CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

Title:	"Jovita Farmer's Cooperative Self Consumption Biodiesel Plant"
Document Version:	Version 1.01
Completion Date:	20 February 2007

This document is written following Guidelines for Completing the Simplified Project Design Document
(CDM-SSC-PDD) Version 04, EB28.

A.2. Description of the small-scale project activity:

The purpose of the Project Activity is to manufacture biodiesel from colza to replace petroleum diesel ("**petro-diesel**") currently used in farm vehicles[1]. The proposed project promotes mitigation of greenhouse gas emissions by substituting the petro-diesel currently used in transportation vehicles[2]. The biodiesel will be for self consumption of the colza producers. The producer will consume biodiesel in their vehicles (tractors, harvesters, trucks and cars). Under current conditions it is not supposed that the biodiesel will be sold.

The plant will be operated by a cooperative of colza producers. The producers will sign a Contrato de Maquila (Grain Measure Contract - "**GMC**") [3], which allows them to bring a certain amount colza to the plant and take away a certain amount of biodiesel and a by-product, colza flour.[4] The producers of the colza will, in exchange for manufacture of biodiesel, hand over these by-products to the cooperative which they will use / sell to cover the costs of the plant and maintain a small profit margin. This will all be part of the GMC. However all the biodiesel will go to the colza producers, and not to the cooperative, i.e. there will be no exchange of money for the biodiesel itself.

The Project will not use new land for the cultivation of colza. The colza, as it is a winter-bearing crop, will be used in the same portion of land that soya (a summer-bearing crop) is planted in the summer. With this application of crop rotation, the Project will avoid any risk of deforestation.

To ensure that the biodiesel is used, biodiesel use will be metered continuously by recording the amount of biodiesel exchanged for colza by each producer. This will be cross-checked with the amount

[1] The project will also allow for the possible use of other oleaginous plants apart from colza in biodiesel production.

[2] Biomass-based fuels are renewable and emissions from these fuels are deemed as "carbon neutral".

[3] Law 25,113. According to this Contract and Law, the grain (in this case colza) will, no matter what condition / place it is in (as grain; as biodiesel; in the farm; in the biodiesel plant), always be the property of the producer. The word "maquila" in its original definition refers to the quantity of grain, flour or oil that the producer, instead of using money, pays in-kind to the miller for processing his product (e.g. milling grain into flour). (Source: *Real Academia Española)*

[4] A protein-rich flour which farmers use as feedstuff for livestock animals.

of biodiesel used by each producer in their cultivation. The producer is also prohibited from selling / exchanging the biodiesel in any manner through the signing of the "Convenio de Adhesion" (Supporting Agreement) signed between the cooperative and FAA.

The producers may, if they wish, purchase extra colza flour from the cooperative but this will be outside of the GMC and will need to be a pecuniary transaction. Other by-products of the biodiesel process are glycerin, and soaps produced at the moment of the neutralisation of the oil. The same applies to glycerin and the soap, which are not part of the GMC and will be sold in its entirety.

Biodiesel is a renewable energy source and contributes to the sustainable development of the region. The project adds the following to the sustainable development of the local community:

- Diminution of GHG: Biodiesel from the Project Activity will replace the use of petro-diesel which is currently being used in farming vehicles. This will lead to a diminution of GHGs in Argentina.
- Increase in income for local community: The concise design of the Project Activity (self consumption of biodiesel in a farmers' cooperative) will ensure that the additional income through cost savings will be appropriated within the local community for its benefit.
- Fuel security for farming community: The farming community provides sustenance for the region and to an extent the country. If the current global fossil fuel shortage continues, production costs may become untenable and supply may be threatened. With the proposed Project, the farmers and the agricultural sector will be able to cushion themselves against further rises in global petroleum prices, thereby ensuring continued productivity which will secure the livelihood of both producer and consumer.
- Increase in employment: The Project will generate an increase in demand for labour, direct (plant workers) and indirect (cultivation workers).
- Safeguarding of carbon stocks: The Project does not contribute to deforestation as it uses land which is already cultivated with other crops.

Background of the Argentine Biofuels Law

On 19 April 2006, the Argentine Congress passed a biofuels law, Ley 26,093, "Regime of Regulation and Promotion for the Production and Sustainable Use of Biofuels". Part of this new law requires all vehicle fuel to contain at least 5% biodiesel by the year 2010. The law does *not* support (through tax incentives): direct sale of biodiesel to the end consumer, nor the export of the biodiesel.

