http://erenovable.com/2011/10/23/biodiesel-casero/

Biodiesel Company.

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Business Administration. WS 2011/2012.

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INTRODUCTION

- Currently the global concerns about fossil fuel prices and availability, and the quest of non dependent energy resources and the necessity to reduce greenhouse gas (GHG) emissions.

- Biofuel is a type of fuel derived from biological resources. Among the Biofuels, in this study we will focuses in one of the liquid fuels with relative high degree of applicability in commercial scale. Biodiesel- Bioethanol.

- Developed countries are the major consumers of transportation fuels. Therefore, the potential demand for biofuels and related export opportunities for developing countries

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OBJECTIVES

MAIN OBJECTIVE.

- Realize the business plant study for the installation of a commercial Biodiesel production plant Chile, Colombia and Mexico, following the guidelines provided by the policy environment of each country and the technology supplier information.

SECUNDARY OBJECTIVES

- Determine the total dividend after ten years project study in each case.
- Apply the knowledge acquire during the Business Plant lecture on the development of economical projects of Fuels and Erection of a Energy-Chemical plant, which contributes to the scope of our Master study.

Definitions

- From a general definition, biodiesel corresponds to a renewable fuel derived from natural fats such as vegetable oils or animal fats, obtained through a process of transesterification of vegetable or animal oil.

- *Biodiesel Blend, n*—a blend of biodiesel fuel meeting ASTM D 6751 with petroleum-based diesel fuel, designated BXX, where XX represents the volume percentage of biodiesel fuel in the blend.

- It is a biodegradable fuel which use reduces emissions of greenhouse gases and sulfur oxides.

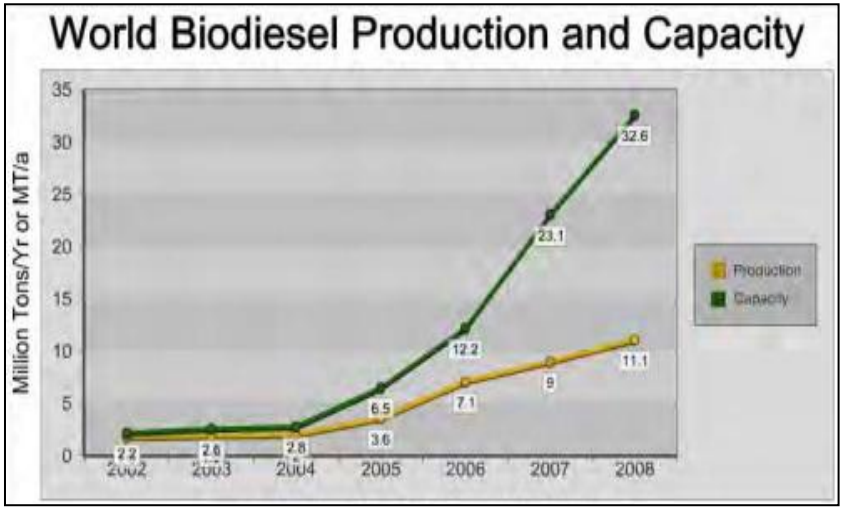
http://agriculturadelperu.blogspot.com/2011/04/siembran-50-mil-hectareas-para-producir.html

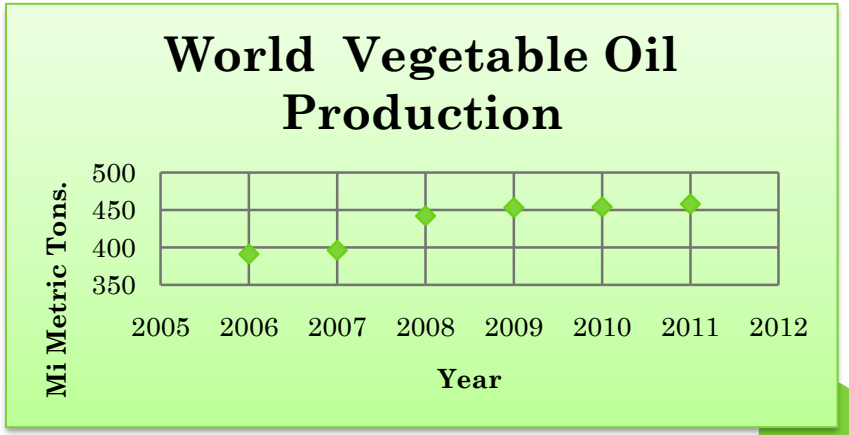
Current Status

- The current scenario for biodiesel is characterized by a continued growth in the next ten years. Europe currently represents 80% of global biodiesel consumption and production, the U.S. is trigging to increase its production in a faster rate than Europe, and Brazil is expected to surpass U.S. and European biodiesel production by the year 2015.

- This accelerated growth is related to the growth of production and fate of vegetable oil in the world.

- Despite of the facts that it is possible to produce biodiesel from any oil, the sources that have been used for this purpose lead to rapeseed oil and less oil palm in the E.U,, while U.S. production comes mainly from soybean oil



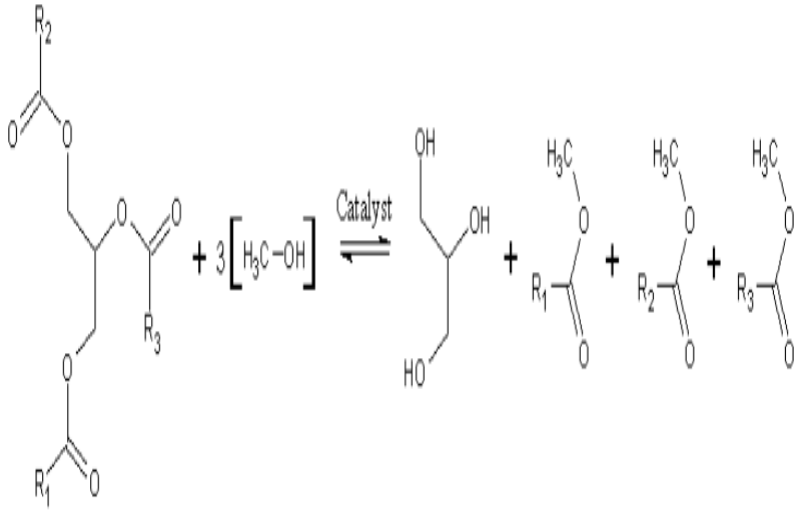


Atlas del Biodiesel. 2010.

Technical Background

- Animal and plant fats and oils are typically made of triglycerides This mixed with an alcohol which commonly, ethanol or methanol are used to produce Biodiesel, and the result is the ester of the alcohol and the glycerol molecule.

- Almost all biodiesel is produced from virgin vegetable oils using the base-catalyzed technique as it is the most economical process for treating virgin vegetable oils, requiring only low temperatures and pressures and producing over 98% conversion yield (provided the starting oil is low in moisture and free fatty acids).



http://jorgedusko.blogspot.com/2010/02/biocombustibles-algunas-experiencias-3.html

Technological Background.

- The production of Biodiesel constitutes a relatively mature chemical production process, and there are several technological suppliers whose provide well established package including all the plant assembly and construction until de post-commissioning itself.
- Our cost calculations are based upon a well known base-catalyst trans-esterification technology and with a relative success in commercial application in subtropical tropics countries.

- *Process building*: Includes all the machinery for the Biodiesel production, the pumps, vessel, reactors and the building structure, where the Biodiesel is produced.
- *Tank Farm*: Includes the tanks for the raw material and final product storage.
- *External Building:* Includes the office Building and all external structure, workers site, etc.

