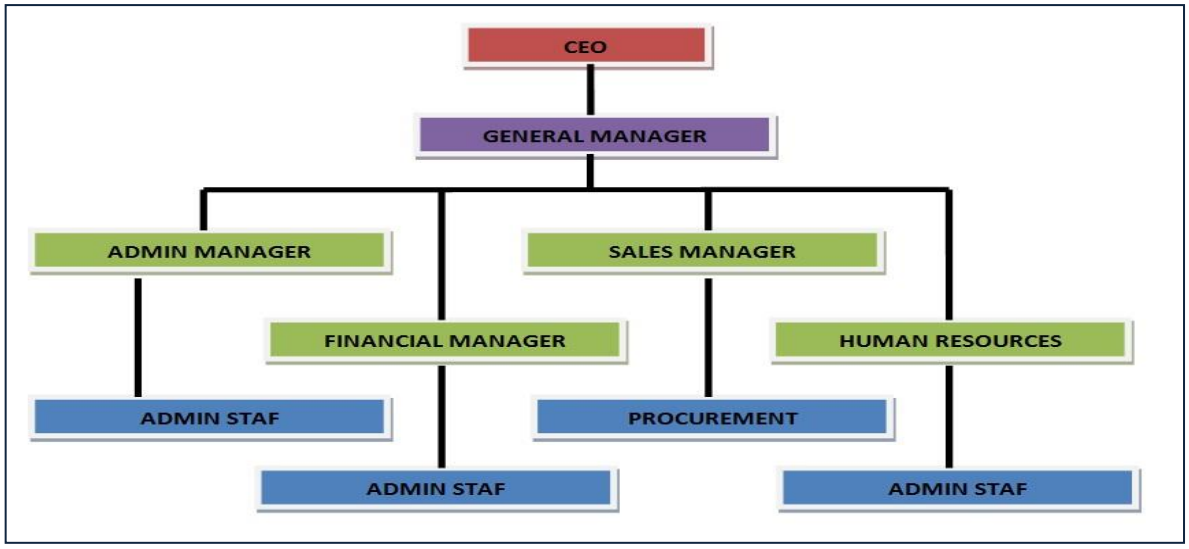

Figure 3.1: Organization chart

CEO is the person will be the driving force behind the company, he or she will make things happen, put together the resources to support the company and take the product to the market place.

General Manager also called an organizer, an inside manager or an operations person, this person is the one who will make sure company operations flow smoothly and economically. He or she is responsible for making certain that necessary work is done

properly and on time. An understanding of details of the business and an enjoyment of handling details are necessary.

Admin Manager is the leader for the operation and has overall responsibility for the financial success of the business. The operations manager handles external relations with lenders, community leaders and vendors. Frequently, this individual also is in charge of either production or marketing for the business. This person will set in motion the vision, strategic plan and goals for the business. Financial Manager is another key function. The individual filling this role has the responsibility for monthly income statements and balance sheets, collection of receivables, payroll and managing the cash. The key aspect here is managing the cash.

Salas Manager is staff to handle all aspects related to promoting and selling the product. The top management person often handles this duty in a small business. Human Resources may serve as human resource director, purchasing agent and "traffic cop" with salespeople and vendors. This employee, in general, will oversee everything not involved in production and may also handle some marketing duties.

3.3 COMPANY MANAGEMENT TEAM

Bio Oil Sdn Bhd is managed by a team of dedicated professionals and expertise in their respective field of study. This company has 5 members. Details for each member in this company are as follows:

- Muhammad Suhaimi Bin Man
  -Graduated in University Malaysia Pahang
  -Expertise in Chemical Engineering
  -Position as a CEO in the company.
  -Continue study in Master chemical engineering and Entepreneur

- Muhammad firdauz bin Ali sibramulisi
  - Graduated in University Malaysia Pahang
  - Expertise in Chemical Engineering and design plant
  - Position as a General Manager in the company

- Anas bin Muhd Naim
  - Graduated in University Malaysia Pahang.
  - Expertise in Chemical Engineering
  - Position as a Admin manager in the company

- Khairul Anuar bin Mamat
  - Graduated in University Malaysia Pahang.
  - Expertise in Chemical Engineering and Financial
  - Position as a Financial manager in the company

- Nik Fazdrul bin Nik Hussain
  - Graduated in University Malaysia Pahang.
  - Expertise in Chemical Engineering and Management
  - Position as a Sale manager in the company

3.4 LOCATION OF OPERATION

3.4.1 Overview of Site Study

It is important to choose best location for a plant because it determines the profitability and accessibility of the plant. There are several factors that should be considered in the process of choosing suitable location. It is very important due to

commercial value and effect towards the market itself. It should be representing the advantages and disadvantages of the available industrial estate. The factors that should be considered are:

- Reasonable land price
- Strategic location
- Availability of raw material
- Market potential
- Transport facilities
- Politics and economics
- Utilities
- Labor
- Regulation and policy
- Waste and disposal facilities

The land price is very important factor in developing plant design to produce certain product. The land should have low land prices while have high commercial values. This is because the major capital is need for building the plant and the site. The plant must be constructed at a suitable area to provide lower cost and convenience in transportation. It should be nearest with airport, port, has access to the raw material in order to decrease the transportation cost, have good supply of labor, constant supply of utilities and near to developed area. Raw material is the heart of the plant design and without it there is no operation to be run. So, the constant supply of raw material is very important and should be available near to plant site.

The market potential for the product is most important factor in site selection. The demand toward the product will create a market for the product. So that means the global market demand for the product is important in establishing the plant. Transportation facilities include transportation of raw material and product. So, the site should be very near to port, have good road system, near to airport, near to highways which enhance the transportation of product or raw material.

The politic and economic status of the country plays major role in establishing new business or plant. The stable economic and politics cause less internal problem and plant can be run constantly. The interest rate and taxation also will be less and owner of the plant can earn more. Utilities include electrical supply, water supply, sewerage, telecommunication, internet service, schedule waste treatment facilities and gas and fuel cost. All of this is import in setting up a plant and run it effectively and smoothly.

Human resource is one of main factors that should be considered in site selection. The constant technical man power is very important in operation of the plant and the production of the product. Every single work or job will be done by them and they are the key players of a plant. The policies and regulation which supports the new business or plant is essential factor which helps them to develop the business. Our Malaysian governments have a lot regulation and policies which allocate some amount of capital to help new business in building and establishing the plant. Thus, this factor supports us to develop our business and indirectly our country. Waste treatment and disposal facilities are a must for every plant and must be planed precisely. All the waste produced must be treated or before disposal, so that the chemical waste produced not spoilt the environment and cause pollution. So, plant which near to the disposal area is an advantage and can reduce cost for transportation of the waste.

3.4.2 Site Screening

Site selection is an essential and critical procedure before construction of the plant. It is carried out to select the ideal site for building of a chemical plant. There are three main areas short listed as site alternatives to set up a plant for production of 100 000 Bio oil MT/annum. The name of the areas selected is as follows:

1. Sabah (Lumadan Palm Oil Mill)
2. Sarawak (Galasah Palm Oil Mill)
3. Johor (KilangSawitSemenchu)
4. Pahang (Gebeng Industrial Estate)

The optimum and ideal plant site is chosen by giving score to each characteristic. The score scale from 4 (highest), 3(high), 2(moderate) and 1(lowest) is given to every characteristic. The best and ideal plant site with highest cumulated points is selected for set up of the plant. The steps of screening are shown in table below:

Table 3.1: Comparison of site selection of three areas

Site / Characteristics	**Sabah Lumadan Mill**	**Sarawak Galasah Palm Oil Mill**	**Johor KilangSawitSemenchu**	**Pahang LeparHilir**
Nearest Town	Labuan (87.5km) (2)	Miri (120 km) (1)	*Kota Tinggi (42km)* (3)	Kuantan (25km) (4)
Developer	SawitKinabalu Group (4)	Sarawak Oil Palms Berhad (4)	LembagaKemajuan Tanah Perseketuan (FELDA) (4)	LembagaKemajuan Tanah Perseketuan (FELDA) (4)
Land Price (RM/ft^2)	RM 0.40 – RM 1.00 (4)	RM 0.60 – RM 1.20 (3)	RM 1.00 (2)	RM1.00 – RM1.20 (1)
Type of Industry Preferred	Palm Oil Mill Estate (4)	Palm Oil Mill Estate (4)	Palm Oil Mill Estate (4)	Palm Oil Mill Estate (4)
Raw Material Availability	1,427,169 ha - Belinin estate - Binakaan	971,611 ha - Sebungan - Sabalaju 1	670,000 ha - Pasak - Air Tawar 1	600,000 ha - Panching - Leparhilir 1

	estate - Bingkor estate - Dalit estate - Dalit laut estate - Inandung estate - Kandangbesar estate - Klias estate - Pandewan estate	- Sabalaju 2 - Sabalaju 3 - Telong - SgTibus - Galasah - Telabit - Pinang	- Air Tawar 2 - Air Tawar 3 - Air Tawar 4 - Air Tawar 5	- Leparhilir 2 - Leparhilir 3 - Bukit sagu
	(4)	(3)	(2)	(1)
Air Transportation	Labuan Airport (87.50km) (2)	Bintulu Airport (141.5km) (1)	International Airport, Senai (82.2km) (3)	Airport Kuantan (21km) (4)
Land Transportation	Road - Sabah State Railway (*JabatanKeretapiNegeri Sabah*) line from TanjungAru to Tenom. -Jalanraya Kota Kinabalu/Beaufort : 90 km Jalanraya Beaufort/Sipitang: 45 km (1)	2hours from Borneo Highway or Miri-Bintulu Highway. (2)	Road Desaruto TanjungBalau (3)	Connected to Kuala Lumpur by East, Coast Highway and Karak highway, Railway linking Kerteh, Gebeng and Kuantan Port (4)
Water Transportation (ie. port)	Kota Kinabalu Port (103 km) (1)	Miri Port (10.2 km) (4)	Tanjung Pelepas Port (82.1 km) (2)	Kuantan Port (68.9km) (3)
Electricity Supply	TenagaNasional (TNB) Sabah	Sarawak Electricity Supply	The Sultan Iskandar Power Station	TenagaNasionalBerhad Petronas

	Electricity SdnBhd (SESB) (4)	Corporation (SESCO) (4)	TenagaNasionalBerhad YTL Power International Sdn. Bhd (2)	Centralised Utility Facilities (2)
Water Supply	Sabah State Water Department (4)	Nearest stream – SgBelasah . - LAKU Management SdnBhd (4)	Syarikat Air Johor (SAJ) from Sungai Layang (2)	Semambu Water Treatment Plant (2)
Total	**26**	**30**	**27**	**29**

Notes:

(4) – Higher selection; (3) – High selection; (2) - Average selection; (1) - Lower selection

After all this factors have been studied and analyzed, a certain area or a few areas would be identified for further consideration. Based on the total values in summary site selection, we choose Galasah Palm Oil Mill, Sawarak. It is particularly difficult for a manufacturer to consider which the best location is for the plants because of there are so many special conditions characteristic of the industry. Therefore, minor factors should be studied so that in final analysis the most economical location will be favored. Few of the minor factors are such as restriction zoning, securities, flood and natural disasters, climatic condition and living condition.