A.3. Project participants:

Table 1. Project participants

Name of Party involved	Private and/or public entity(ies) project participants	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Argentina	Private: FAA (Federación Agraria Argentina)	No
Argentina	Jovita Biodiesel Trust, Córdoba	No
Japan	Mitsubishi UFJ Securities Co., Ltd.	No

FAA

FAA is the private agricultural federation located in Rosario, Argentina, established in Argentina in 1912. FAA will oversee the interests of small and medium sized grain producers in the Project Activity and will be responsible for overseeing development, construction, and operation of the biodiesel plant. The given name for the department overseeing the Project Activity is BIOFAA.

Jovita Biodiesel Trust

Jovita Biodiesel Trust is part of the farmers' cooperative located in Jovita, General Roca, Córdoba, Argentina. The cooperative will be responsible for the daily operation and maintenance of the biodiesel plant.

Mitsubishi UFJ Securities Co., Ltd. ("**MUS**")

Through its Clean Energy Finance Committee, MUS acts as the CDM consultant to the Project.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

Jovita, General Roca, Córdoba, Argentina

A.4.1.1. Host Party(ies):

Argentina

A.4.1.2. Region/State/Province etc.:

Jovita is located in the department of General Roca, Córdoba

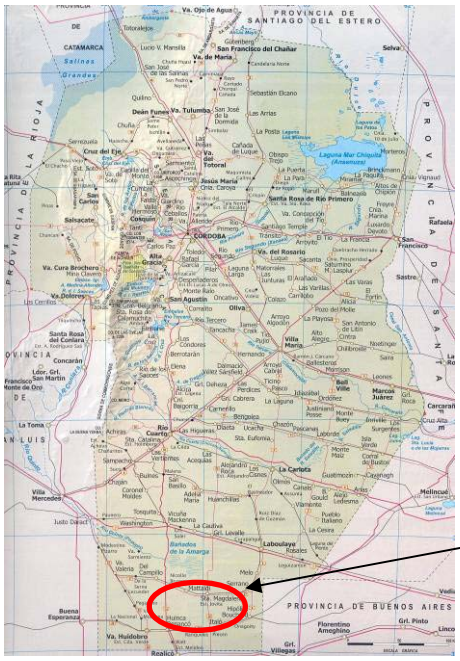
A.4.1.3. City/Town/Community etc:

Jovita

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

Córdoba is a province of Argentina, located in the heart of the country. Its capital, Córdoba, is the second largest city in the country. It covers an area of 165,321 km² and has a population of 3,066,801 (2001). Population density is 18.6/km².

The location of the Project Activity, Jovita, is located in the south of the province, 592km from Buenos Aires, the capital of Argentina.



Weather

Córdoba is part of the Humid Pampa, an extensive region of flat, fertile grassland in Argentina. The area is characterised by four distinct seasons. The weather is temperate, humid, without extreme temperatures and rare snowfalls. Its natural vegetation comprises meadows of high grass with isolated forests. Annual rainfall in the province of Córdoba itself is 752.9 mm (2004). Average annual temperature is 17.6ºC (2004).

Agricultural Activity

Agriculture and livestock provide 25% of the province's income. Main agricultural activity is soya, wheat and maize, and other cereals, as well as cattle and sheep farming. The province provides 15% of the national cattle production. The food industry around oil, milk and cereal derivatives is also significant. Cultivated land area in the province for production of cereals and grains amount to a total of 20,250km² (2001).

Field planted with colza

A.4.2. Type and category(ies) and technology / measure of the small-scale project activity:

As per Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities (SSC M&P), the Project Activity falls under the following type and category:

Type II: Energy efficiency improvement projects

Category F: – Energy efficiency and fuel switching measures for agricultural facilities and activities

Universidad Tecnológica Nacional Facultad Regional Villa María, (National University of Technology, Regional Faculty of Villa Maria, Córdoba) ("**UTN**") developed the technology pertaining to the Project Activity.

The plant will use the following raw materials:

1. Oleaginous grain (mainly colza)
2. Methanol
3. Sodium Hydroxide (NaOH) (caustic soda)
4. Tap water
5. Hydrochloric acid (HCl)
6. Electricity from national grid
7. LPG

The daily consumption of the colza grain will be 13.4 tonnes, equivalent to 2,680 tonnes annually. This will imply the delivery of the oleaginous grain by trucks to the plant every 2 days.

The basic premises of the technology are as follows:

- Simple management and adjustment of processes
- Low maintenance requirements
- Meet Argentine national standards regarding quality of supplies, human resources and energetic requirements
- Management of raw materials and products which meet accepted safety standards

The Grain

In the initial design of the project, many different technologies and scenarios were studied. The production of biodiesel does not have many variations as regards to the trans-esterification process, but the raw materials used and the level of complexity of the technology may differ greatly. Biodiesel production from colza, soya, sunflower seed and cotton seed oils were all evaluated. The colza grain was chosen as the best option due to its low production cost, its life cycle which complements that of soya (a summer crop), and its high yield of oil per ton of grain. The environmental impacts vary little between the different grains. The incorporation of the colza grain, a crop that is seldom cultivated in Argentina, into the local harvest increases crop rotation and the biological diversity generated by the agricultural industry.