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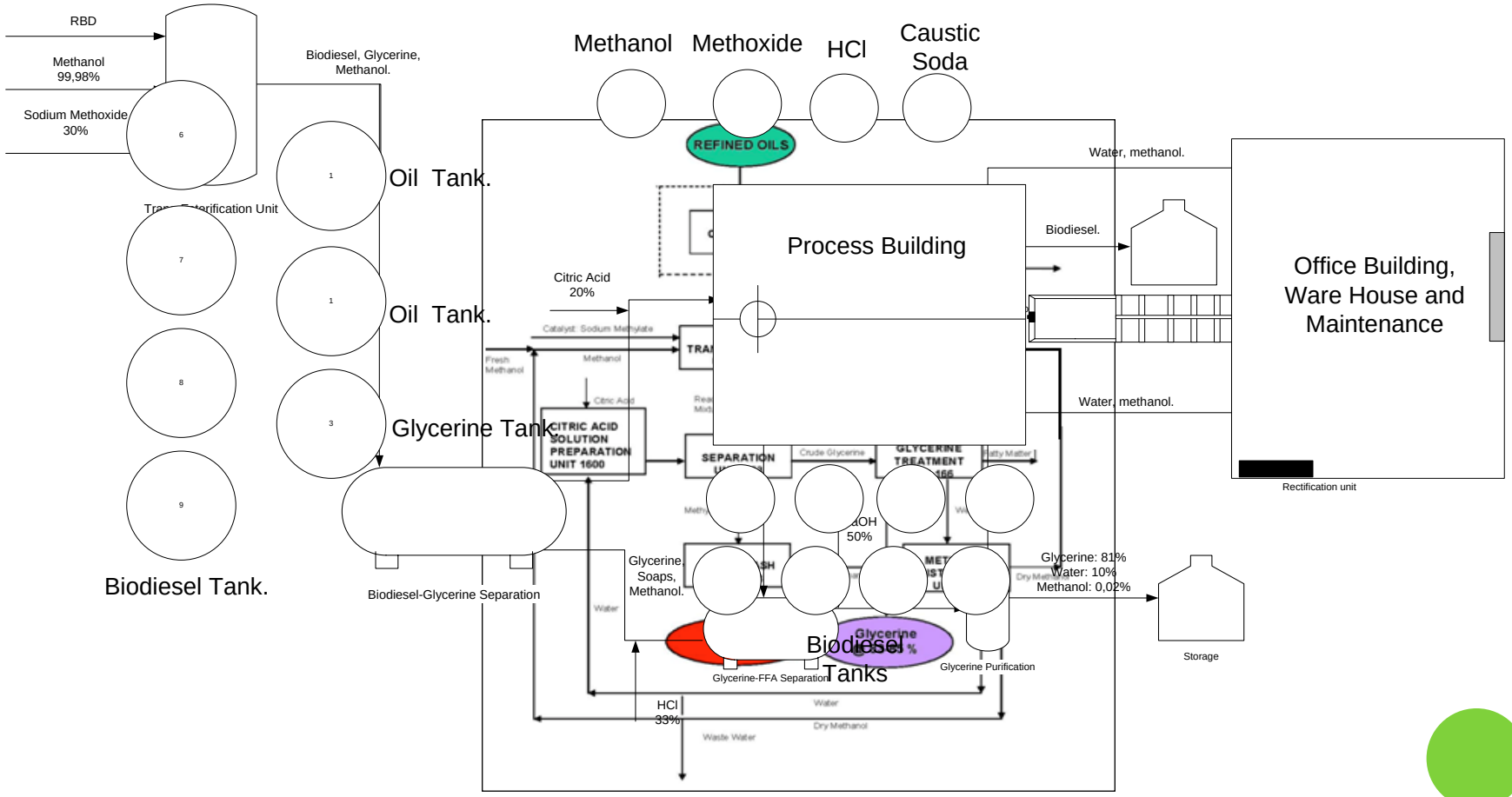
Process Building (Chemical Plant)		
Item	Description	Process section
Process Equipment	Delivery in situ of Machinery, reactors, pumps, and vessels, and special equipment.	Process Building
Grading/Concrete	Include the foundations work and related.	
Structural Building	Include the material and construction of the metal structure where the plant will be placed up.	
Equipment setting	Includes the installation of all the equipment, vessel, pumps, and columns.	
Piping	Includes all the pipelines and equipment related (valves, mixer, special pipes)	
Electrical Setting	Includes the installation and material of all the electrical wiring, connection of equipment with the control room.	
Automation	Includes the installation, calibration of all the instruments and control valve of the plant.	
Insulation	Includes all the isolation material and installation, pipelines and equipment necessary.	
Tank Farm (Storage Tanks)		
Storage Final Product Tanks	Includes the materials and construction.	Tank Farm
Storage Raw Material Tanks	Includes the materials and construction.	
Site Work Labour Cost in the Erection and Commissioning. Engineering		
Site Work erection assembly and related.	Labour Force, material, and welding work.	Site Work
Site Work Commissioning	Training of new costumer in the management of the plant, supervision of the erection and assembly.	
External Buildings		
Utility Buildings/Warehouse	Materials and construction of the utility building where the maintenance of equipment is done, the warehouse for storage and services in general.	Buildings
Office Buildings including furniture	Materials and construction of the office building and administrative services.	

Technological Background.

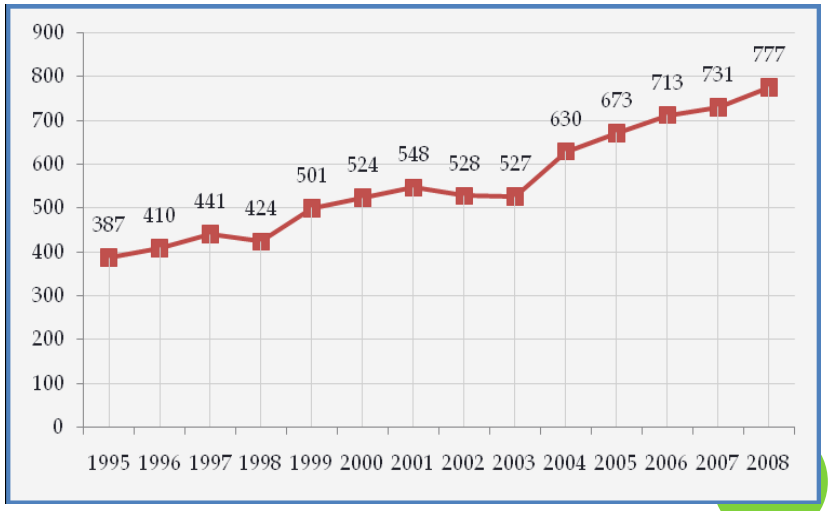


COLOMBIA

- The vegetable sources in Colombia for Biodiesel production are the following including its yield of production.

- Due the high performance of the Colombian palm oil and considering that Colombia is the largest producer of palm oil in Latin America and the fourth in the world, we decided to choose this for the Biodiesel production in our company.

Oil	Performance (lt/he/year)
Palm	5550
Coconut	4200
Castor	2600
Avocado	2460
Jatropha	1559
Rapel	1100
Peanut	990
Soy	840
Sunflower	890



Production performance of crude palm oil in the period 1995 - 2008 (thousand of tonnes)

COLOMBIA

Policy:

- ***"Ley 939 del 2004"*** It stimulates the production and marketing of biofuels for use in diesel engines, according to the following items:

  Article 1: The tax to net income generated by the exploitation of new late yield crops of cocoa, rubber, oil palm, citrus and fruit, which will be determined by the Ministry of Agriculture and Rural Development. The validity of the exemption shall apply within ten years following the enactment of this law.

  Article 9. The Biofuels plant or animal for use in diesel engines of national production is intended for mixing with diesel fuel will be exempt from the global tax to diesel fuel.