The best location is that in which the sum of cost materials, all transportation charges and all manufacturing expenses for the product delivered to the customer is at the minimum point. In order to consider a location from this standpoint, the problem may be analyzing from the angle of general area and then to the more specific standpoint of the definite region and actual site. The general classifications of factors are encountered in the solution of any location problem. The first factors relating directly to the production are including labor, power, fuel, water supply and raw material. Then, the second category

comprises those factors that affecting distribution, including location markets, location of competitive industries and transportation facilities. The third section concerns both production and distribution and also includes climate and legislative factors.

CHAPTER 4

OPERATION DESCRIPTION

4.1 PRODUCT DESCRIPTIONS

Bio Oil is the final result of the flash pyrolysis process of organic material. For the process all different types of organic waste materials can be used as well. It is a source of green energy due to the fact that Bio Oil is derived from renewable biomass as stated by Kyoto Agreement. Depending on the type of biomass, Bio Oil has a calorific value approximately half of diesel fuel.

Bio Oil is qualified as environmentally friendly alternative fuel by various governments. Use of alternative green energy is stimulated. The side effect of Bio Oil production from waste materials is the reduction of various waste materials. Waste materials which can be transferred into Bio Oil are sewer sludge, paper sludge, straw, grass, sunflower husk etc.

Produced Bio Oil can vary in color from dark red to black depending on the feedstock. Difference in color comes from micro coal particles in Bio Oil. Important Bio Oil properties are viscosity, water content, acidity, density, chemical composition, ash content, surface tension, solvability, aging and combustion temperature.

This ash free fuel has a positive market value due to the use in existing boilers. Bio Oil can be used without further refining in the most natural gas and diesel fueled boilers with small adjustments. Bio Oil can be burned immediately in adjusted turbines for electricity

production. Sale of clean, dust free Bio Oil is possible to various energy demanding industries. Bio Oil has the following advantages:

- Reduction of emissions CO_2, SO_2
- Emissions of chlorite and sulfur
- Immediate application in heating installations
- Competitive price comparing with natural gas and diesel
- Easy to store and to transport
- Combined use of Bio Oil and mineral oil

4.2 PROCESS DESCRIPTIONS

4.2.1 Flash Pyrolysis Process

The flash pyrolysis process is a thermal disintegration process to form Bio Oil out of organic material. The main goal of the flash pyrolysis process is to get as high as possible oil yield with as high as possible calorific value.

The process occurs at temperatures between 500 and 700°C in absence of oxygen. The cold biomass particles are heated in a second (Figure4.1).The organic part of biomass is thermally cracked and afterwards condensated in mainly Bio Oil. Additionally, flash pyrolysis has two bi-products bio-gas and bio-coal. Bio-gas is used for air cleaning in the afterburner and bio-coal is for 30% used for plant heating and 70% is available freely. Pending on granulation of input biomass more or less bio-coal is generated.

The flash pyrolysis process is CO_2 neutral. The big advantage of this process is possibility to separate organic and inorganic part of feedstock. The organic parts are completely transformed into energy consisting out of three streams Bio Oil, bio-gas, and bio-coal.

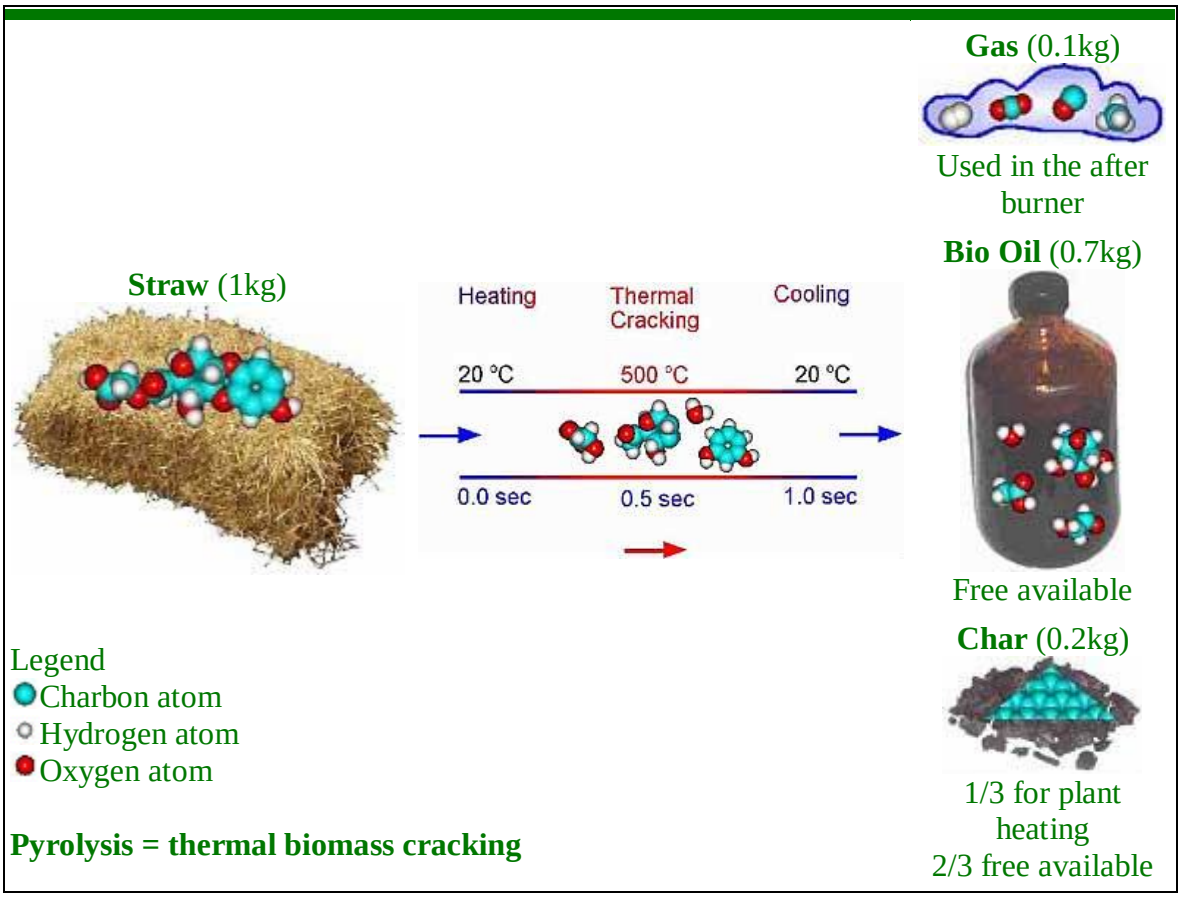

Figure 4.1: Bio oil production process

Source: http://www.bio-oil-holding.eu *accessed November 2013*

4.2.2 Bio Oil Production Process Flow Diagram

In Figure 4.2 one can find schematic representation of the Bio Oil Production Unit which is going to be constructed in Tessenderlo (BE). The unit consists of following parts:

- Feeding machine for biomass
- Pyrolysis Reactor
- Coal Combustor
- Bio Oil Quencher
- Air Cleaning System

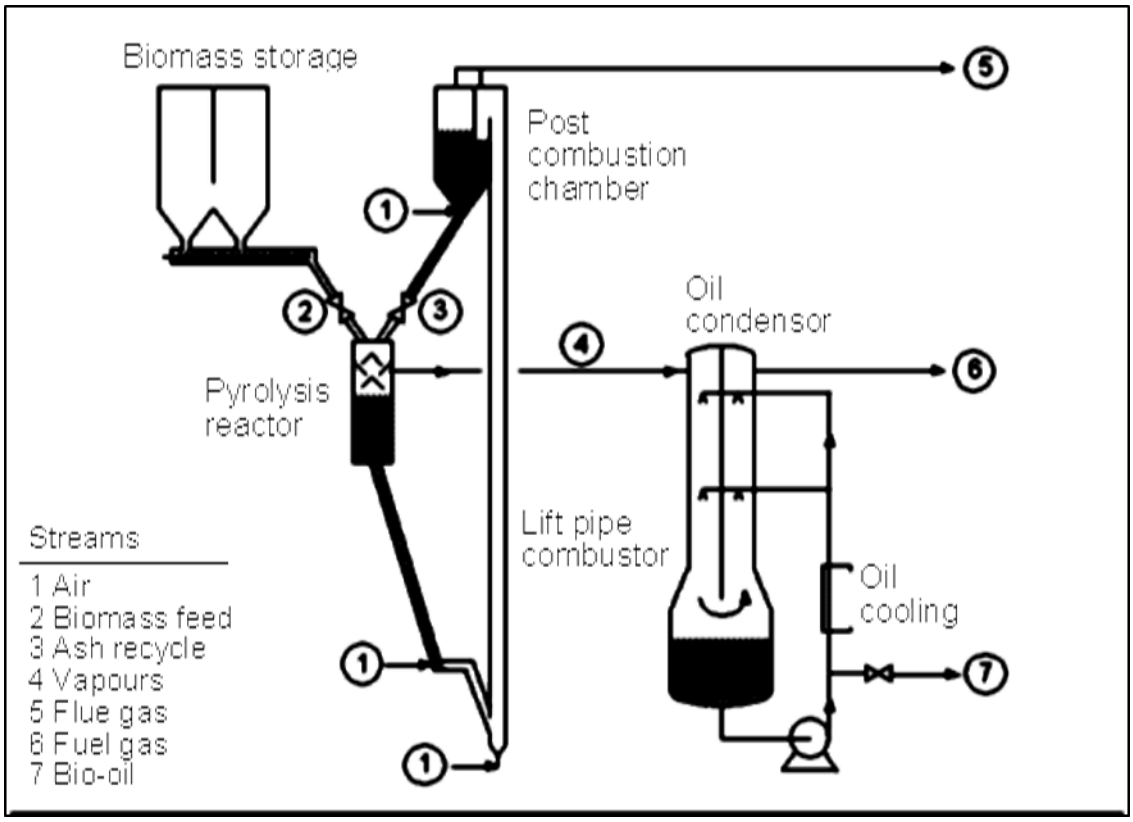

Figure 4.2: Process flow diagram for bio oil production

Source: http://www.bio-oil-holding.eu, *accessed November 2013*

The cold input material goes to the pyrolysis reactor. It has to be done in completely oxygen free conditions. In addition, biomass is not allowed to be preheated otherwise some chemical degradation processes can take place.In the pyrolysis reactor biomass is transformed into pyrolysis gasses and bio-coal. Pyrolysis gasses are transported through pyrolysis cyclones towards oil cooling system (quencher).