Colza is an under-cultivated crop in Argentina, where hectares harvested in the last 5 years account for only around 10,000 hectares in total.[5] This is in comparison to the total national agricultural surface area of 25,000,000 hectares.[6] It is also a useful rotation crop as it prevents nitrogen run off and fixes other important nutrients in the soil. It also helps counter the current soil erosion and degradation problems caused by lack of crop rotation in the province of Córdoba, which has nearly 80% of the cropland harvested with soya.

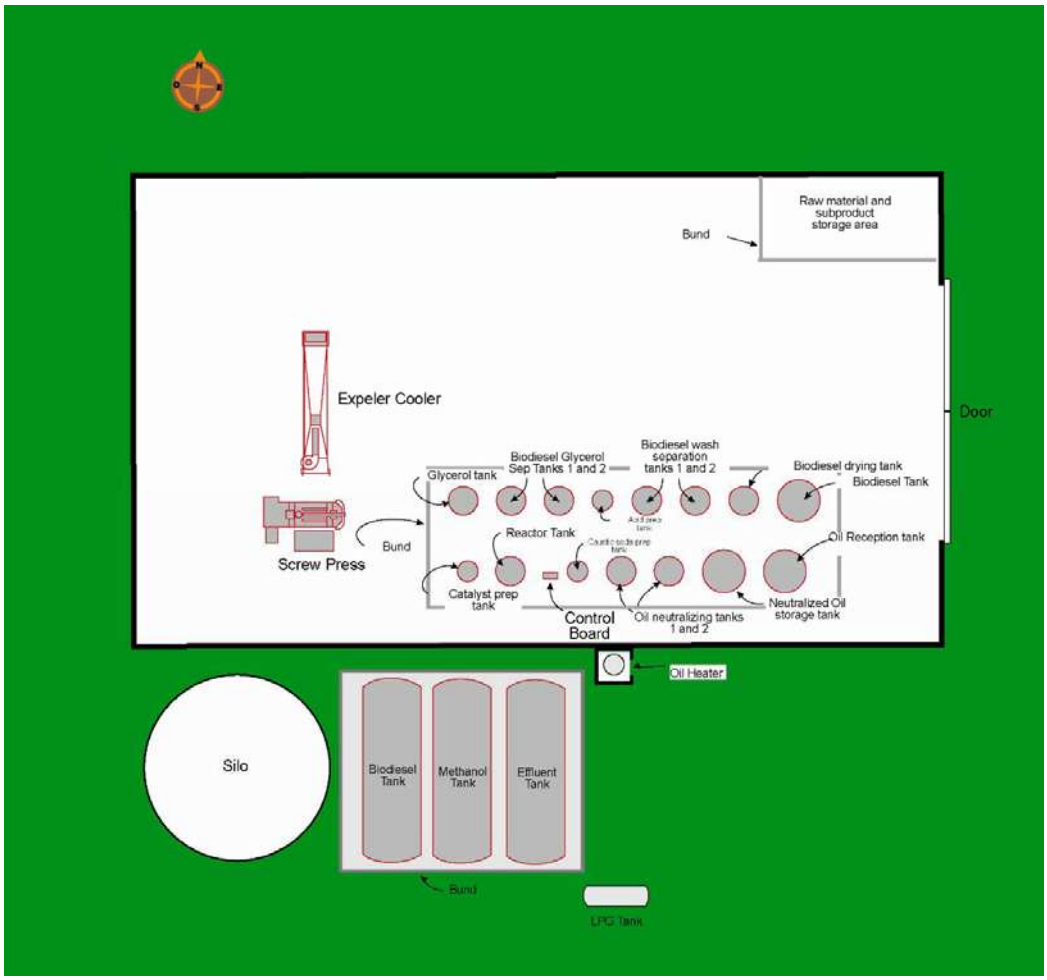
The Plant

[5] Ministry of Agricultural Affairs, Province of Buenos Aires. 2004-2005 figures.
[6] Secretary of Agriculture, Farming, Fishery and Food – Argentine Republic, 2005.

All of the biodiesel production plant in the Project Activity is designed for manual operation except for the following areas, which possess electrical components: press; cooler for the expeller; and the pumps for the transfer of liquids.

The plant is divided into various sectors: Supplies warehouse, oil extraction, oil conditioning, trans-esterification, purification of biodiesel and product warehouse.