- "***Ley 1111 of 2006***" provides a deduction of 40% income tax on investments in real assets products. And a free taxes zone for imports.

- **"Decreto Ministerio de Minas y Energía 2629 de 10 de julio del 2007"**. Establishes a timetable for extending the mandatory blending of biofuels by 10% from 1 January 2010 and 20% from 2012 and the requirement that from 1 January 2012 the fleet new and new motor other devices must be flex-fuel at least 20% for both E-20 blend (80% of basic gasoline with 20% fossil fuel alcohol) and for B-20 (80% of diesel fossil fuels with 20% biofuel).

- **"Resolución 18 1780 de 2005, modificada por la Resolución 18 0212 del 2007."** It was defined a price framework that takes the higher value between the opportunity costs of materials for use in the production of biodiesel and the opportunity cost of fossil diesel fuel, as well as ensuring the recovery of investments in both cases (input efficiency). Ligament was established in the domestic price to international Biodiesel price to petroleum diesel and crude palm oil.

COLOMBIA

- These policy incentives and some others, our company obtains tax exception in the imports of this kind of technology, and a reduction in income taxes to **15%.** In addition the price is fixed by the minister of Energy based in the feedstock price and according to the current oil prices in order to maintain a profit margin in our case we will state the average of the las two years of **€$962/Ton.**

http://www.biosc.com.co/images/phocagallery/thumbs/phoca_thumb_l_vista_nocturna.jpg

COLOMBIA

- The plant will be placed in Barranquilla, north of Colombia, since offers access to the port and zone of free taxes.

Market Study			
Parameter	Spec. Assumption		Comments
	Value	Units	
Total Production	100000	Ton/Year	Based in 8000 operation hours per year
Capacity	300	Ton/day	
Work Time	7 days per week/ 24 hours per day		Continuous Operation. Labour Intensive.
Selling Princes	---		Fixed price by Government Authorities. Energy Minister.
Place of Production	Barranquilla/Colombia		Placed Near the port.
Product	Biodiesel		Must Meet, ASTM Requirements.

Depreciation Table Colombia	
Buildings	20 years
Boats, trains, airplanes, machinery, equipment and property	10 years
vehicles and computers	5 years

COLOMBIA

- The prices for the equipment and its delivery to Latin-America are stated in the table For suggestion of the provider we bought 2 Centrifuge machine to have a redundant system ensuring availability this is the purchased price in situ.
- The prices of the storage tank where estimated with the information of the technology supplier.
- The total costs of the plant are covered by the shareholders with a total participation of 40%, and a bank loan with a participation of 60%, for this kind of projects the interest rate is 4,5% in Colombia.

Item	Price	
Reactor 1	€ 100.000	**Reactor**
Reactor 2	€ 120.000	
Reactor 3	€ 135.000	
Reactor 4	€ 100.000	
Heat Exhanger 1	€ 5.000	**Heat Exchanger**
Heat Exhanger 2	€ 6.000	
Heat Exhanger 3	€ 10.000	
Heat Exhanger 4	€ 15.000	
Heat Exhanger 5	€ 50.000	
Heat Exhanger 6	€ 35.000	
Heat Exhanger 7	€ 50.000	
Heat Exhanger 8	€ 45.000	
Pump 1	€ 4.000	**Pumps**
Pump 2	€ 5.000	
Pump 3	€ 4.500	
Pump 4	€ 3.500	
Pump 5	€ 4.000	
Pump 6	€ 5.000	
Pump 7	€ 5.000	
Pump 8	€ 6.000	
Pump 9	€ 2.275	
Pump 10	€ 2.275	
Pump 11	€ 7.500	
Pump 12	€ 7.500	
Pump 13	€ 8.000	
Pump 14	€ 8.000	
Pump 15	€ 5.500	
Pump 16	€ 5.000	
Pump 17	€ 7.000	
Pump 18	€ 10.000	
Pump 19	€ 7.000	
Methanol Column	€ 375.000	**Columns**
Biodiesel Column	€ 200.000	
Glycerine Column	€ 300.000	
Set cooilng Tower	€ 150.000	**Cooling Water**
Water treatment Plant	€ 80.000	**Waste Purification**
163S2	€ 250.000	**Centrifuge machine**
Total	€ 2.383.050	

COLOMBIA (Consumables and Storage Farm Costs)

Expendable Material	Consumption per Ton of Biodiesel (Kg)	Specific price in Euro (€/kg)	Cost/Ton Biodiesel (€)	Section
Pretreated Oil	1000	0,827	827	Raw Material
Methanol	108	0,649	70,092	
Sodium Methoxide (30%) (70% etanol)	5	0,477	2,385	
Citric Acid	0,7	0,83	0,581	
Clorhydric Acid (36%)	12	3,3	39,6	
Caustic Soda (50%)	1	0,2	0,2	
Electricity (Kwh)	10	0,07	0,66	Services
Water Treatment (Kg Water treatment chemical)	0,5	0,05	0,03	
Steam (Kg)	300	0,00075	0,225143382	
		Total	€ 940,77	

Tank No.	Product	Price	Section
6	Biodiesel	€ 95.993	Final Product
7	Biodiesel	€ 95.993	
8	Biodiesel	€ 95.993	
9	Biodiesel	€ 95.993	
10	Biodiesel	€ 76.794	
11	Biodiesel	€ 76.794	
12	Biodiesel	€ 76.794	
13	Biodiesel	€ 76.794	
14	Biodiesel	€ 76.794	
15	Biodiesel	€ 76.794	
16	Biodiesel	€ 76.794	
3	Glycerine	€ 38.397	
2	Metanol	€ 157.079	Raw Material
3	Sodium Methylate	€ 196.348	
1	Oil	€ 157.079	
1	Oil	€ 157.079	
4	HCl	€ 78.539	
5	Caustic Soda	€ 39.270	
	Total	€ 1.745.319	

COLOMBIA

TOTAL INVESTMENT AND DEPRECIATION COSTS.							
Description	**Value**	**Units**	**Unitary Cost €**	**Total Cost €**	**Depreciation rate in (years)**	**Depreciation per year (€)**	**Detail**
Land	17000	m2	402,00	6.834.000	0	€ -	Land
			Total Land	**6.834.000**		**€ -**	
Process Building (Chemical Plant)							
Process Equipment				2.383.050	10	238.305	Process Building
Granding/Concrete				188.136	10	18.814	
Structural Building				627.118	10	62.712	
Equipment setting				219.491	10	21.949	
Piping				1.254.237	10	125.424	
Electrical Setting				752.542	10	75.254	
Automation				501.695	10	50.169	
Insulation				376.271	10	37.627	
			Total Process Building	**6.302.540**		**630.254**	
Tank Farm (Storage Tanks)							
Storage Final Product Tanks				959.925	10	95.993	Tank Farm
Storage Raw Material Tanks				785.393	10	78.539	
			Total Farm Storage	**1.745.319**		**174.532**	
Site Work Labour Cost in the Erection and Commisioning. Engineering							
Site Work erection assembly and related.				872.659			Site Work
Site Work Commisioning				96.962			
			Total Site Erection	**969.622**		-	
External Buildings							
Utiliy Buildings/Warehouse				387.849	20	19.392	Buildings
Office Buildings including furniture				290.886	20	14.544	
			Total External Buildings	**678.735**		**33.937**	
			Total Erection And Building of the Palnt	**9.696.216**		**838.723**	
			Total unexpected	**1.000.000**			
			Total circulating Capital	**1.000.000**			
			Total	**€ 18.530.216**			

COLOMBIA (LABOUR COSTS)