In the installation cold biomass (2) is put into pyrolysis reactor in which is mixed rapidly with sand at 550°C (3). Finely grained biomass is heated rapidly to reach fast cracking of organic material. Hereby, biomass is transformed in Bio Oil gasses (4) which are condensated in oil cooler (quencher). The oil cooling is done in direct contact heat exchanger known as quencher. Bio Oil comes out of quencher as liquid (7) as well as non-

condensable gasses (6). The Bio Oil is cooled with water circuit which is coupled with water cooling tower. The coal which is still present in Bio Oil is removed b with filter system. The non-condensable gasses are treated in the afterburner and cleaned in electrostatic filter.

The sand will leave the reactor with coal particles. Coal particles are removed in the combustor and the sand is removed brought back to right temperature and can be reused in the process (3).In this way 1000 kg of organic material is transferred in 700 kg of Bio Oil, 150 kg of bio-gas and 150 kg of bio-coal. Depending on the working temperature more or less of Bio Oil is produced. The pyrolysis temperature as well as residence time of biomass particles in the reactor are the most important parameters determining type of product which is produced.

Bio-coal is used for internal heating of pyrolysis installation; due to coal combustion sand is heated up to 500 °C. Produced pyrolysis fumes are removed from combustor and used fas energy source in the afterburner. The whole installation is isolated to avoid heat losses to the environment.

CHAPTER 5

FINANCIAL

5.1 FUND REQUIRED

For the capital requirement, after doing all the detail expanses in this plant,the total amount that required in this business is around RM2.3 million. From this amount, I will make loan from Bank Negara Malaysia is RM 2 million. The balance from the amount we can get from the owners and investor around RM 300 000.So the total capital we get is around RM 2.3 million.

Table 5.1: Startup expenses

Sources of Capital	
Owners' and other investments	RM 300,000
Bank loans	RM2,000,000
Other loans	-
Total Source of Funds	RM2,300,000

From the capital cost we get, we will derive for the startup expenses. The detail is as below:

Table 5.2: Startup expenses

Startup Expenses	
Buildings/real estate	RM 710,000
Leasehold improvements	-
Capital equipment	RM 430,000
Location/administration expenses	RM 79,284
Opening inventory	-
Other expenses	-
Contingency fund	RM 80,716
Working capital	RM 1,000,000
Total Startup Expenses	RM 2,300,000

5.2 SALE FORECAST

The production unit of Bio Oil is 250 ton/month for first year. The revenue that we get for every month in first year is RM 710,250. Total revenue for first year is RM7, 102,500.For the second year, we increase the unit sale by 25% from the previous year which is 313 ton/month. Revenue for the first month is RM 887,813 and total annual revenue for second year is RM 10,653,750.

For the 3rd year, we increase the unit sale by 25% from the previous year which is 313 ton/month. Revenue for the first month is RM 887,813 and total annual revenue for 3rd year is RM 13,329,972.Same with the previous year, the unit sale we increase 25% to 489 ton/month. Total revenue for the 4th year is RM 16,670,988.And for the 5th year the production is 611 ton/month and total revenue for this year is RM 20,830,212.The detail calculation was illustrated in appendix A.

5.3 PROFIT AND LOST

There was no production in the first two month in year one due to startup period and net profit in 1st year is RM 343,565.The profit increase every year. Detail profit as follow and at appendix B.

Year	Net profit
2014	RM 343,565
2015	RM 1,114,669
2016	RM 1,663,204
2017	RM 2,391,698
2018	RM 3,305,567

5.4 CASH FLOW

Cash flow shows a positive value from starting year until the 5th year. It mean the company does not need any external funding for continuing the business but for the first year in Feb and March we need working capital RM 1,000,000 to buy raw material. The detail calculation is on appendix C.

5.5 BALANCE SHEET

From the beginning until year five, total asset is same with liability and equity.The total Asset for the first year is RM 2,343,566 and for the debt we pay RM300,000 every year. Debt for the first year decrease to RM 1,700,000.Total Asset for 2nd year is RM 3,158,241. And debt remaining decrease to RM 1,400,000.Total Asset for 3rd year is RM

4,521,440. Total debt for this year is RM 1,100,000.Total asset for the 4th year is RM 6,613,138 and for the 5th year is RM 9,618,705 and debt at the 5th year is RM500; 000.The detail calculation is on appendix D.

5.6 RATIO ANALYSIS

Ratio Analysis is used to obtain a quick indication of a firm's financial performance in several key areas.

Short-term Solvency Ratios	
Current Ratio:	$\text{Current Ratio} = \frac{\text{Total Current Assets}}{\text{Total Current Liabilities}}$
Quick Ratio:	$\text{Quick Ratio} = \frac{\text{Total Current Assets} - \text{Inventory}}{\text{Total Current Liabilities}}$
Asset Management Ratios	
Receivables Turnover:	$\text{Receivables Turnover} = \frac{\text{Sales}}{\text{Accounts Receivable}}$
Days' Receivables:	$\text{Days' Receivables} = \frac{365}{\text{Receivables Turnover}}$
Inventory Turnover:	$\text{Inventory Turnover} = \frac{\text{COGS}}{\text{Inventory}}$
Days' Inventory:	$\text{Days' Inventory} = \frac{365}{\text{Inventory Turnover}}$
Fixed Assets Turnover:	$\text{Fixed Assets Turnover} = \frac{\text{Sales}}{\text{Net Fixed Assets}}$
Total Assets Turnover:	$\text{Total Assets Turnover} = \frac{\text{Sales}}{\text{Total Assets}}$
Debt Management Ratios	
Debt Ratio:	$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}} = \frac{\text{Total Assets} - \text{Total Owners' Equity}}{\text{Total Assets}}$
Debt-Equity Ratio:	$\text{Debt to Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Owners' Equity}} = \frac{\text{Total Assets} - \text{Total Owners' Equ}}{\text{Total Owners' Equity}}$
Equity Multiplier:	$\text{Equity Multiplier} = \frac{\text{Total Assets}}{\text{Total Owners' Equity}}$
Profitability Ratio	

Profit Margin:	$\text{Profit Margin} = \frac{\text{Net Income}}{\text{Sales}}$
Return on Assets:	$\text{Return on Assets (ROA)} = \frac{\text{Net Income}}{\text{Total Assets}}$
Return on Equity:	$\text{Return on Equity (ROE)} = \frac{\text{Net Income}}{\text{Total Owners' Equity}}$

FIGURE 5.1: Ratio Analysis Equations

Table 5.3: Summary of Ratio Analysis

Ratio	2014	2015	2016	2017	2018	Industry Average
Current Ratio	N/A	N/A	N/A	N/A	N/A	1.24
Quick Ratio	N/A	N/A	N/A	N/A	N/A	1
Receivables Turnover:	18.71	15.39	50.92	64.28	80.92	23.1
Days' Receivables:	19.50	23.72	7.17	5.68	4.51	-
Inventory Turnover:	N/A	N/A	N/A	N/A	N/A	-
Days' Inventory:	N/A	N/A	N/A	N/A	N/A	-
Fixed Assets Turnover:	6.97	11.29	14.82	19.32	25.13	-
Total Assets Turnover:	2.71	3.17	2.82	2.43	2.10	4.57
Debt Ratio %:	72.54	44.33	24.33	12.10	5.20	1.24
Debt-Equity Ratio:	2.64	0.80	0.32	0.14	0.05	3.74
Equity Multiplier:	3.64	1.80	1.32	1.14	1.05	4.13
Profit Margin %:	5.40	11.14	13.07	14.88	16.34	59.9
Return on Assets %:	14.66	35.29	36.78	36.17	34.37	-
Return on Equity %:	53.38	63.40	48.61	41.14	36.25	41.62

Short-term Solvency Ratios attempt to measure the ability of a firm to meet its short-term financial obligations. In other words, these ratios seek to determine the ability of a firm to avoid financial distress in the short-run. The two most important Short-term Solvency Ratios are the Current Ratio and the Quick Ratio. (Note: the Quick Ratio is also known as the Acid-Test Ratio.)Current ratio and quick ratio is not applicable because we don't have current liability .This is because we buy the raw material by cash.

Asset Management Ratios attempt to measure the firm's success in managing its assets to generate sales. For example, these ratios can provide insight into the success of the firm's credit policy and inventory management. These ratios are also known as Activity or Turnover Ratios. For receivable turnover is increase every year from 18.71 to 80.92 at 5th year. It is good because the rate we collect the debt increase and day's receivable is decreasing by year until 4.51 day. It means we can convert debt to cash in little of time. For the inventory turnover and day inventory is not applicable because we don't have inventory. Our production is just in time. For the fixed asset turnover it increases by year. It means we use the fix asset to generate sales. Total asset turnover is decreasing by year because the increasing cash in hand.