Figure 1. Plant layout



The oil extraction sector consists of a mechanical press with a grain forcer incorporated. It also has an expeller unit with transporters and air extraction. The plant uses two oil conditioning tanks of 500 litres each. The process of neutralisation takes 30 minutes. The following chemical equation describes the reaction of trans-esterification which converts the vegetable oil into biodiesel. The reactant is methanol, and the reaction takes place in the presence of a catalyst, in this case caustic soda. The basic formula for trans-esterification is as follows:

1 Oil + 3 Methanol ↔ 3 Methyl Ester + 1 Glycerol

The plant also has a closed-circuit oil heater with a capacity of 100 litres. The oil in the heater is not consumed in the biodiesel production process, but rather used to heat the reactor to 55 ºC and also the dryer to 105ºC.

Heat is used in the trans-esterification process and the drying tank. Steam is produced from the drying tank. The daily quantity of steam produced from the plant is 48.75Nm^3, equivalent to 9,750Nm^3 annually.

Inside the biodiesel plant

Performance of Biodiesel

It is assumed that B100 (pure biodiesel) will be used in the tractors. The Instituto Nacional de Tecnología Agropecuaria (National Institute of Agricultural Technology - "**INTA**") has produced a study on the standards, properties and research on agricultural tractors efficiency using pure and blends of biodiesel[7]. Some important deviations were discovered in the characteristics of biodiesel in comparison with accepted international standards, which highlights the importance of relying on a national standard. Chemical analysis and dynamometric tests were performed on tractors of variable power and age. On dynamometric test of pure biodiesel against normal diesel fuel a mean decrease of 3.7% in maximum power and 4.2% in maximum torque were found accompanied by an increase of 3% in fuel consumption per hour and 9.5% of specific fuel consumption.

It is important to note two things regarding this study: 1) That the study is based upon soya biodiesel, whose energy content is less than that of biodiesel produced from colza, and therefore whose

[7] *Comparative Performance of Biodiesel and Diesel Oil on Agricultural Tractors,* INTA, Argentina, 2002.

performance is notably less[8]; 2) under "normal agricultural use", tractors never use maximum torque. Furthermore, the aforementioned study mentions that the performance curve of the motors (power, hourly consumption, specific consumption) indicated that the differences between petro-diesel, B20 and B100 remained constant throughout the graph at maximum torque performance. Such differences did not amount to more than 2.5% and the study concludes that in a tractor's "normal use", it would be unnoticeable. If one takes into account the higher energy content of colza biodiesel in comparison to soya biodiesel, the situation would further improve.

Therefore, it would be safe to assume that the difference in the energy content between colza biodiesel and petro-diesel in Argentina in relation to its performance in motors is insignificant.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

The total emission reduction is estimated as in Table 2.

Table 2. Net emission reduction by the project (tonnes CO_2 equivalent per year)

Year	Annual estimation of emission reductions in tonnes of CO_2e
Year 1	0
Year 2	115
Year 3	482
Year 4	1,007
Year 5	1,532
Year 6	2,057
Year 7	2,624
Total estimated reductions (tonnes of CO_2e)	**7,817.3**
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	1,116.7

Note: First year emission reductions are actually negative. According to the *Extract of the report of the twenty-first meeting of the Executive Board, paragraph 18***,** proposed new methodologies should stipulate that if a project activity temporarily results in "negative emission reductions", i.e. baseline emissions minus project emissions minus leakage effects are negative, any further Certified Emissions Reductions ("**CERs**") will only be issued when the emissions increase has been compensated by subsequent emission reductions by the project activity. Therefore, in this project activity, the second year emissions reductions have been reduced by the negative amount in the first year to compensate for the exceeded emissions in the first year.

[8] BTU/lb of hydrogenated soy ethyl ester = 17,113; Rapeseed methyl ester = 17,500 (Source: Pacific Biodiesel www.biodiesel.com); BTU/lb of colza biodiesel 17,506 (Source: independent trial by University of National Technology, Regional Faculty of Villa Maria); Average BTU/lb of refined, bleached soybean oil (3 samples), refined soybean oil (2 samples) and degummed soybean oil (4 samples) = 17,022 (Source: *Comparative Esterification of Agricultural Oils for Biodiesel Blending Final Report,* Department of Agricultural Economics and Agribusiness, University of Arkansas)

A.4.4. Public funding of the small-scale project activity:

The Project does not involve public funding from Annex I countries.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

According to the *Paragraph 2 of Appendix C to SSC M&P Project Activities*, a small-scale project is considered a debundled component of a large project activity if there is a registered small-scale activity or an application to register another small-scale activity:

- With the same project participants;
- In the same project category and technology/measure;
- Registered within the previous 2 years;
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