			DEDUCTIONS			
Personal in Costs Center	**Number**	**Salary Agreed Brut**	**Health insurance (4%)**	**Retirement Pay (4%)**	**Social Contribution of Salary (10%)**	**Salary Net**
Manager	1	€ 9.615	€ 385	€ 385	€ 962	€ 8.654
Plant Director	1	€ 3.846	€ 154	€ 154	€ 385	€ 3.462
Industrial Security Chief	1	€ 2.692	€ 108	€ 108	€ 269	€ 2.423
Maintenance Chief	1	€ 2.692	€ 108	€ 108	€ 269	€ 2.423
Comercial Chief	1	€ 2.692	€ 108	€ 108	€ 269	€ 2.423
Accountant	1	€ 1.154	€ 46	€ 46	€ 115	€ 1.038
Secretary	1	€ 769	€ 31	€ 31	€ 77	€ 692
Logistic Services Personnel	2	€ 769	€ 31	€ 31	€ 77	€ 692
Sales Personnel	1	€ 769	€ 31	€ 31	€ 77	€ 692
Tender Personnel	1	€ 769	€ 31	€ 31	€ 77	€ 692
Maitenance Engineering	2	€ 962	€ 38	€ 38	€ 96	€ 865
Automation Engineer	1	€ 962	€ 38	€ 38	€ 96	€ 865
Plant Engineer	5	€ 1.154	€ 46	€ 46	€ 115	€ 1.038
Plant operator	5	€ 385	€ 15	€ 15	€ 38	€ 346
Mechanical Operator	5	€ 385	€ 15	€ 15	€ 38	€ 346
Electric Operator	5	€ 385	€ 15	€ 15	€ 38	€ 346
General Services	5	€ 308	€ 12	€ 12	€ 31	€ 277
Total labour Cost per month		**€ 30.308**				
Total labour Cost per year		**€ 363.692**				

COLOMBIA (FINANCING COSTS)

Total investment	€	18.530.216
40% Shareholders	€	7.412.086
60% Bank loan	€	11.118.129

Interest Rate %	4,5%

Year	Balance Of Debt	Interest Rate	Interest Costs Paid	Repayment / Paying back loan p.a.
1	€ 11.118.129	4,5%	€ 500.316	€ 1.111.813
2	€ 10.006.316	4,5%	€ 450.284	€ 1.111.813
3	€ 8.894.503	4,5%	€ 400.253	€ 1.111.813
4	€ 7.782.691	4,5%	€ 350.221	€ 1.111.813
5	€ 6.670.878	4,5%	€ 300.189	€ 1.111.813
6	€ 5.559.065	4,5%	€ 250.158	€ 1.111.813
7	€ 4.447.252	4,5%	€ 200.126	€ 1.111.813
8	€ 3.335.439	4,5%	€ 150.095	€ 1.111.813
9	€ 2.223.626	4,5%	€ 100.063	€ 1.111.813
10	€ 1.111.813	4,5%	€ 50.032	€ 1.111.813
Total			€ 2.751.737	

COLOMBIA (SELF COSTS)

Capacity (Ton/year) 100000

Year	1	2	3	4	5	6	7	8	9	10
Utilization Capacity	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Quantity produced (Ton)	80000	100000	100000	100000	100000	100000	100000	100000	100000	100000
Costs										
Depreciation Cost (€)	838.723	838.723	838.723	838.723	838.723	838.723	838.723	838.723	838.723	838.723
Financing Costs (€)	500.316	450.284	400.253	350.221	300.189	250.158	200.126	150.095	100.063	50.032
Labour Costs (€)	363.692	363.692	363.692	363.692	363.692	363.692	363.692	363.692	363.692	363.692
Consumption Costs (€)	75.261.600	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000
Total Costs (€)	76.964.331	95.729.699	95.679.668	95.629.636	95.579.604	95.529.573	95.479.541	95.429.510	95.379.478	95.329.447
Costs per Ton/Biodiesel. (€)	962	957	957	956	956	955	955	954	954	953

COLOMBIA (CASH FLOW)

Year	1	2	3	4	5	6	7	8	9	10
Production Biodiesel(Ton)	80000	100000	100000	100000	100000	100000	100000	100000	100000	100000
Price of Biodiesel stated by Minister (€)	962	962	962	962	962	962	962	962	962	962
Production Glycerine (Ton)	9600	12000	12000	12000	12000	12000	12000	12000	12000	12000
Price of Glycerine (€/Ton)	25	25	25	25	25	25	25	25	25	25
Turnover (€)	77.200.000	96.500.000	96.500.000	96.500.000	96.500.000	96.500.000	96.500.000	96.500.000	96.500.000	96.500.000
Depreciation Costs (€)	838.723	838.723	838.723	838.723	838.723	838.723	838.723	838.723	838.723	838.723
Labour costs (€)	363.692	363.692	363.692	363.692	363.692	363.692	363.692	363.692	363.692	363.692
Consumption Costs (€)	75.261.600	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000	94.077.000
Financing Costs (€)	500.316	450.284	400.253	350.221	300.189	250.158	200.126	150.095	100.063	50.032
Loss carried Forward (€)		(72.771)	0	0	0	0	0	0	0	0
Profit Before Taxes (€)	235.669	770.301	820.332	870.364	920.396	970.427	1.020.459	1.070.490	1.120.522	1.170.553
Taxes (15%) (€)	35.350	115.545	123.050	130.555	138.059	145.564	153.069	160.574	168.078	175.583
Profit after Taxes (€)	200.319	654.756	697.283	739.809	782.336	824.863	867.390	909.917	952.444	994.970
Cash Flow (€)	1.039.041	1.493.478	1.536.005	1.578.532	1.621.059	1.663.586	1.706.113	1.748.639	1.791.166	1.833.693
Repayment credit (€)	1.111.813	1.111.813	1.111.813	1.111.813	1.111.813	1.111.813	1.111.813	1.111.813	1.111.813	1.111.813
Dividend (€)	(72.771)	381.665	424.192	466.719	509.246	551.773	594.300	636.826	679.353	721.880

Total dividend

€

4.893.184

MEXICO

Currently, Mexican association of bioenergy (Red Mexicana de Bioenergía) has asset that the share of bioenergy represents 8% of the total primary energy in Mexico, however the same association considers that it could represent 60% of the current demand .[1] However, only one biofuel law has been approved by the Mexican Congress "the Bio-Fuels Promotion and Development Law" in late April, 2007[4] and complemented with the approval of the " biofuels Promotion & Development Law" (*Ley de Promoción y Desarrollo de los Bioenergéticos*, or LPDB), which targets mainly to promote biofuel input production derived from agricultural activities, forestry and biotechnological and enzymatic processes without jeopardizing food safety or sovereignty, while fostering rural development through production, commercialization and use of biofuels, reactivating the rural sector and improving economic conditions, especially in underprivileged communities. It also targets reducing greenhouse-effect gas emissions.[3]

Biofuels currently are not used by the transportation sector in Mexico and PEMEX, the national oil company, would be the sole buyer of biofuel products, thus it would be the responsibility of PEMEX to make necessary upgrades to its own refining, storage, and distribution systems (USDA 2007). It would cost $77M-120M to convert Mexico's existing gasoline/biodiesel storage and distribution terminals to allow for the blending of biofuels. Also, fossil fuels count with a subsidy benefiting the final consumer with around 20% less.[7]

Biodiesel production in Mexico is limited to a few small-scale plants with a total production of approximately 3300 tons per year (USDA 2007). Biodiesel in Mexico is produced from animal fat and used cooking oil. The following plants are currently in operation in Mexico and mainly for exporting biofuel:

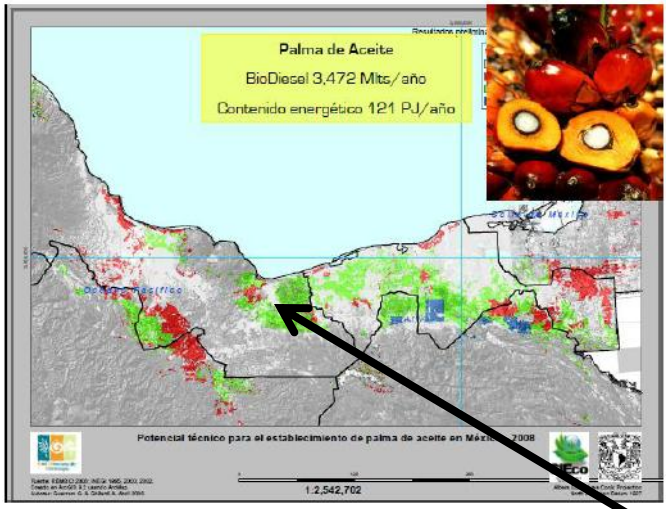
- Grupo Energeticos (3200 T/year)
- Monterrey institute of Technology (84T/year)
- Vasconcelos University (38T/year)

Mexico has also expressed interest in jatropha, but has not developed any action plan. Estimates by SENER show that there are more than 2 million ha available for palm oil production (currently 15000 ha), and approximately 1 million ha available for jatropha cultivation. [2]

MEXICO

Prior to designing a program to promote the use of biofuels, there has been a feasibility study in which it is mentioned that to achieve the substitution of 5% of fossil diesel it is necessary to install 10 large-scale plants (100 000 t/a) and the required investment is up to 182352941€ (MEX$3100 million). The cost of biodiesel production has been estimated (without taxes and tariffs) between 0, 31€ – 0,73€ ($5,3 – $12,4 Mexican pesos) per liter, in contrast with the cost of production of fossil diesel 0,25€ ($4,3 Mexican pesos).

During the last 8 years it has been observed an increased in the crop area for oil palm and according the research made around 2,5 million ha with high potential for growing oil palm in Chiapas, Oaxaca, Campeche, Guerrero, Quintana Roo, Tabasco y Veracruz and the regions with good rainfalls for growing purposes match to Tabasco, Veracruz, Jalisco, Morelos, Chiapas, among others.



Minatitlán, Veracruz

Fig. 10 Source: SOLBEN. Biodiesel en México.

The potential for biodiesel production out of palm oil has been estimated as 3472M liters/year and the state of Veracurz is considered with high potencial for biodiesel production.

Source: SOLBEN. Biodiesel en México.

Mexico

- **MEXICANA BIODIESEL S.A.**

The business plan has been calculated based on data obtained from the Mexican government; the available information provides data considering a large-scale plant (100.000 tones/year production), however there is a lack of detailed information in regard the costs of machinery, installation, commissioning and equipment setting for this type of plant in Mexico, so the total costs for erection of such a plant was found on feasibility study (Atlas de Biodiesel América).

Depreciation Table México	
Buildings	5.0%
Machinery, furnitures	10.0%
Automobiles	25.0%
Electronic equipment	30.0%

Table No. 15 Depreciation rate

MEXICO (MARKET STUDY)

The location of the plant has been chosen in Veracruz considering the potential of the location to grow the principal raw material need. Also the proximity to the main ports and one of the six refineries existing in Mexico are major factors considered in the selection of this location (see Fig. 10).The following chart shows the market study and depreciation rates in Mexico:

Market Study			
Parameter	Spec. Assumption		Comments
	Value	Units	
Total Production	100000	Ton/Year	Based in 7500 operation hours per year
Capacity	274.0	Ton/day	
Work Time	7 days per week/ 24 hours per day		Continuous Operation. Labour Intensive.
Place of Production	Minatitlán Veracruz, México		Placed Near the refinery & Harbor
Product	Biodiesel (palm oil)		Must Meet, ASTM Requirements.

MEXICO (MACHINERY AND EQUIPMENT)

Item	Price	Net price		Importing tax
Reactor 1	€ 100,000	€ 546,000	Reactor	20.00%
Reactor 2	€ 120,000			
Reactor 3	€ 135,000			
Reactor 4	€ 100,000			
Heat Exhanger 1	€ 5,000	€ 231,120	Heat Exchanger	7.00%
Heat Exhanger 2	€ 6,000			
Heat Exhanger 3	€ 10,000			
Heat Exhanger 4	€ 15,000			
Heat Exhanger 5	€ 50,000			
Heat Exhanger 6	€ 35,000			
Heat Exhanger 7	€ 50,000			
Heat Exhanger 8	€ 45,000			

MEXICO (MACHINERY AND EQUIPMENT)

Item	Price	Net price		Importing tax
Pump 1	€ 4,000	€ 114,544	Pumps	7.00%
Pump 2	€ 5,000			
Pump 3	€ 4,500			
Pump 4	€ 3,500			
Pump 5	€ 4,000			
Pump 6	€ 5,000			
Pump 7	€ 5,000			
Pump 8	€ 6,000			
Pump 9	€ 2,275			
Pump 10	€ 2,275			
Pump 11	€ 7,500			
Pump 12	€ 7,500			
Pump 13	€ 8,000			
Pump 14	€ 8,000			
Pump 15	€ 5,500			
Pump 16	€ 5,000			
Pump 17	€ 7,000			
Pump 18	€ 10,000			
Pump 19	€ 7,000			

MEXICO (MACHINERY AND EQUIPMENT)

Item	Price	Net price		Importing tax
Methanol Column	€ 375,000	€ 962,500	Columns	10.00%
Biodiesel Column	€ 200,000			
Glycerine Column	€ 300,000			
Set cooilng Tower	€ 150,000	€ 180,000	Cooling Water	20.00%
Water treatment Plant	€ 80,000	€ 88,000	Waste Purification	10.00%
163S2	€ 250,000	€ 275,000	Centrifuge machine	10.00%
Subtotal	€ 2,383,050			
TOTAL		€ 2,672,163.50	€ 289,114	

2 Centrifugue machine wer bought to have a redundant system ensuring availability.

Importing taxes for Mexico. Reference LIGIE (law of general taxes for importing and exporting)

MEXICO (CONSUMPTION COSTS)

Based on the experience of the plant in Colombia, the raw material and supplies are calculated for 1000 kg of biodiesel production with palm oil; however the prices vary according to information provided by Mexican studies:

Expendable Material	Specific Consumption per Ton of Biodiesel produced. (Kg)	Specific price in Euro (€)	Cost/Ton Biodiesel (€)	Section
Pretreated Oil	1000	0.24 €	235.88 €	Raw Material
Methanol	108	0.21 €	23.06 €	
Sodium Methoxide (30%) (70% methanol)	5	0.49 €	2.44 €	
Citric Acid	0.7	0.83 €	0.58 €	
Clorhydric Acid (36%)	12	3.30 €	39.60 €	
Caustic Soda (50%)	1	0.20 €	0.20 €	
Electricity (Kwh)	10	0.04 €	0.44 €	Services
Water Treatment (Kg Water treatment chemical)	0.5	0.05 €	0.03 €	
Steam (Kg)	300	3.46 €	1,037.28 €	
		Total	€ 1,339.51	

MEXICO (TOTAL INVESTMENT AND DEPRECIATION COSTS)

Description	Unitary Cost	Total Cost	Depreciation rate in (years)	Depreciation per year (%)
Land	€ 51.30	€ 872,100	0.00%	€ -
Total Land		€ 872,100		€ -
Process Building (Chemical Plant)				
Process Equipment (Machinery, reactors, pumps, and vessels)		€ 2,672,164	10.00%	€ 267,216
Granding/Concrete		€ 210,960	5.00%	€ 10,548
Structural Building		€ 703,201	5.00%	€ 35,160
Equipment setting		€ 246,120	10.00%	€ 24,612
Piping		€ 1,406,402	10.00%	€ 140,640
Electrical Setting		€ 843,841	10.00%	€ 84,384
Automation		€ 562,561	10.00%	€ 56,256
Insulation		€ 421,921	10.00%	€ 42,192
Total Process Building		€ 7,067,169		€ 661,009