Debt Management Ratios attempt to measure the firm's use of Financial Leverage and ability to avoid financial distress in the long run. These ratios are also known as Long-Term Solvency Ratios. The percentage of debt ratio is decreasing by year. So it is good because we have the cash to generate sale and not depend on debt. Debt-Equity Ratio is decreasing by year, and it good because company operation is depend more to the equity compare to the debt.

Profitability Ratios attempt to measure the firm's success in generating income. These ratios reflect the combined effects of the firm's asset and debt management. Profit increase by year. It is good because our profit increase by year. The ROA ratio indicate income earned by the company on its asset and ROE ratio indicate that the income earned by the company by the shareholder equity. The ROA and ROE show the company is good in converting the investment into profit.The breakeven analysis shows that the minimum sale is RM433,449 or minimum production is 153 units.

CHAPTER 6

RISK ANALYSIS

Assumptions used in this report are based on the best currently available knowledge of bio-oil technology and business conditions as they currently exist in Malaysia. It is understood that assumptions may change based on differences relevant to proprietary technology and conditions unique to specific business groups and/or locations.

6.1 Critical Factors

Critical factors used in the economic analysis such as feedstock moisture content, bio-oil yield, capital cost, return on investment, overhead rates and etc. are consistent with those currently being used in Malaysia at the time of writing. These parameters may change with time, location and/or readers may wish to use parameters more to their liking. If so, the accompanying spreadsheet may be used to change these parameters to assess their impact on the overall economic analysis.

6.2 Emerging Technology

The production of bio-oil from the fast pyrolysis of Emty Fruit Bunch (EFB) is in the early stages of development. There is no assurance that this technology will emerge as a

significant source of alternative fuels and/or become an expanded source for value-added chemicals.

6.3 Feedstock Availability

There is no assurance that existing markets for EFB will not grow and/or that alternative uses of EFB will not be found. A competitive market for wood chips could result in a price increase, thus making the production of bio-oil economically impractical.

6.4 Limited Access to Technology

To date there are no companies in Malaysia capable of supplying the required technology. Only foreign companies have demonstrated the ability to establish a commercial plant. There is no assurance that any of these companies are interested in building a plant in Malaysia. There is no assurance that a viable business agreement can be reached with any of the potential suppliers.

6.5 Limited Source of Information

Much of the information necessary to establish a commercial plant is retained as proprietary information. There is no public information available to validate and/or contradict many of the assumptions made in this study. There are no existing stand-alone commercial plants. Existing commercial plants are an integrated part of other commercial processes and most, if not all, products generated by the plant are consumed onsite. Operating and financial information is retained as proprietary information. Much of the information provided in this report was obtained from private conversations and presentations made by the potential suppliers, “knowledgeable third party sources” and/or from academic studies.

6.6 Limited Market

To date sufficient quantities of bio-oil have not been available to establish a market. There is no assurance that a viable market will emerge. To use bio-oil as an alternative fuel, customers will need to invest time and money into converting boilers to burn bio-oil. New value-added chemicals will need to compete with existing sources. Barriers to market entry are unknown and could be significant. It is uncertain how current market suppliers will react, e.g., reduce prices in an effort to eliminate competition

CHAPTER 7

CONCLUSION

In the last few years, against the background of increasing concerns regarding the energy supply security as well as environmental concern has increased the interest for renewable energy sources. This has resulted in some countries to look for bio-based alternative energies which lead to the increase in demand for bio-based feedstocks. Due to the increased importance of bio oil in Malaysia and elsewhere, our company has a bright future in this field.

For the conclusion, after doing the market analysis and financial study, we can see that this project is feasible to run but in the future it may be consider looking how to increasevthe profitable or profit margin according to profit margin is not good as ratio industrial average in the same field. The payback period we get within 2 years. After this we must carefully manage the risk to make sure that the project can run smoothly.

REFERENCES

First Sabah bio-oil plant on pipeline. *Sabah Today*. Retrieved on December 6, 2011, from http://www.sabahtoday.com.my/index.php?option=com_content&view=article&id=1609:first-sabah-bio-oil-plant-in-pipeline&catid=34:sabah&Itemid=18

N. Abdullah and H. Gerhauser (2008) Bio-Oil derived from Empty Fruit Bunches, Fuel 87 (2008), 2606-2613.

N. Abdullah and H. Gerhauser (2007) Bio Oil from Fast Pyrolysis of Oil Palm from Empty Fruit Bunches, Journal Physical Science, Vol 18 (1),57- 74, 2007.

P.Dominov, R.Gilyazetdinova, B.Zhirynov, I.Tarasov, and R.Khletskin (2009). Overview World Technologies of Pyrolysis and Perspective of Development, Oil and Gas Business.

Premium Malaysia to invest RM124m in bio-oil plant. *The Star Online*. Retrieved on September 22, 2011, from http://biz.thestar.com.my/news/story.asp?file=/2010/9/22/business/7079542&sec=business.

Premium Renewable Energy's bio oil project for green renewable power and transportation fuels is part of Malaysia's economic transformation programme. *Premium Renewable Energy*. Retrieved on September 21, 2011, from http://www.premium-re.com.my/news-releases/premium-renewable-energys-bio-oil-project-for-green-renewable-power-and-transportation-fuels-is-part-of-malaysias-economic-transformation-programme.

S.Shuit, K.T Tan, K.T Lee*, and A.H Kamaruddin (2009). Oil Palm Biomass As A Sustainable Energy Source: A Malaysian Case Study. *Energy*. (34), pp: 1255 - 1235.

APPENDIX

A Sale Forecast

Fiscal Year Begins Jan-14

12-month Sales Forecast

	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Annual Totals
Cat 1 units sold	0	0	250	250	250	250	250	250	250	250	250	250	2500
Sale price @ unit	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	
Cat 1 TOTAL	0	0	710,250	710,250	710,250	710,250	710,250	710,250	710,250	710,250	710,250	710,250	7,102,500
Monthly totals:	0	0	710,250	710,250	710,250	710,250	710,250	710,250	710,250	710,250	710,250	710,250	7,102,500

Fiscal Year Begins Jan-15

12-month Sales Forecast

	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Annual Totals
Cat 1 units sold	313	313	313	313	313	313	313	313	313	313	313	313	3750
Sale price @ unit	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	
Cat 1 TOTAL	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	10,653,750
Monthly totals:	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	887,813	10,653,750

Fiscal Year Begins Jan-16

12-month Sales Forecast

	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Annual Totals
Cat 1 units sold	391	391	391	391	391	391	391	391	391	391	391	391	4692
Sale price @ unit	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	
Cat 1 TOTAL	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	13,329,972
Monthly totals:	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	1,110,831	13,329,972

Fiscal Year Begins Jan-17

12-month Sales Forecast

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Annual Totals
Cat 1 units sold	489	489	489	489	489	489	489	489	489	489	489	489	5868
Sale price @ unit	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	
Cat 1 TOTAL	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	16,670,988
Monthly totals:	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	1,389,249	16,670,988

Fiscal Year Begins Jan-18

12-month Sales Forecast

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Annual Totals
Cat 1 units sold	611	611	611	611	611	611	611	611	611	611	611	611	7332
Sale price @ unit	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	2,841.00	
Cat 1 TOTAL	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	20,830,212
Monthly totals:	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	1,735,851	20,830,212

Fiscal Year Begins
Jan-14

	IND. %	Jan-14	% B/A	Feb-14	%	Mar-14	%	Apr-14	%	May-14	%	Jun-14	%	Jul-14	%	Aug-14	%	Sep-14	%	Oct-14	%	Nov-14	%	Dec-14	%	YEARLY	%
Revenue (Sales)																											
Category 1		0	-	0	-	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	7,102,500	100.0
Total Revenue (Sales)		0	0.0	0	0.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	710,250	100.0	7,102,500	100.0
Cost of Sales																											
Category 1		0	-	0	-	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	4,749,750	66.9
Total Cost of Sales		0	-	0	-	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	474,975	66.9	4,749,750	66.9
Gross Profit		0	-	0	-	235,275	33.1	235,275	33.1	235,275	33.1	235,275	33.1	235,275	33.1	235,275	33.1	235,275	33.1	235,275	33.1	235,275	33.1	235,275	33.1	2,352,750	33.1
Expenses																											
Salary expenses		95,600	-	95,600	-	95,600	13.5	95,600	13.5	95,600	13.5	95,600	13.5	95,600	13.5	95,600	13.5	95,600	13.5	95,600	13.5	95,600	13.5	95,600	13.5	1,147,200	16.2
Payroll expenses		7,648	-	7,648	-	7,648	1.1	7,648	1.1	7,648	1.1	7,648	1.1	7,648	1.1	7,648	1.1	7,648	1.1	7,648	1.1	7,648	1.1	7,648	1.1	91,776	1.3
Outside services		0	-	0	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Supplies (office and operating)		3,000	-	3,000	-	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	36,000	0.5
Repairs and maintenance		0	-	0	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Advertising		3,551	-	3,551	-	3,551	0.5	3,551	0.5	3,551	0.5	3,551	0.5	3,551	0.5	3,551	0.5	3,551	0.5	3,551	0.5	3,551	0.5	3,551	0.5	42,615	0.6
Car, delivery and travel		3,000	-	3,000	-	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	3,000	0.4	36,000	0.5
Accounting and legal		2,000	-	2,000	-	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	24,000	0.3
Utilities		4,970	-	4,970	-	16,567	2.3	16,567	2.3	16,567	2.3	16,567	2.3	16,567	2.3	16,567	2.3	16,567	2.3	16,567	2.3	16,567	2.3	16,567	2.3	175,612	2.5
Insurance		2,000	-	2,000	-	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	2,000	0.3	24,000	0.3
Interest		10,000	-	10,000	-	10,000	1.4	10,000	1.4	10,000	1.4	10,000	1.4	10,000	1.4	10,000	1.4	10,000	1.4	10,000	1.4	10,000	1.4	10,000	1.4	120,000	1.7
Depreciation		2,250	-	2,250	-	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	27,000	0.4
Other expenses (Royalties)		14,205	-	14,205	-	14,205	2.0	14,205	2.0	14,205	2.0	14,205	2.0	14,205	2.0	14,205	2.0	14,205	2.0	14,205	2.0	14,205	2.0	14,205	2.0	170,460	2.4
Other expenses (specify)		0	-	0	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Misc. (unspecified)		0	-	0	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total Expenses		148,224	-	148,224	-	159,821	22.5	159,821	22.5	159,821	22.5	159,821	22.5	159,821	22.5	159,821	22.5	159,821	22.5	159,821	22.5	159,821	22.5	159,821	22.5	1,894,663	26.7
Net Profit Before Taxes		-148,224		-148,224		75,454		75,454		75,454		75,454		75,454		75,454		75,454		75,454		75,454		75,454		458,087	
Income Taxes		-37,056	-	-37,056	-	18,863	-	18,863	-	18,863	-	18,863	-	18,863	-	18,863	-	18,863	-	18,863	-	18,863	-	18,863	-	114,522	-
Net Operating Income		-111,168	-	-111,168	-	56,590	8.0	56,590	8.0	56,590	8.0	56,590	8.0	56,590	8.0	56,590	8.0	56,590	8.0	56,590	8.0	56,590	8.0	56,590	8.0	343,565	4.8