There is no other small-scale activity that meets all the above mentioned criteria. Accordingly, the proposed Project Activity is not a debundled component of a larger project activity. The BIOFAA biodiesel production plant has a certain maximum size which is dependant upon the pre-determined quantities and destinations of the biodiesel by-products (colza flour etc). By chance, this maximum size is in accordance with most of the "zones of influence" in Argentina and its capacity for production.[9]

As mentioned in Section A.2., the Argentine biofuels law does not support the direct sale of biodiesel to end consumers through tax incentives. Therefore, any sale of biodiesel will imply taxes, which on top of its production cost, will make it a prohibitively expensive fuel under current conditions. Currently the retail price of diesel in Argentina is around 1.50 Argentine pesos per litre, which is less than the cost for biodiesel production on a large scale. For this reason, it will not make economic sense to scale up the biodiesel plant to sell to the general public. It will also be inadvisable from a CDM standpoint, as double counting through the sale of biofuels is as yet an unresolved issue in biofuel methodologies.

For a self consumption scheme, a small scale project is ideal in order to keep the structure compact and workable. Furthermore, the biodiesel plant should be as small and as simple as possible in order to allow maximum economic benefit without the need to group together too many producers.

[9] Zone of influence is the territory which is controlled by / influenced by a certain population / locality and is different to the zone of political control. Each zone of influence is of a similar size, (usually around 30,000 hectares), and it will be impractical and difficult to bundle different zones of influence to create a larger production plant.

Opportunity costs

In determining the end use of his crop, the producer must weigh up the various opportunity costs of using his grain. The opportunity cost of making biodiesel vary depending on the grain, the prices demanded by it, and the location of the grain (for example locations far from ports will have a higher transport cost). Although not dismissed entirely as a possibility, it is unlikely that producers in the Project Activity will resort to making biodiesel from soya, as the opportunity cost is too high under current conditions. If soya grain is sold in the open market, the producer will be able to buy more fossil fuel than the amount of fuel he would obtain if he processed the grain to produce his own biodiesel.[10] In such a case, it would not make economic sense to make soya biodiesel. To build a biodiesel plant with soya would only make sense in a hypothetical situation where a) the price of soya is stabilised (i.e. does not rise and the producer would not be tempted to sell), and b) the price of petro-diesel rises significantly (to make biodiesel from soya an economically attractive alternative). There are two sub-dimensions to this argument:

a) Soya oil for exportation: To meet the current colossal demand for biodiesel in Europe which exceeds domestic European production, a vegetable oil which is available in abundant quantities is required from other countries such as Argentina. In Argentina, no other vegetable oil is as abundant as soya. The abundance of the crop automatically creates a demand for its exportation. Furthermore, for the large corporation, the cost of producing soya biodiesel on a large scale is around 1.60 Argentine pesos per litre. However, as the resulting selling price of this biodiesel will be too high for the domestic market in Argentina (retail price of petro-diesel being 1.50 pesos), the large producer will choose to export this oil, and can claim a price of 2.00 pesos, with the added benefit of tax exemption (a government incentive to promote exportation).
b) Competition from the large corporations: The small farm producer is constantly under pressure to cut costs, and increasingly so with the emergence of large corporations with the power to control prices and volumes. One way to cut costs is to produce your own fuel. However, the small producer cannot do this on a large scale, as the opportunity cost is too high, and the margins and the manpower are simply not available to them. To the small producer, soya grain that is not sold has a large effect on his income. What they can do however, is to cultivate small rotational crops such as colza, which has the added benefit of using land already cultivated for other crops such as corn and soya (i.e. will not cause deforestation). For the large corporations, a new crop such as colza requires training, investment and time. In this sense the small producer is more flexible.

This is the reason why farmers in Argentina are currently not using biodiesel – they all have soya (they do not have other oleaginous crops), and the opportunity cost for soya biodiesel is simply too high. The colza biodiesel producer creates a niche market using a special crop, and land, which in the absence of the Project Activity would not have been used. BIOFAA believes that further deforestation from soya cultivation in Argentina can be mitigated to some extent through the use of such a crop for the production of biodiesel for small farmers' self consumption.

[10] Current prices for petro-diesel in Argentina is 1.50 Argentine pesos per litre versus 1.80 pesos which is the estimated cost for producing soya biodiesel for self consumption on a small scale.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

Type II: Energy efficiency improvement projects

Category F: Energy efficiency and fuel switching measures for agricultural facilities and activities.

The monitoring methodology, as defined in Appendix B of the SSC M&P for Type II.F. Version 08, is applied to this Project Activity.

The proposed Project Activity is eligible to apply the monitoring methodologies of Type II.F. since it is a agriculture based fuel switching project that prevents the emission of CO_2 through the combustion of a carbon neutral fuel, not exceeding the equivalent of 60GWh per year.