MEXICO (TOTAL INVESTMENT AND DEPRECIATION COSTS)

Tank Farm (Storage Tanks)				
Storage Final Product Tanks		€ 1,076,384	10.00%	€ 107,638
Storage Raw Material Tanks		€ 880,678	10.00%	€ 88,068
Total Farm Storage		€ 1,957,062		€ 195,706
Site Work Labour Cost in the Erection and Commisioning. Engineering				
Site Work erection assembly and related.		€ 978,531	10.00%	€ 97,853
Site Work Commisioning		€ 108,726	10.00%	€ 10,873
Total Site Erection		€ 1,087,257		€ 108,726
External Buildings				
Utiliy Buildings/Warehouse		€ 434,903	20.00%	€ 2,174,514
Office Buildings including furniture		€ 326,177	20.00%	€ 1,630,885
Total External Buildings		€ 761,080		€ 3,805,399
Total Erection And Building of the Palnt		€ 10,872,568		€ 4,770,840
Total unexpected		€ 1,000,000		
Total circulating Capital		€ 1,000,000		
Total	€	13,744,668		

MEXICO (LABOR COSTS)

The labor costs for Mexico have been calculated according to the Ministry of Labor

Personal in Costs Center	Number	Salary Agreed Brut	Health insurance (3%)	Retirement contribution (1.125%)	income tax (ca. 25%)	Salary Net
Manager	1	€ 5,882.35	€ 176	€ 66	€ 1,471	€ 4,169.12
Plant Director	1	€ 4,706	€ 141	€ 53	€ 1,176	€ 3,335.29
Industrial Security Chief	1	€ 3,706	€ 111	€ 42	€ 926	€ 2,626.54
Maintenance Chief	1	€ 3,235	€ 97	€ 36	€ 809	€ 2,293.01
Comercial Chief	1	€ 2,647	€ 79	€ 30	€ 662	€ 1,876.10
Accountant	1	€ 1,176	€ 35	€ 13	€ 294	€ 833.82
Secretary	1	€ 588	€ 18	€ 7	€ 147	€ 416.91
Logistic Services Personnel	2	€ 882	€ 26	€ 10	€ 221	€ 625.37
Sales Personnel	1	€ 1,471	€ 44	€ 17	€ 368	€ 1,042.28
Tender Personnel	1	€ 1,765	€ 53	€ 20	€ 441	€ 1,250.74
Maitenance Engineering	2	€ 882	€ 26	€ 10	€ 221	€ 625.37
Automation Engineer	1	€ 1,294	€ 39	€ 15	€ 324	€ 917.21
Plant Engineer	5	€ 1,294	€ 39	€ 15	€ 324	€ 917.21
Plant operator	5	€ 294	€ 9	€ 3	€ 74	€ 208.46
Mechanical Operator	5	€ 294	€ 9	€ 3	€ 74	€ 208.46
Electric Operator	5	€ 294	€ 9	€ 3	€ 74	€ 208.46
General Services	5	€ 235	€ 7	€ 3	€ 59	€ 166.76
Total labour Cost per year		€ 367,764.71				

MEXICO (SELF-COSTS)

Taking all the previous calculations and self-costs the cash-flow is calculated as follows:

Year	1	2	3	4	5	6	7	8	9	10
Utilization Capacity	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Quantity produced	80000	100000	100000	100000	100000	100000	100000	100000	100000	100000
Costs										
Depreciation Cost	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840
Financing Costs	€ 494,808	€ 445,327	€ 395,846	€ 346,366	€ 296,885	€ 247,404	€ 197,923	€ 148,442	€ 98,962	€ 49,481
Labour Costs	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765
Consumption Costs	€ 107,161,186	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482
Total Costs	€ 112,794,598	€ 139,535,414	€ 139,485,933	€ 139,436,452	€ 139,386,971	€ 139,337,491	€ 139,288,010	€ 139,238,529	€ 139,189,048	€ 139,139,567
Costs per Ton/Biodiesel.	€ 1,409.93	€ 1,395.35	€ 1,394.86	€ 1,394.36	€ 1,393.87	€ 1,393.37	€ 1,392.88	€ 1,392.39	€ 1,391.89	€ 1,391.40

MEXICO (CASH-FLOW)

Total dividend in ten years is: €50,599,180

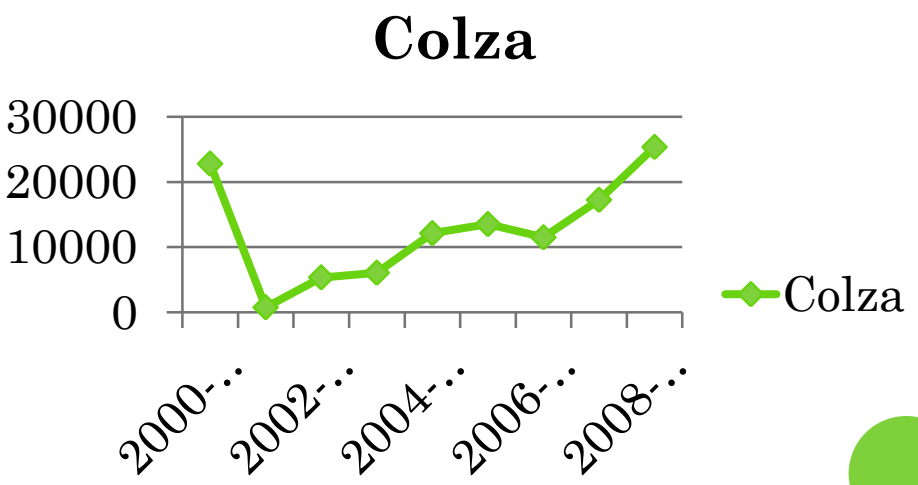
Year	1	2	3	4	5	6	7	8	9	10
Production Biodiesel(Ton)	80000	100000	100000	100000	100000	100000	100000	100000	100000	100000
Price of Diesel (ton)	€ 1,400	€ 1,400	€ 1,400	€ 1,400	€ 1,400	€ 1,400	€ 1,400	€ 1,400	€ 1,400	€ 1,400
Production of Glycerine (Ton)	9600	12000	12000	12000	12000	12000	12000	12000	12000	12000
Price of ton Glycerine	€ 96	€ 96	€ 96	€ 96	€ 96	€ 96	€ 96	€ 96	€ 96	€ 96
Turnover	€ 112,923,294	€ 141,154,118	€ 141,154,118	€ 141,154,118	€ 141,154,118	€ 141,154,118	€ 141,154,118	€ 141,154,118	€ 141,154,118	€ 141,154,118
Depreciation Costs	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840	€ 4,770,840
Labour costs	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765	€ 367,765
Consumption Costs	€ 107,161,186	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482	€ 133,951,482
Financiang Costs	€ 494,808	€ 445,327	€ 395,846	€ 346,366	€ 296,885	€ 247,404	€ 197,923	€ 148,442	€ 98,962	€ 49,481
Loss carried Forward		0	0	0	0	0	0	0	0	0
Profit Before Taxes	€ 128,696	€ 1,618,704	€ 1,668,185	€ 1,717,665	€ 1,767,146	€ 1,816,627	€ 1,866,108	€ 1,915,589	€ 1,965,069	€ 2,014,550
Taxes (0.15 iva & 0.0166 IEPS = 0.166)	€ 21,364	€ 268,705	€ 276,919	€ 285,132	€ 293,346	€ 301,560	€ 309,774	€ 317,988	€ 326,202	€ 334,415
Profit after Taxes	€ 107,332	€ 1,349,999	€ 1,391,266	€ 1,432,533	€ 1,473,800	€ 1,515,067	€ 1,556,334	€ 1,597,601	€ 1,638,868	€ 1,680,135
Cash Flow	€ 4,878,172	€ 6,120,839	€ 6,162,106	€ 6,203,373	€ 6,244,639	€ 6,285,906	€ 6,327,173	€ 6,368,440	€ 6,409,707	€ 6,450,974
Repayment credit	€ 1,085,215	€ 1,085,215	€ 1,085,215	€ 1,085,215	€ 1,085,215	€ 1,085,215	€ 1,085,215	€ 1,085,215	€ 1,085,215	€ 1,085,215
Dividend	€ 3,792,957	€ 5,035,624	€ 5,076,890	€ 5,118,157	€ 5,159,424	€ 5,200,691	€ 5,241,958	€ 5,283,225	€ 5,324,492	€ 5,365,759