Fiscal Year Begins

Jan-15

	IND. %	Jan-15	% B/A	Feb-15	%	Mar-15	%	Apr-15	%	May-15	%	Jun-15	%	Jul-15	%	Aug-15	%	Sep-15	%	Oct-15	%	Nov-15	%	Dec-15	%	YEARL Y	%
Revenue (Sales)																											
Category 1		887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	10,653,750	100.0
Total Revenue (Sales)		887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	887,813	100.0	10,653,750	100.0
Cost of Sales																											
Category 1		594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	7,136,024	67.0
Total Cost of Sales		594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	594,669	67.0	7,136,024	67.0
Gross Profit		293,144	33.0	293,144	33.0	293,144	33.0	293,144	33.0	293,144	33.0	293,144	33.0	293,144	33.0	293,144	33.0	293,144	33.0	293,144	33.0	293,144	33.0	293,144	33.0	3,517,726	33.0
Expenses																											
Salary expenses		100,380	11.3	100,380	11.3	100,380	11.3	100,380	11.3	100,380	11.3	100,380	11.3	100,380	11.3	100,380	11.3	100,380	11.3	100,380	11.3	100,380	11.3	100,380	11.3	1,204,560	11.3
Payroll expenses		8,030	0.9	8,030	0.9	8,030	0.9	8,030	0.9	8,030	0.9	8,030	0.9	8,030	0.9	8,030	0.9	8,030	0.9	8,030	0.9	8,030	0.9	8,030	0.9	96,365	0.9
Outside services		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Supplies (office and operating)		3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	36,000	0.3
Repairs and maintenance		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Advertising		4,439	0.5	4,439	0.5	4,439	0.5	4,439	0.5	4,439	0.5	4,439	0.5	4,439	0.5	4,439	0.5	4,439	0.5	4,439	0.5	4,439	0.5	4,439	0.5	53,269	0.5
Car, delivery and travel		3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	36,000	0.3
Accounting and legal		2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	24,000	0.2
Utilities		17,936	2.0	17,936	2.0	17,936	2.0	17,936	2.0	17,936	2.0	17,936	2.0	17,936	2.0	17,936	2.0	17,936	2.0	17,936	2.0	17,936	2.0	17,936	2.0	215,232	2.0
Insurance		2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	24,000	0.2
Interest		8,500	1.0	8,500	1.0	8,500	1.0	8,500	1.0	8,500	1.0	8,500	1.0	8,500	1.0	8,500	1.0	8,500	1.0	8,500	1.0	8,500	1.0	8,500	1.0	102,000	1.0
Depreciation		2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	2,250	0.3	27,000	0.3
Other expenses (Royalties)		17,756	2.0	17,756	2.0	17,756	2.0	17,756	2.0	17,756	2.0	17,756	2.0	17,756	2.0	17,756	2.0	17,756	2.0	17,756	2.0	17,756	2.0	17,756	2.0	213,075	2.0
Other expenses (specify)		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Misc. (unspecified)		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total Expenses		169,292	19.1	169,292	19.1	169,292	19.1	169,292	19.1	169,292	19.1	169,292	19.1	169,292	19.1	169,292	19.1	169,292	19.1	169,292	19.1	169,292	19.1	169,292	19.1	2,031,501	19.1
Net Profit Before Taxes		123,852		123,852		123,852		123,852		123,852		123,852		123,852		123,852		123,852		123,852		123,852		123,852		1,486,225	
Income Taxes		30,963	3.5	30,963	3.5	30,963	3.5	30,963	3.5	30,963	3.5	30,963	3.5	30,963	3.5	30,963	3.5	30,963	3.5	30,963	3.5	30,963	3.5	30,963	3.5	371,556	41.9
Net Operating Income		92,889	10.5	92,889	10.5	92,889	10.5	92,889	10.5	92,889	10.5	92,889	10.5	92,889	10.5	92,889	10.5	92,889	10.5	92,889	10.5	92,889	10.5	92,889	10.5	1,114,669	10.5

Fiscal Year Begins

Jan-16

	IND. %	Jan-16	% B/A	Feb-16	%	Mar-16	%	Apr-16	%	May-16	%	Jun-16	%	Jul-16	%	Aug-16	%	Sep-16	%	Oct-16	%	Nov-16	%	Dec-16	%	YEARL Y	%
Revenue (Sales)																											
Category 1		1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	13,329,972	100.0
Total Revenue (Sales)		1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	1,110,831	100.0	13,329,972	100.0
Cost of Sales																											
Category 1		742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	8,914,331	66.9
Total Cost of Sales		742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	742,861	66.9	8,914,331	66.9
Gross Profit		367,970	33.1	367,970	33.1	367,970	33.1	367,970	33.1	367,970	33.1	367,970	33.1	367,970	33.1	367,970	33.1	367,970	33.1	367,970	33.1	367,970	33.1	367,970	33.1	4,415,641	33.1
Expenses																											
Salary expenses		105,399	9.5	105,399	9.5	105,399	9.5	105,399	9.5	105,399	9.5	105,399	9.5	105,399	9.5	105,399	9.5	105,399	9.5	105,399	9.5	105,399	9.5	105,399	9.5	1,264,788	9.5
Payroll expenses		8,432	0.8	8,432	0.8	8,432	0.8	8,432	0.8	8,432	0.8	8,432	0.8	8,432	0.8	8,432	0.8	8,432	0.8	8,432	0.8	8,432	0.8	8,432	0.8	101,183	0.8
Outside services		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Supplies (office and operating)		3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	36,000	0.3
Repairs and maintenance		4,000	0.4	4,000	0.4	4,000	0.4	4,000	0.4	4,000	0.4	4,000	0.4	4,000	0.4	4,000	0.4	4,000	0.4	4,000	0.4	4,000	0.4	4,000	0.4	48,000	0.4
Advertising		5,554	0.5	5,554	0.5	5,554	0.5	5,554	0.5	5,554	0.5	5,554	0.5	5,554	0.5	5,554	0.5	5,554	0.5	5,554	0.5	5,554	0.5	5,554	0.5	66,650	0.5
Car, delivery and travel		3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	3,000	0.3	36,000	0.3
Accounting and legal		2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	24,000	0.2
Utilities		18,318	1.6	18,318	1.6	18,318	1.6	18,318	1.6	18,318	1.6	18,318	1.6	18,318	1.6	18,318	1.6	18,318	1.6	18,318	1.6	18,318	1.6	18,318	1.6	219,816	1.6
Insurance		2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	2,000	0.2	24,000	0.2
Interest		7,000	0.6	7,000	0.6	7,000	0.6	7,000	0.6	7,000	0.6	7,000	0.6	7,000	0.6	7,000	0.6	7,000	0.6	7,000	0.6	7,000	0.6	7,000	0.6	84,000	0.6
Depreciation		2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	27,000	0.2
Other expenses (Royalties)		22,217	2.0	22,217	2.0	22,217	2.0	22,217	2.0	22,217	2.0	22,217	2.0	22,217	2.0	22,217	2.0	22,217	2.0	22,217	2.0	22,217	2.0	22,217	2.0	266,599	2.0
Other expenses (specify)		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Misc. (unspecified)		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total Expenses		183,170	16.5	183,170	16.5	183,170	16.5	183,170	16.5	183,170	16.5	183,170	16.5	183,170	16.5	183,170	16.5	183,170	16.5	183,170	16.5	183,170	16.5	183,170	16.5	2,198,036	16.5
Net Profit Before Taxes		184,800		184,800		184,800		184,800		184,800		184,800		184,800		184,800		184,800		184,800		184,800		184,800		2,217,605	
Income Taxes		46,200	4.2	46,200	4.2	46,200	4.2	46,200	4.2	46,200	4.2	46,200	4.2	46,200	4.2	46,200	4.2	46,200	4.2	46,200	4.2	46,200	4.2	46,200	4.2	554,401	49.9
Net Operating Income		138,600	12.5	138,600	12.5	138,600	12.5	138,600	12.5	138,600	12.5	138,600	12.5	138,600	12.5	138,600	12.5	138,600	12.5	138,600	12.5	138,600	12.5	138,600	12.5	1,663,204	12.5