B.2 Justification of the choice of the project category:

As explained in Section A.4.2., the Project Activity is applicable to the project category of Type II.F. – Energy efficiency and fuel switching measures for agricultural facilities and activities under *Appendix B of the SSC M&P*.

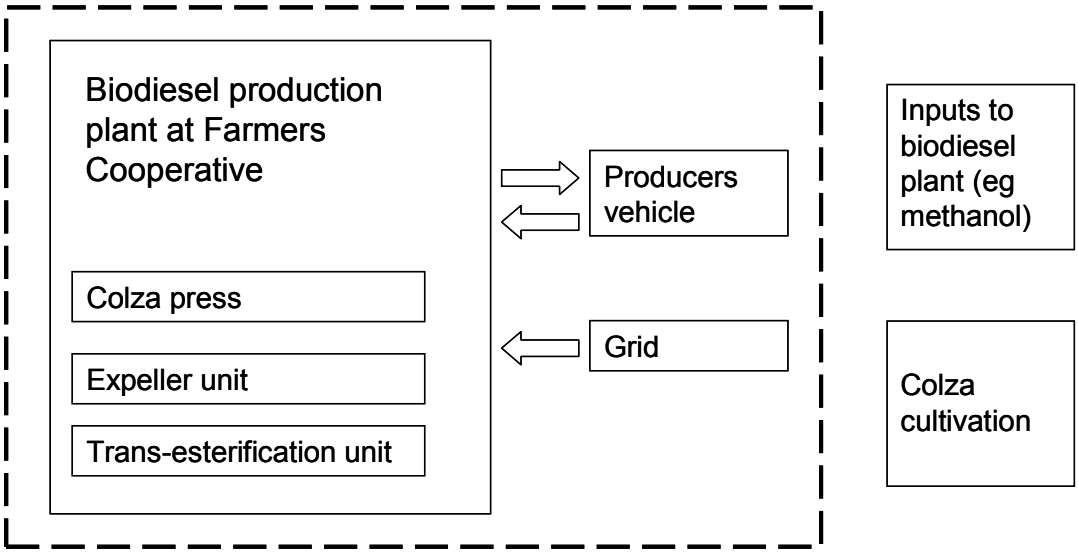
Among two options for estimation of baseline emission, option (b) of item 4 for Type II.F. is selected. The energy baseline is the existing fuel consumption or the amount of fuel that would be used by the practice that would have been implemented otherwise, i.e. total fuel consumption in the project area per year for field operations and average fuel consumption per unit area (ha), crop yield and year.

B.3. Description of the project boundary:

The spatial extent of the project boundary includes:

a) The biodiesel production plant site comprising the colza press, trans-esterification unit, expeller unit and other installations on the site;
b) Farm vehicles where the biodiesel is consumed;
c) The national electricity grid.

Figure 2. Project boundary



Relevant emission sources within this boundary include (see table below for details):

- Fuel and electricity consumed at the biodiesel plant;
- Fuel consumed for land cultivation.

The following processes are excluded from the project boundary:

- Transports of feedstocks / personnel to the biodiesel plant, and of biodiesel to consumers / retailers;
- Fossil fuel consumption and emissions from production of other inputs in biodiesel production;
- Emissions from treatment of by-products of biodiesel.

Attachment C to Appendix B *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories* states that emission sources such as transportation of raw materials and biomass, and fossil fuel consumption for the cultivation of plantations are likely to be small, and "can therefore be neglected in the context of SSC project activities."[11].

As the energy displaced is a fossil fuel (petro-diesel in tractors and other farm vehicles), the energy baseline is the existing fuel consumption or the amount of fuel that would be used by the practice that would have been implemented otherwise, i.e. total fuel consumption in the project area per year for field operations and average fuel consumption per unit area (ha), crop yield and year.

[11] http://cdm.unfccc.int/Panels/ssc_wg/SSCWG08_repan17_Revisions_guidance_leakage.pdf

Table 3. Description of the project boundary

	Activity	Source	Gas	Inside / Outside Boundary	Justification / Explanation
Baseline	Fuel consumption	Petroleum diesel consumption by vehicles	CO_2	Inside	Main source of baseline emissions
Project Activity	Biodiesel production	Grid electricity and fossil fuel consumption in biodiesel production plant	CO_2	Inside	Considered as project emissions
		LPG consumption in biodiesel production plant	CO_2	Inside	Considered as project emissions; disregarded for simplicity
		Fossil carbon content of methanol used in trans-esterification	CO_2	Inside	Considered as project emissions; disregarded for simplicity
		Fossil fuel consumption in transportation of feedstocks to biodiesel plant	CO_2	Outside	Considered as project emissions; disregarded for simplicity
		Fossil fuel consumption in biodiesel transportation	CO_2	Outside	Considered as project emissions; disregarded for simplicity
		Fumigation in biodiesel cultivation	CO_2	Outside	Considered as project emissions; disregarded for simplicity
		Fertiliser use in biodiesel cultivation	N_2O	Outside	Considered as project emissions; disregarded for simplicity
		Emissions from treatment of by-products of biodiesel	CO_2	Outside	Considered as leakage; disregarded for simplicity