Chile

- Plant sources of Chile for the production of biodiesel are as follows including their production performance.

  Because of the high performance of Chilean rapeseed oil and taking it has the highest production in Chile, we decided to choose this for the production of biodiesel in our company.

cultivation	Area (hectares)
Colza	25360
Sunflower (Girasol)	3780

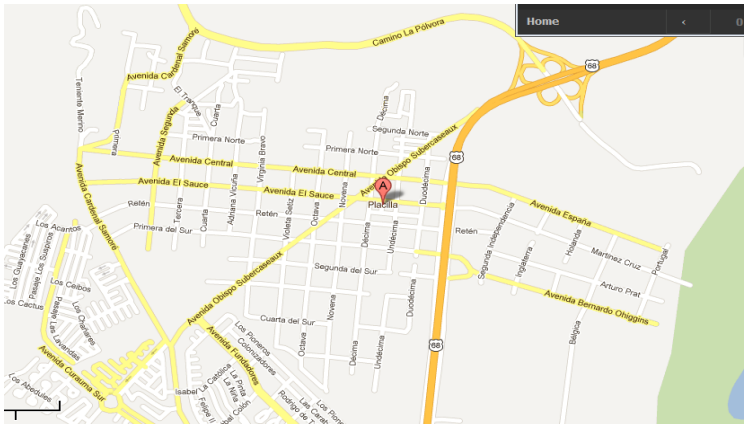


POLICY-CHILE

- Decree No. 1442 of the Ministry of Finance-Customs Tariff Amendment
  || national (OJ 04.05.2008) of the National Customs Service, introduces new
  new tariff codes for biodiesel from oilseed species
  as canola, soybean, sunflower, castor, palm oils and animal fats; of mixtures
  vegetable and animal oils and synthetic biomass in heading 38.24.
- Circular No. 30 of IBS, of May 16, 2007: Train-on treatment taxation of biofuels || called biodiesel and bioethanol, consider that biofuels will have differential tax treatment
- Law No. 20 257 of the Ministry of Economy, Development and Reconstruction:
  -Introduces Amendments to the General Law on the Electric Utility power generation with renewable energy sources conventional "(OJ 01.04.2008) states that, from 2010, new should ensure supply contracts from 5% NCRE. this percentage will increase by 0.5% annually from 2015 to reach a 10% in 2024. It is estimated that this provision will mean the incorporation of
  about 1600 MW additional power NCRE in the next 16 years

Chile

- The site chosen for the installation of the plant was Placilla, Valp araiso



Market Study			
Parameter	Spec. Assumption		Comments
	Value	Units	
Total Production	100000	Ton/Year	Based in 8000 operation hours per year
Capacity	300	Ton/day	
Work Time	7 days per week/ 24 hours per day		Continuous Operation. Labour Intensive.
Selling Princes	---		Fixed price by Govermenment Authorities. Energy Minister.
Place of Production	Placilla, Valparaiso/Chile		Placed Near the port.
Product	Biodiesel		Must Meet, ASTM Requirements.

Depreciation Table Chile	
Property	40 year
Machinery	15 year
furniture and vehicles	7 year
Equipos computacionales	6 year
Electric system, offices and ponds	10 year

COMSUMPTION COST-CHILE

Expendable Material	Specific Consumption per Ton of Biodiesel produced. (Kg)	Specific price in Euro (€/kg)	Cost/Ton Biodiesel (€)	Section
Pretreated Oil	1000	0,865	865	Raw Material
Methanol	108	0,65	70,2	
Sodium Methoxide (30%) (70% methanol)	5	0,432	2,16	
Citric Acid	0,7	0,59	0,413	
Clorhydric Acid (36%)	12	3,8	45,6	
Caustic Soda (50%)	1	0,25	0,25	
Electricity (Kwh)	10	0,10	0,99	Services
Water Treatment (Kg Water treatment chemical)	0,5	0,07	0,04	
Steam (Kg)	300	0,00318	0,9528	
		Total	€ 985,60	

CHILE

Description	Value	Units	Unitary Cost	Total Cost	Depreciation rate in (years)	Depreciation per year (€)	Detail
Land	17000	m2	€ 18,08	€ 307.360	0	€ -	Land
Total Land				€ 307.360		€ -	
Process Building (Chemical Plant)							
Process Equipment (Machinery, reactors, pumps, and vessels)				€ 2.383.050	15	€ 158.870	Process Building
Granding/Concrete				€ 188.136	40	€ 4.703	
Structural Building				€ 627.118	40	€ 15.678	
Equipment setting				€ 219.491	15	€ 14.633	
Piping				€ 1.254.237	15	€ 83.616	
Electrical Setting				€ 752.542	10	€ 75.254	
Automation				€ 501.695	6	€ 83.616	
Insulation				€ 376.271	15	€ 25.085	
Total Process Building				€ 6.302.540		€ 461.455	
Tank Farm (Storage Tanks)							
Storage Final Product Tanks				€ 959.925	10	€ 95.993	Tank Farm
Storage Raw Material Tanks				€ 785.393	10	€ 78.539	
Total Farm Storage				€ 1.745.319		€ 174.532	
Site Work Labour Cost in the Erection and Commisioning. Engineering							
Site Work erection assembly and related.				€ 872.659			Site Work
Site Work Commisioning				€ 96.962			
Total Site Erection				€ 969.622		€ -	
External Buildings							
Utiliy Buildings/Warehouse				€ 387.849	10	€ 38.785	Buildings

LABOUR COST-CHILE

			DEDUCTIONS				
Personal in Costs Center	Number	Salary Agreed Brut	Health insurance (7%)	Retirement Pay (10%)	Income tax (5-40%)	Salary Net	Salary per year
Manager	1	€ 7.400	€ 518	€ 740	€ 2.368	€ 3.774	€ 88.800
Plant Director	1	€ 5.035	€ 352	€ 504	€ 1.259	€ 2.920	€ 60.420
Industrial Security Chief	1	€ 2.700	€ 189	€ 270	€ 270	€ 1.971	€ 32.400
Maintenance Chief	1	€ 2.670	€ 187	€ 267	€ 267	€ 1.949	€ 32.040
Comercial Chief	1	€ 2.700	€ 189	€ 270	€ 270	€ 1.971	€ 32.400
Accountant	1	€ 1.407	€ 98	€ 141	€ 70	€ 1.097	€ 16.884
Secretary	1	€ 590	€ 41	€ 59	€ -	€ 490	€ 7.080
Logistic Services Personnel	2	€ 580	€ 41	€ 58	€ -	€ 481	€ 6.960
Sales Personnel	1	€ 590	€ 41	€ 59	€ -	€ 490	€ 7.080
Tender Personnel	1	€ 769	€ 54	€ 77	€ -	€ 638	€ 9.231
Maitenance Engineering	2	€ 962	€ 67	€ 96	€ 48	€ 750	€ 11.538
Automation Engineer	1	€ 962	€ 67	€ 96	€ 48	€ 750	€ 11.538
Plant Engineer	5	€ 1.470	€ 103	€ 147	€ 74	€ 1.147	€ 17.640
Plant operator	5	€ 385	€ 27	€ 38	€ -	€ 319	€ 4.615
Mechanical Operator	5	€ 443	€ 31	€ 44	€ -	€ 368	€ 5.316
Electric Operator	5	€ 443	€ 31	€ 44	€ -	€ 368	€ 5.316
General Services	5	€ 405	€ 28	€ 41	€ -	€ 336	€ 4.860
Total labour Cost per month		€ 29.510					€ 354.119