Fiscal Year Begins

Jan-17

	IND. %	Jan-17	% B/A	Feb-17	%	Mar-17	%	Apr-17	%	May-17	%	Jun-17	%	Jul-17	%	Aug-17	%	Sep-17	%	Oct-17	%	Nov-17	%	Dec-17	%	YEARL Y	%
Revenue (Sales)																											
Category 1		1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	16,670,988	100.0
Total Revenue (Sales)		1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	1,389,249	100.0	16,670,988	100.0
Cost of Sales																											
Category 1		929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	11,148,613	66.9
Total Cost of Sales		929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	929,051	66.9	11,148,613	66.9
Gross Profit		460,198	33.1	460,198	33.1	460,198	33.1	460,198	33.1	460,198	33.1	460,198	33.1	460,198	33.1	460,198	33.1	460,198	33.1	460,198	33.1	460,198	33.1	460,198	33.1	5,522,375	33.1
Expenses																											
Salary expenses		110,669	8.0	110,669	8.0	110,669	8.0	110,669	8.0	110,669	8.0	110,669	8.0	110,669	8.0	110,669	8.0	110,669	8.0	110,669	8.0	110,669	8.0	110,669	8.0	1,328,027	8.0
Payroll expenses		8,854	0.6	8,854	0.6	8,854	0.6	8,854	0.6	8,854	0.6	8,854	0.6	8,854	0.6	8,854	0.6	8,854	0.6	8,854	0.6	8,854	0.6	8,854	0.6	106,242	0.6
Outside services		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Supplies (office and operating)		3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	36,000	0.2
Repairs and maintenance		4,000	0.3	4,000	0.3	4,000	0.3	4,000	0.3	4,000	0.3	4,000	0.3	4,000	0.3	4,000	0.3	4,000	0.3	4,000	0.3	4,000	0.3	4,000	0.3	48,000	0.3
Advertising		6,946	0.5	6,946	0.5	6,946	0.5	6,946	0.5	6,946	0.5	6,946	0.5	6,946	0.5	6,946	0.5	6,946	0.5	6,946	0.5	6,946	0.5	6,946	0.5	83,355	0.5
Car, delivery and travel		3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	36,000	0.2
Accounting and legal		2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	24,000	0.1
Utilities		18,450	1.3	18,450	1.3	18,450	1.3	18,450	1.3	18,450	1.3	18,450	1.3	18,450	1.3	18,450	1.3	18,450	1.3	18,450	1.3	18,450	1.3	18,450	1.3	221,400	1.3
Insurance		2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	24,000	0.1
Interest		5,500	0.4	5,500	0.4	5,500	0.4	5,500	0.4	5,500	0.4	5,500	0.4	5,500	0.4	5,500	0.4	5,500	0.4	5,500	0.4	5,500	0.4	5,500	0.4	66,000	0.4
Depreciation		2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	2,250	0.2	27,000	0.2
Other expenses (Royalties)		27,785	2.0	27,785	2.0	27,785	2.0	27,785	2.0	27,785	2.0	27,785	2.0	27,785	2.0	27,785	2.0	27,785	2.0	27,785	2.0	27,785	2.0	27,785	2.0	333,420	2.0
Other expenses (specify)		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Misc. (unspecified)		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total Expenses		194,454	14.0	194,454	14.0	194,454	14.0	194,454	14.0	194,454	14.0	194,454	14.0	194,454	14.0	194,454	14.0	194,454	14.0	194,454	14.0	194,454	14.0	194,454	14.0	2,333,444	14.0
Net Profit Before Taxes		265,744		265,744		265,744		265,744		265,744		265,744		265,744		265,744		265,744		265,744		265,744		265,744		3,188,931	
Income Taxes		66,436	4.8	66,436	4.8	66,436	4.8	66,436	4.8	66,436	4.8	66,436	4.8	66,436	4.8	66,436	4.8	66,436	4.8	66,436	4.8	66,436	4.8	66,436	4.8	797,233	57.4
Net Operating Income		199,308	14.3	199,308	14.3	199,308	14.3	199,308	14.3	199,308	14.3	199,308	14.3	199,308	14.3	199,308	14.3	199,308	14.3	199,308	14.3	199,308	14.3	199,308	14.3	2,391,698	14.3

Fiscal Year Begins

Jan-18

	IND. %	Jan-18	% B/A	Feb-18	%	Mar-18	%	Apr-18	%	May-18	%	Jun-18	%	Jul-18	%	Aug-18	%	Sep-18	%	Oct-18	%	Nov-18	%	Dec-18	%	YEARL Y	%
Revenue (Sales)																											
Category 1		1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	20,830,212	100.0
Total Revenue (Sales)		1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	1,735,851	100.0	20,830,212	100.0
Cost of Sales																											
Category 1		1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	13,930,067	66.9
Total Cost of Sales		1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	1,160,839	66.9	13,930,067	66.9
Gross Profit		575,012	33.1	575,012	33.1	575,012	33.1	575,012	33.1	575,012	33.1	575,012	33.1	575,012	33.1	575,012	33.1	575,012	33.1	575,012	33.1	575,012	33.1	575,012	33.1	6,900,145	33.1
Expenses																											
Salary expenses		116,202	6.7	116,202	6.7	116,202	6.7	116,202	6.7	116,202	6.7	116,202	6.7	116,202	6.7	116,202	6.7	116,202	6.7	116,202	6.7	116,202	6.7	116,202	6.7	1,394,429	6.7
Payroll expenses		9,296	0.5	9,296	0.5	9,296	0.5	9,296	0.5	9,296	0.5	9,296	0.5	9,296	0.5	9,296	0.5	9,296	0.5	9,296	0.5	9,296	0.5	9,296	0.5	111,554	0.5
Outside services		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Supplies (office and operating)		3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	36,000	0.2
Repairs and maintenance		4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	48,000	0.2
Advertising		8,679	0.5	8,679	0.5	8,679	0.5	8,679	0.5	8,679	0.5	8,679	0.5	8,679	0.5	8,679	0.5	8,679	0.5	8,679	0.5	8,679	0.5	8,679	0.5	104,151	0.5
Car, delivery and travel		3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	3,000	0.2	36,000	0.2
Accounting and legal		2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	24,000	0.1
Utilities		18,582	1.1	18,582	1.1	18,582	1.1	18,582	1.1	18,582	1.1	18,582	1.1	18,582	1.1	18,582	1.1	18,582	1.1	18,582	1.1	18,582	1.1	18,582	1.1	222,984	1.1
Insurance		2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	24,000	0.1
Interest		4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	4,000	0.2	48,000	0.2
Depreciation		2,250	0.1	2,250	0.1	2,250	0.1	2,250	0.1	2,250	0.1	2,250	0.1	2,250	0.1	2,250	0.1	2,250	0.1	2,250	0.1	2,250	0.1	2,250	0.1	27,000	0.1
Other expenses (Royalties)		34,717	2.0	34,717	2.0	34,717	2.0	34,717	2.0	34,717	2.0	34,717	2.0	34,717	2.0	34,717	2.0	34,717	2.0	34,717	2.0	34,717	2.0	34,717	2.0	416,604	2.0
Other expenses (specify)		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Misc. (unspecified)		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total Expenses		207,727	12.0	207,727	12.0	207,727	12.0	207,727	12.0	207,727	12.0	207,727	12.0	207,727	12.0	207,727	12.0	207,727	12.0	207,727	12.0	207,727	12.0	207,727	12.0	2,492,722	12.0
Net Profit Before Taxes		367,285		367,285		367,285		367,285		367,285		367,285		367,285		367,285		367,285		367,285		367,285		367,285		4,407,423	
Income Taxes		91,821	5.3	91,821	5.3	91,821	5.3	91,821	5.3	91,821	5.3	91,821	5.3	91,821	5.3	91,821	5.3	91,821	5.3	91,821	5.3	91,821	5.3	91,821	5.3	1,101,856	63.5
Net Operating Income		275,464	15.9	275,464	15.9	275,464	15.9	275,464	15.9	275,464	15.9	275,464	15.9	275,464	15.9	275,464	15.9	275,464	15.9	275,464	15.9	275,464	15.9	275,464	15.9	3,305,567	15.9

C Cash Flow

Cash Flow (12 months)

Enter Company Name Here — Fiscal Year Begins: Jan-14

	Pre-Startup EST	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Total Item EST
Cash on Hand (beginning of month)	0	0	-145,974	308,052	685,755	663,459	641,162	818,866	796,569	774,273	751,976	729,680	707,384	0
CASH RECEIPTS														
Cash Sales		0	0	610,250	610,250	610,250	610,250	610,250	610,250	610,250	610,250	610,250	610,250	6,102,500
Collections fm CR accounts	300,000	0	0	0	0	0	200,000	0	0	0	0	0	200,000	700,000
Loan/ other cash inj.	1,000,000	0	600,000	400,000	0	0	0	0	0	0	0	0	0	2,000,000
TOTAL CASH RECEIPTS	1,300,000	0	600,000	1,010,250	610,250	610,250	810,250	610,250	610,250	610,250	610,250	610,250	810,250	8,802,500
Total Cash Available (before cash out)	1,300,000	0	454,026	1,318,302	1,296,005	1,273,709	1,451,412	1,429,116	1,406,819	1,384,523	1,362,226	1,339,930	1,517,634	8,802,500
CASH PAID OUT														
Buildings/real estate	710,000	0	0	0	0	0	0	0	0	0	0	0	0	710,000
Capital equipment	230,000	0	0	0	0	0	0	0	0	0	0	0	0	230,000
Location/administration expenses	79,284	0	0	0	0	0	0	0	0	0	0	0	0	79,284
Contingency fund	280,716	0	0	0	0	0	0	0	0	0	0	0	0	280,716
Cost of good sold	0	0	0	474,975	474,975	474,975	474,975	474,975	474,975	474,975	474,975	474,975	474,975	4,749,750
Salary expenses	0	95,600	95,600	95,600	95,600	95,600	95,600	95,600	95,600	95,600	95,600	95,600	95,600	1,147,200
Payroll expenses	0	7,648	7,648	7,648	7,648	7,648	7,648	7,648	7,648	7,648	7,648	7,648	7,648	91,776
Outside services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Supplies (office and operating)	0	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Repairs and maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Advertising	0	3,551	3,551	3,551	3,551	3,551	3,551	3,551	3,551	3,551	3,551	3,551	3,551	42,615
Car, delivery and travel	0	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Accounting and legal	0	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Utilities	0	4,970	4,970	16,567	16,567	16,567	16,567	16,567	16,567	16,567	16,567	16,567	16,567	175,612
Insurance	0	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Interest	0	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	120,000
Other expenses (Royalties)	0	14,205	14,205	14,205	14,205	14,205	14,205	14,205	14,205	14,205	14,205	14,205	14,205	170,460
Other expenses (income tax)	0	0	0	0	0	0	0	0	0	0	0	0	114,522	114,522
Misc. (unspecified)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	1,300,000	145,974	145,974	632,546	632,546	632,546	632,546	632,546	632,546	632,546	632,546	632,546	747,068	8,031,935
Loan principal payment													300,000	300,000
Capital purchase (specify)														
Other startup costs														
Reserve and/or Escrow														
Owners' Withdrawal														
TOTAL CASH PAID OUT	1,300,000	145,974	145,974	632,546	632,546	632,546	632,546	632,546	632,546	632,546	632,546	632,546	1,047,068	8,331,935
Cash Position (end of month)	0	-145,974	308,052	685,755	663,459	641,162	818,866	796,569	774,273	751,976	729,680	707,384	470,565	470,566
ESSENTIAL OPERATING DATA (non cash flow information)														
Sales Volume (dollars)														
Accounts Receivable				100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	600,000
Bad Debt (end of month)														
Inventory on hand (eom)														
Accounts Payable (eom)														
Depreciation														