		Emissions from production process of other inputs in biodiesel production (methanol etc.)	CO_2	Outside	Considered as leakage; disregarded for simplicity
	Fuel consumption	Biodiesel consumption by vehicles	CO_2	Inside	Deemed as "carbon netural"

B.4. Description of baseline and its development:

As stated in Section B.2., the method of option (b) of item 4 for Type II.F. is selected for baseline calculation. As mentioned above, the use of the biodiesel produced will prevent the combustion of fossil fuels in farm vehicles. Baseline and project scenarios of fuel consumption are demonstrated against reference agricultural activities, including cultivated acreage and crop yield from the project land.

The plant's production rate is 4,000 litres of biodiesel per day; however, the first few years of the project will generate less than this owing to the gradual increase in colza plantation and the gradual take-up of the new fuel by farmers.

The baseline for the Project Activity is the consumed fossil diesel which would have been used for the farming of soya, wheat and other crops. This is the most likely scenario which would have happened in the absence of the Project Activity. The issue of the shift of pre-project activities is therefore not a concern in this Project Activity.

The Project Activity will not contribute to deforestation. Furthermore, the land in question has not been a forest for at least 10 years, and no natural forestation is likely to occur.

There is no double counting in the project because the resulting biodiesel will be for self consumption.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The biodiesel produced will replace the use of petro-diesel in the farm vehicles employed in agricultural activities. Consequently, the emissions of GHGs by sources will eventually be reduced. In the absence of the Project Activity the farmers would use petro-diesel (cheaper and more accessible than biodiesel), and emissions of anthropogenic GHGs from the use of petro-diesel would occur.

As described in Section B.5.1., these reductions would not occur in the absence of the CDM due mainly to the high operating costs without the CERs income. As regards national / sectoral policy, there are currently no elements in the existing biofuels law in Argentina which demand the replacement of fossil fuels with biofuel for self supply; only an exemption of the taxes which are normally applied to petro-diesel.

B.5.1 Barrier analysis:

The implementation of the Project Activity is hindered by the barriers below.

Investment Barrier. The operating costs and the extra income available from the Project Activity is a determining factor for choosing between producing biodiesel for self consumption versus selling the grain and buying fossil fuel with the profit. For example, under current market conditions, in the absence of the Project Activity, the producer will sell the colza grains in the open market and buy fossil fuel to use in his farm vehicles, as biodiesel will be too costly to buy from a third party. The Clean Development Mechanism and the extra margin available from the CERs, plus the sale of the glycerin, soap and the colza flour make this particular Project Activity economically viable.

Technological Barrier. This technology is "first of its kind" in Argentina, and hence there are various technological concerns such as performance uncertainty of the biodiesel technology, uncertainty with regards to the quality control and quality assurance, apprehension about vehicular performance using the new fuel etc. Further, there is a need for skilled labour and / or training to operate and maintain the plant as well as to maintain vehicles using biodiesel. The crop colza is also an unfamiliar crop in the farming community in Argentina. As evidence of this point, INTA has worked with the project proponent to promote the use of this crop.[12]

Barriers Due to Prevailing Practice. Due to the technological concerns noted above, there is a cultural barrier which hinders the switch to biodiesel from petro-diesel. Scepticism regarding performance of existing engines with biodiesel blends is still prevalent in the farming community. One apprehension is that the biodiesel may affect vehicular performance, due to lack of proper experience in biodiesel technology. Therefore, during initial years of plant operation, the preference will be to use lower quantities of biodiesel (i.e less land area cultivated with colza), making the Project Activity less attractive from the point of view of emission reductions.

Other barriers.
New business model: The idea of self consumption of fuel using the GMC is a new type of business model in Argentina and one that is previously untested. A thorough assessment and adjustment of the model is required, and a solid initiation for personnel to ensure organisational capacity from the technical / operational level to managerial.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

As prescribed in Section B.5.1., the method of option (b) of item 4 for Type II.F. is selected for calculating fossil fuel combustion baseline emission for the Project. Baseline and project scenarios of

[12] "*Implementation of the colza crop – canola in six agricultural companies as a source of improved profitability, risk diversification and potential uses"* 2004 and 2005. Expert director of project: Jorge Villar Ezcurra (Engineer in Agricultural Production MSc Crop Physiology and Production). Funding: FONTAR (Argentine Technological Fund), ANPCyT (Nacional Agency of Scientific and Technological Promotion), SECyT (National Secretary of Science and Technology)

fuel consumption are demonstrated against reference agricultural activities, including cultivated acreage and crop yield from the project land.