FINANCING COST-CHILE

Total investment	€ 12.003.576		Interest Rate %	8,7%
40% Shareholders	€ 4.801.430			
60% Bank loan	€ 7.202.145			
Year	Balance Of Debt	Interest Rate	Interest Costs Paid	Repayment / Paying back loan p.a.
1	€ 11.118.129	8,7%	€ 967.277	€ 1.111.813
2	€ 10.006.316	8,7%	€ 870.550	€ 1.111.813
3	€ 8.894.503	8,7%	€ 773.822	€ 1.111.813
4	€ 7.782.691	8,7%	€ 677.094	€ 1.111.813
5	€ 6.670.878	8,7%	€ 580.366	€ 1.111.813
6	€ 5.559.065	8,7%	€ 483.639	€ 1.111.813
7	€ 4.447.252	8,7%	€ 386.911	€ 1.111.813
8	€ 3.335.439	8,7%	€ 290.183	€ 1.111.813
9	€ 2.223.626	8,7%	€ 193.455	€ 1.111.813
10	€ 1.111.813	8,7%	€ 96.728	€ 1.111.813
Total			€ 5.320.025	

SELF COST-CHILE

Capacity (Ton/year)	100000									
Year		1	2	3	4	5	6	7	8	9	10
Utilization Capacity		80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Quantity produced		80000	100000	100000	100000	100000	100000	100000	100000	100000	100000
Costs											
Depreciation Cost		€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860
Financing Costs		€ 967.277	€ 870.550	€ 773.822	€ 677.094	€ 580.366	€ 483.639	€ 386.911	€ 290.183	€ 193.455	€ 96.728
Labour Costs		€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119
Consumption Costs		€ 78.848.076	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095
Total Costs		€ 80.873.332	€ 100.488.624	€ 100.391.896	€ 100.295.168	€ 100.198.440	€ 100.101.713	€ 100.004.985	€ 99.908.257	€ 99.811.530	€ 99.714.802
Costs per Ton/Biodiesel.		€ 1.010,92	€ 1.004,89	€ 1.003,92	€ 1.002,95	€ 1.001,98	€ 1.001,02	€ 1.000,05	€ 999,08	€ 998,12	€ 997,15

CASH FLOW-CHILE

Year	1	2	3	4	5	6	7	8	9	10
Production Biodiesel(Ton)	80000	100000	100000	100000	100000	100000	100000	100000	100000	100000
Price of Biodiesel	€ 1.020	€ 1.020	€ 1.020	€ 1.020	€ 1.020	€ 1.020	€ 1.020	€ 1.020	€ 1.020	€ 1.020
Production Glycerine (Ton)	9600	12000	12000	12000	12000	12000	12000	12000	12000	12000
Price of Glycerine (Ton)	€ 25	€ 25	€ 25	€ 25	€ 25	€ 25	€ 25	€ 25	€ 25	€ 25
Turnover	€ 81.840.000	€ 102.300.000	€ 102.300.000	€ 102.300.000	€ 102.300.000	€ 102.300.000	€ 102.300.000	€ 102.300.000	€ 102.300.000	€ 102.300.000
Depreciation Costs	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860	€ 703.860
Labour costs	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119	€ 354.119
Consumption Costs	€ 78.848.076	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095	€ 98.560.095
Financing Costs	€ 967.277	€ 870.550	€ 773.822	€ 677.094	€ 580.366	€ 483.639	€ 386.911	€ 290.183	€ 193.455	€ 96.728
Loss carried Forward		0	0	0	0	0	0	0	0	0
Profit Before Taxes	€ 966.667,64	€ 1.811.376,37	€ 1.908.104,09	€ 2.004.831,82	€ 2.101.559,54	€ 2.198.287,27	€ 2.295.014,99	€ 2.391.742,72	€ 2.488.470,44	€ 2.585.198,17
Taxes (18%)	€ 174.000	€ 326.048	€ 343.459	€ 360.870	€ 378.281	€ 395.692	€ 413.103	€ 430.514	€ 447.925	€ 465.336
Profit after Taxes	€ 792.667	€ 1.485.329	€ 1.564.645	€ 1.643.962	€ 1.723.279	€ 1.802.596	€ 1.881.912	€ 1.961.229	€ 2.040.546	€ 2.119.862
Cash Flow	€ 1.496.527	€ 2.189.189	€ 2.268.505	€ 2.347.822	€ 2.427.139	€ 2.506.456	€ 2.585.772	€ 2.665.089	€ 2.744.406	€ 2.823.723
Repayment credit	€ 1.111.813	€ 1.111.813	€ 1.111.813	€ 1.111.813	€ 1.111.813	€ 1.111.813	€ 1.111.813	€ 1.111.813	€ 1.111.813	€ 1.111.813
Dividend	€ 384.715	€ 1.077.376	€ 1.156.692	€ 1.236.009	€ 1.315.326	€ 1.394.643	€ 1.473.959	€ 1.553.276	€ 1.632.593	€ 1.711.910

Total dividend €12.936.498 after 10 years

As a conclusion of the business plan designed for a large-scale plant for biodiesel production in Mexico, it is feasible to install such a plant and the turnover will be positive since the first year of production as well as in Colombia and Chile.

- In comparison with Colombia and Chile, there is no price for biodiesel stated by the ministry of energy and it would be more attractive for investors to install the plant in Mexico because the total dividend is much higher compared with this country, however the limited market for oil fuels in Mexico makes it more difficult for producers to realize this project since the production, distribution, transportation and supply to the final customer is subject to the national oil company.
- However the price of Biodiesel would not be competitive at this moment because the production cost of fossil diesel is approximately 27% less compared to biodiesel production. Also, the price per ton of biodiesel is around 50% higher compared to the price of the fossil diesel without considering prices of transporting the biofuel to the final distributors.

DIESEL	BIODIESEL
735.3 €	1400.0 €

- Another obstacle to biodiesel production is the limited refining, exploding and distribution of fuels in Mexico own by the national oil company who is fixing the prices of the fuels and will be responsible for the distribution of biodiesel since the current fuel stations are owned by the national oil company (PEMEX) and it will be necessary to adapt the current pumps and stations for supplying new type of fuels.
- The subsidies provided by government to the national oil company would affect a private producer of biofuel since the fuel market in Mexico is reduced to only one company and in this moment here is no law allowing private companies to compete in this sector. However there is a possible market to export this product to the U.S.A since they have an increasing demand of diesel and they are working on the transition to low emission fuels such as ULSD diesel.

General Conclusions

- The total dividend after 10 years of production for Colombia is **€ 4.893.184**
- The total dividend after 10 years of production for Chile is **€12.936.498**
- The total dividend after 10 years of production for Mexico is **€ 50,599,180**

Thanks for your attention