Cash Flow (12 months)

Enter Company Name Here | Fiscal Year Begins: Jan-15

	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Total Item EST
Cash on Hand (beginning of month)	470,566	496,668	572,771	648,874	724,976	801,079	1,177,181	1,253,284	1,329,387	1,405,489	1,481,592	1,557,694	470,566
CASH RECEIPTS													
Cash Sales	787,813	837,813	837,813	837,813	837,813	837,813	837,813	837,813	837,813	837,813	837,813	837,813	10,003,756
Collections fm CR accounts	0	0	0	0	0	300,000	0	0	0	0	0	300,000	600,000
Loan/ other cash inj.	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CASH RECEIPTS	787,813	837,813	837,813	837,813	837,813	1,137,813	837,813	837,813	837,813	837,813	837,813	1,137,813	10,603,756
Total Cash Available (before cash out)	1,258,379	1,334,481	1,410,584	1,486,687	1,562,789	1,938,892	2,014,994	2,091,097	2,167,200	2,243,302	2,319,405	2,695,507	11,074,322
CASH PAID OUT													
Buildings/real estate	0	0	0	0	0	0	0	0	0	0	0	0	0
Capital equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Location/administration expenses	0	0	0	0	0	0	0	0	0	0	0	0	0
Contingency fund	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of good sold	594,669	594,669	594,669	594,669	594,669	594,669	594,669	594,669	594,669	594,669	594,669	594,669	7,136,024
Salary expenses	100,380	100,380	100,380	100,380	100,380	100,380	100,380	100,380	100,380	100,380	100,380	100,380	1,204,560
Payroll expenses	8,030	8,030	8,030	8,030	8,030	8,030	8,030	8,030	8,030	8,030	8,030	8,030	96,365
Outside services	0	0	0	0	0	0	0	0	0	0	0	0	0
Supplies (office and operating)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Repairs and maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0
Advertising	4,439	4,439	4,439	4,439	4,439	4,439	4,439	4,439	4,439	4,439	4,439	4,439	53,269
Car, delivery and travel	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Accounting and legal	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Utilities	17,936	17,936	17,936	17,936	17,936	17,936	17,936	17,936	17,936	17,936	17,936	17,936	215,232
Insurance	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Interest	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	102,000
Other expenses (Royalties)	17,756	17,756	17,756	17,756	17,756	17,756	17,756	17,756	17,756	17,756	17,756	17,756	213,075
Other expenses (income tax)	0	0	0	0	0	0	0	0	0	0	0	371,556	371,556
Misc. (unspecified)	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	761,710	761,710	761,710	761,710	761,710	761,710	761,710	761,710	761,710	761,710	761,710	1,133,267	9,512,081
Loan principal payment												300,000	300,000
Capital purchase (specify)													
Other startup costs													
Reserve and/or Escrow													
Owners' Withdrawal													
TOTAL CASH PAID OUT	761,710	761,710	761,710	761,710	761,710	761,710	761,710	761,710	761,710	761,710	761,710	1,433,267	9,812,081
Cash Position (end of month)	496,668	572,771	648,874	724,976	801,079	1,177,181	1,253,284	1,329,387	1,405,489	1,481,592	1,557,694	1,262,241	1,262,241
ESSENTIAL OPERATING DATA (non cash flow information)													
Sales Volume (dollars)													
Accounts Receivable	700,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	650,000
Bad Debt (end of month)													
Inventory on hand (eom)													
Accounts Payable (eom)													
Depreciation													

Cash Flow (12 months)

Enter Company Name Here | Fiscal Year Begins: Jan-16

	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Total Item EST
Cash on Hand (beginning of month)	1,262,241	1,399,291	1,536,341	1,673,391	1,810,441	1,947,491	2,584,541	2,721,591	2,858,641	2,995,691	3,132,741	3,269,791	1,262,241
CASH RECEIPTS													
Cash Sales	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	12,729,972
Collections fm CR accounts	0	0	0	0	0	500,000	0	0	0	0	0	500,000	1,000,000
Loan/ other cash inj.	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CASH RECEIPTS	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	1,560,831	1,060,831	1,060,831	1,060,831	1,060,831	1,060,831	1,560,831	13,729,972
Total Cash Available (before cash out)	2,323,072	2,460,122	2,597,172	2,734,222	2,871,272	3,508,322	3,645,372	3,782,422	3,919,472	4,056,522	4,193,572	4,830,622	14,992,213
CASH PAID OUT													
Buildings/real estate	0	0	0	0	0	0	0	0	0	0	0	0	0
Capital equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Location/administration expenses	0	0	0	0	0	0	0	0	0	0	0	0	0
Contingency fund	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of good sold	742,861	742,861	742,861	742,861	742,861	742,861	742,861	742,861	742,861	742,861	742,861	742,861	8,914,331
Salary expenses	105,399	105,399	105,399	105,399	105,399	105,399	105,399	105,399	105,399	105,399	105,399	105,399	1,264,788
Payroll expenses	8,432	8,432	8,432	8,432	8,432	8,432	8,432	8,432	8,432	8,432	8,432	8,432	101,183
Outside services	0	0	0	0	0	0	0	0	0	0	0	0	0
Supplies (office and operating)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Repairs and maintenance	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	48,000
Advertising	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	66,650
Car, delivery and travel	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Accounting and legal	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Utilities	18,318	18,318	18,318	18,318	18,318	18,318	18,318	18,318	18,318	18,318	18,318	18,318	219,816
Insurance	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Interest	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	84,000
Other expenses (Royalties)	22,217	22,217	22,217	22,217	22,217	22,217	22,217	22,217	22,217	22,217	22,217	22,217	266,604
Other expenses (income tax)	0	0	0	0	0	0	0	0	0	0	0	554,401	554,401
Misc. (unspecified)	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	923,781	923,781	923,781	923,781	923,781	923,781	923,781	923,781	923,781	923,781	923,781	1,478,182	11,639,773
Loan principal payment												300,000	300,000
Capital purchase (specify)													
Other startup costs													
Reserve and/or Escrow													
Owners' Withdrawal													
TOTAL CASH PAID OUT	923,781	923,781	923,781	923,781	923,781	923,781	923,781	923,781	923,781	923,781	923,781	1,778,182	11,939,773
Cash Position (end of month)	1,399,291	1,536,341	1,673,391	1,810,441	1,947,491	2,584,541	2,721,591	2,858,641	2,995,691	3,132,741	3,269,791	3,052,440	3,052,440
ESSENTIAL OPERATING DATA (non cash flow information)													
Sales Volume (dollars)													
Accounts Receivable	700,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	250,000
Bad Debt (end of month)													
Inventory on hand (eom)													
Accounts Payable (eom)													
Depreciation													

Cash Flow (12 months)

Enter Company Name Here | Fiscal Year Begins: Jan-17

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Total Item EST
Cash on Hand (beginning of month)	3,052,440	4,391,689	4,609,683	4,827,677	5,045,671	5,263,666	5,781,660	5,999,654	6,217,648	6,435,642	6,653,637	6,871,631	3,052,440
CASH RECEIPTS													
Cash Sales	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	16,070,988
Collections fm CR accounts	0	0	0	0	0	300,000	0	0	0	0	0	300,000	600,000
Loan/ other cash inj.	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CASH RECEIPTS	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	1,639,249	1,339,249	1,339,249	1,339,249	1,339,249	1,339,249	1,639,249	16,670,988
Total Cash Available (before cash out)	4,391,689	5,730,938	5,948,932	6,166,926	6,384,920	6,902,915	7,120,909	7,338,903	7,556,897	7,774,891	7,992,886	8,510,880	19,723,428
CASH PAID OUT													
Buildings/real estate	0	0	0	0	0	0	0	0	0	0	0	0	0
Capital equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Location/administration expenses	0	0	0	0	0	0	0	0	0	0	0	0	0
Contingency fund	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of good sold	929,051	929,051	929,051	929,051	929,051	929,051	929,051	929,051	929,051	929,051	929,051	929,051	11,148,613
Salary expenses	110,669	110,669	110,669	110,669	110,669	110,669	110,669	110,669	110,669	110,669	110,669	110,669	1,328,027
Payroll expenses	8,854	8,854	8,854	8,854	8,854	8,854	8,854	8,854	8,854	8,854	8,854	8,854	106,242
Outside services	0	0	0	0	0	0	0	0	0	0	0	0	0
Supplies (office and operating)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Repairs and maintenance	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	48,000
Advertising	6,946	6,946	6,946	6,946	6,946	6,946	6,946	6,946	6,946	6,946	6,946	6,946	83,355
Car, delivery and travel	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Accounting and legal	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Utilities	18,450	18,450	18,450	18,450	18,450	18,450	18,450	18,450	18,450	18,450	18,450	18,450	221,400
Insurance	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Interest	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	66,000
Other expenses (Royalties)	27,785	27,785	27,785	27,785	27,785	27,785	27,785	27,785	27,785	27,785	27,785	27,785	333,420
Other expenses (income tax)	0	0	0	0	0	0	0	0	0	0	0	797,233	797,233
Misc. (unspecified)	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	0	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,918,487	14,252,290
Loan principal payment												300,000	300,000
Capital purchase (specify)													
Other startup costs													
Reserve and/or Escrow													
Owners' Withdrawal													
TOTAL CASH PAID OUT	0	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	1,121,255	2,218,487	14,552,290
Cash Position (end of month)	4,391,689	4,609,683	4,827,677	5,045,671	5,263,666	5,781,660	5,999,654	6,217,648	6,435,642	6,653,637	6,871,631	6,292,392	5,171,138
ESSENTIAL OPERATING DATA (non cash flow information)													
Sales Volume (dollars)													
Accounts Receivable	300,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	250,000
Bad Debt (end of month)													
Inventory on hand (eom)													
Accounts Payable (eom)													
Depreciation													

Cash Flow (12 months)

Enter Company Name Here | Fiscal Year Begins: Jan-18

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Total Item EST
Cash on Hand (beginning of month)	5,171,138	5,490,673	5,810,208	6,129,743	6,449,279	6,768,814	7,388,349	7,707,884	8,027,419	8,346,955	8,666,490	8,986,025	5,171,138
CASH RECEIPTS													
Cash Sales	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	20,230,212
Collections fm CR accounts	0	0	0	0	0	300,000	0	0	0	0	0	300,000	600,000
Loan/ other cash inj.	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CASH RECEIPTS	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	1,985,851	1,685,851	1,685,851	1,685,851	1,685,851	1,685,851	1,985,851	20,830,212
Total Cash Available (before cash out)	6,856,989	7,176,524	7,496,059	7,815,594	8,135,130	8,754,665	9,074,200	9,393,735	9,713,270	10,032,806	10,352,341	10,971,876	26,001,350
CASH PAID OUT													
Buildings/real estate	0	0	0	0	0	0	0	0	0	0	0	0	0
Capital equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Location/administration expenses	0	0	0	0	0	0	0	0	0	0	0	0	0
Contingency fund	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of good sold	1,160,839	1,160,839	1,160,839	1,160,839	1,160,839	1,160,839	1,160,839	1,160,839	1,160,839	1,160,839	1,160,839	1,160,839	13,930,067
Salary expenses	116,202	116,202	116,202	116,202	116,202	116,202	116,202	116,202	116,202	116,202	116,202	116,202	1,394,429
Payroll expenses	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296	111,554
Outside services	0	0	0	0	0	0	0	0	0	0	0	0	0
Supplies (office and operating)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Repairs and maintenance	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	48,000
Advertising	8,679	8,679	8,679	8,679	8,679	8,679	8,679	8,679	8,679	8,679	8,679	8,679	104,151
Car, delivery and travel	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Accounting and legal	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Utilities	18,582	18,582	18,582	18,582	18,582	18,582	18,582	18,582	18,582	18,582	18,582	18,582	222,984
Insurance	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Interest	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	48,000
Other expenses (Royalties)	34,717	34,717	34,717	34,717	34,717	34,717	34,717	34,717	34,717	34,717	34,717	34,717	416,604
Other expenses (income tax)	0	0	0	0	0	0	0	0	0	0	0	1,101,856	1,101,856
Misc. (unspecified)	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	2,468,171	17,497,645
Loan principal payment												300,000	300,000
Capital purchase (specify)													
Other startup costs													
Reserve and/or Escrow													
Owners' Withdrawal													
TOTAL CASH PAID OUT	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	1,366,316	2,768,171	17,797,645
Cash Position (end of month)	5,490,673	5,810,208	6,129,743	6,449,279	6,768,814	7,388,349	7,707,884	8,027,419	8,346,955	8,666,490	8,986,025	8,203,705	8,203,705
ESSENTIAL OPERATING DATA (non cash flow information)													
Sales Volume (dollars)													
Accounts Receivable	300,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	250,000
Bad Debt (end of month)													
Inventory on hand (eom)													
Accounts Payable (eom)													
Depreciation													

D Balance sheet

		Year 2014
		as of 12/31/2014
Assets		
Current Assets		
Cash in bank		$ 470,566
Accounts receivable		600,000
Inventory		-
Prepaid expenses		-
Other current assets		-
Total Current Assets		$ 1,070,566
Fixed Assets		
Machinery & equipment		$ 200,000
Furniture & fixtures		30,000
Land & buildings		710,000
Other fixed assets		-
(Accumulated depreciation)		(27,000)
Total Fixed Assets (net of		$ 913,000
Other Assets		
Intangibles		$ -
Deposits		79,284
Goodwill		-
Other		280,716
Total Other Assets		$ 360,000
TOTAL Assets		$ 2,343,566
Liabilities and Equity		
Current Liabilities		
Accounts payable		$ -
Interest payable		-
Taxes payable		-
Notes, short-term (due within		-
Current part, long-term debt		-
Other current liabilities		-
Total Current Liabilities		$ -
Long-term Debt		
Bank loans payable		$ 1,700,000
Notes payable to stockholders		-
LESS: Short-term portion		-
Other long term debt		-
Total Long-term Debt		$ 1,700,000
Total Liabilities		$ 1,700,000
Owners' Equity		
Invested capital		$ 300,000
Retained earnings - beginning		-
Retained earnings - current		343,565
Total Owners' Equity		$ 643,565
Total Liabilities & Equity		$ 2,343,565

		Year 2015
		as of 12/31/2015
Assets		
Current Assets		
Cash in bank		$ 1,262,241
Accounts receivable		650,000
Inventory		-
Prepaid expenses		-
Other current assets		-
Total Current Assets		$ 1,912,241
Fixed Assets		
Machinery & equipment		$ 200,000
Furniture & fixtures		30,000
Land & buildings		710,000
Other fixed assets		-
(Accumulated depreciation)		(54,000)
Total Fixed Assets (net of		$ 886,000
Other Assets		
Intangibles		$ -
Deposits		79,284
Goodwill		-
Other		280,716
Total Other Assets		$ 360,000
TOTAL Assets		$ 3,158,241
Liabilities and Equity		
Current Liabilities		
Accounts payable		$ -
Interest payable		-
Taxes payable		-
Notes, short-term (due within		-
Current part, long-term debt		-
Other current liabilities		-
Total Current Liabilities		$ -
Long-term Debt		
Bank loans payable		$ 1,400,000
Notes payable to stockholders		-
LESS: Short-term portion		-
Other long term debt		-
Total Long-term Debt		$ 1,400,000
Total Liabilities		$ 1,400,000
Owners' Equity		
Invested capital		$ 300,000
Retained earnings - beginning		343,565
Retained earnings - current		1,114,669
Total Owners' Equity		$ 1,758,234
Total Liabilities & Equity		$ 3,158,234

		Year 2016
		as of 12/31/2016
Assets		
Current Assets		
Cash in bank		$ 3,052,440
Accounts receivable		250,000
Inventory		-
Prepaid expenses		-
Other current assets		-
Total Current Assets		$ 3,302,440
Fixed Assets		
Machinery & equipment		$ 200,000
Furniture & fixtures		30,000
Land & buildings		710,000
Other fixed assets		-
(Accumulated depreciation)		(81,000)
Total Fixed Assets (net of		$ 859,000
Other Assets		
Intangibles		$ -
Deposits		79,284
Goodwill		-
Other		280,716
Total Other Assets		$ 360,000
TOTAL Assets		$ 4,521,440
Liabilities and Equity		
Current Liabilities		
Accounts payable		$ -
Interest payable		-
Taxes payable		-
Notes, short-term (due within		-
Current part, long-term debt		-
Other current liabilities		-
Total Current Liabilities		$ -
Long-term Debt		
Bank loans payable		$ 1,100,000
Notes payable to stockholders		-
LESS: Short-term portion		-
Other long term debt		-
Total Long-term Debt		$ 1,100,000
Total Liabilities		$ 1,100,000
Owners' Equity		
Invested capital		$ 300,000
Retained earnings - beginning		1,458,234
Retained earnings - current		1,663,204
Total Owners' Equity		$ 3,421,437
Total Liabilities & Equity		$ 4,521,437

		Year 2017
		as of 12/31/2017
Assets		
Current Assets		
Cash in bank		$ 5,171,138
Accounts receivable		250,000
Inventory		-
Prepaid expenses		-
Other current assets		-
Total Current Assets		$ 5,421,138
Fixed Assets		
Machinery & equipment		$ 200,000
Furniture & fixtures		30,000
Land & buildings		710,000
Other fixed assets		-
(Accumulated depreciation)		(108,000)
Total Fixed Assets (net of		$ 832,000
Other Assets		
Intangibles		$ -
Deposits		79,284
Goodwill		-
Other		280,716
Total Other Assets		$ 360,000
TOTAL Assets		$ 6,613,138
Liabilities and Equity		
Current Liabilities		
Accounts payable		$ -
Interest payable		-
Taxes payable		-
Notes, short-term (due within		-
Current part, long-term debt		-
Other current liabilities		-
Total Current Liabilities		$ -
Long-term Debt		
Bank loans payable		$ 800,000
Notes payable to stockholders		-
LESS: Short-term portion		-
Other long term debt		-
Total Long-term Debt		$ 800,000
Total Liabilities		$ 800,000
Owners' Equity		
Invested capital		$ 300,000
Retained earnings - beginning		3,121,437
Retained earnings - current		2,391,698
Total Owners' Equity		$ 5,813,135
Total Liabilities & Equity		$ 6,613,135

		Year 2018
		as of 12/31/2018
Assets		
Current Assets		
Cash in bank		$ 8,203,705
Accounts receivable		250,000
Inventory		-
Prepaid expenses		-
Other current assets		-
Total Current Assets		$ 8,453,705
Fixed Assets		
Machinery & equipment		$ 200,000
Furniture & fixtures		30,000
Land & buildings		710,000
Other fixed assets		-
(Accumulated depreciation)		(135,000)
Total Fixed Assets (net of		$ 805,000
Other Assets		
Intangibles		$ -
Deposits		79,284
Goodwill		-
Other		280,716
Total Other Assets		$ 360,000
TOTAL Assets		$ 9,618,705
Liabilities and Equity		
Current Liabilities		
Accounts payable		$ -
Interest payable		-
Taxes payable		-
Notes, short-term (due within		-
Current part, long-term debt		-
Other current liabilities		-
Total Current Liabilities		$ -
Long-term Debt		
Bank loans payable		$ 500,000
Notes payable to stockholders		-
LESS: Short-term portion		-
Other long term debt		-
Total Long-term Debt		$ 500,000
Total Liabilities		$ 500,000
Owners' Equity		
Invested capital		$ 300,000
Retained earnings - beginning		5,513,135
Retained earnings - current		3,305,567
Total Owners' Equity		$ 9,118,702
Total Liabilities & Equity		$ 9,618,702