B.6.1.1 Baseline emissions:

Baseline emission from the displacement of petro-diesel

According to AMS.II.F., if the energy displaced is a fossil fuel, the energy baseline is the existing fuel consumption or the amount of fuel that would be used by the practice that would have been implemented otherwise, i.e. total fuel consumption in the project area per year for field operations and average fuel consumption per unit area (ha), crop yield and year.

The number of litres of petro-diesel displaced by biodiesel has been calculated using the following method:

Each crop requires a slightly different amount of fuel per hectare according to its characteristic. An average litre per hectare was calculated using a breakdown of litres per hectare for each crop. For each sample 100 hectares, 22 hectares would be soya; 33 hectares would be for soya in summer and wheat in winter; 33 hectares would be corn; and 11 hectares would be for soya in summer and colza in winter. In the baseline scenario, the only difference would be that the 11 hectares for colza in winter would be left fallow. All other crops would be cultivated with the same proportions. (See Annex 3 Baseline Information "Use of Land" tables for a graphical explanation). In the remaining winters there will be no cultivation of any other crop, and the land will be left fallow. Therefore the rotation is:

Soya — 67%
Corn — 33%
Wheat — 33%
Colza — 11%

Fuel consumption per cultivated crop was calculated using the above percentages.

Next, the following formulae Equation 1 and 2 were used to calculate the net amount of petro-diesel replaced by biodiesel:

Equation 1

$$U_{f\_y} = Q_{f\_y} — Q_{PD\_WP\_y}$$

where:

Variable	Unit	Description
U_{f_y}	L	Incremental use of fuel f owing to Project Activity in year y
Q_{f_y}	L	Total fuel f required for Project Activity
$Q_{PD\_WP\_y}$	L	Petro-diesel which would have been used without Project Activity

Equation 2

$$NQ_{BD\_PD\_y} = Q_{BD\_y} — (U_{f\_y} \cdot R_{BD\_PD})$$

where:

Variable	Unit	Description
$NQ_{BD\_PD\_y}$	L	Net quantity of biodiesel replacing petro-diesel
Q_{BD_y}	L	Total quantity of biodiesel produced
R_{BD_PD}	n/a	Ratio of petro-diesel to be replaced by biodiesel

Baseline emissions from displaced fossil fuels are determined for petro-diesel fuel using the following formulae Equations 3 and 4.

For blends of biodiesel with petro-diesel, and generally whenever the baseline fuel is petro-diesel, the efficiency multiplier EfM_{BD_PD} shall be calculated based on the respective net calorific values of biodiesel and petro-diesel, as shown in equation 3:

Equation 3

$$EfM_{BD\_PD} = \frac{NCV_{BD}}{NCV_{PD}}$$

where:

Variable	Unit	Description
EfM_{BD_PD}	kg/kg	Efficiency multiplier (mass basis) for petro-diesel vs. biodiesel
NCV_{BD}	TJ/Gg	Net calorific value of biodiesel, determined from local / national statistics at start of Project Activity
NCV_{PD}	TJ/Gg	Net calorific value of petro-diesel, determined from national statistics at start of Project Activity

Equation 4

$$E_{BL\_y} = NQ_{BD\_PD\_y} \cdot DEN_{BD} \cdot EfM_{BD\_PD} \cdot EF_{PD} \cdot OXID_{PD} \cdot 44/12$$

where:

Variable	Unit	Description
E_{BL_y}	t-CO_2	Baseline emissions in year y
DEN_{BD}	t/m^3	Density of biodiesel
EF_{PD}	t-C/t-fuel	Carbon content of petro-diesel
$OXID_{PD}$	n/a	Oxidation factor of petro-diesel
44/12	n/a	Molar weight ratio to convert t-C to t-CO_2

The carbon contents of the baseline fuel EF_{PD} should be based on either national statistics or IPCC default values.

It is assumed that the combustion efficiency of diesel equals to that of biodiesel in the estimation of emission reductions. (See Section A.4.2 "Performance of Biodiesel".)

As mentioned above, the fossil fuel combustion from the farming activity will prevent the emission of CO_2 through the combustion of a carbon neutral fuel.

B.6.1.2 Project emissions:

Project emission from the use of grid-connected electricity

Project emissions from the Project Activity will arise from the use of grid-connected electricity, whose source includes fossil fuels, for the production of biodiesel in the biodiesel plant.

Project emissions related to the electricity consumption when it occurs will be calculated as follows:

$$PE_{y\_power} = ECy \cdot CEF_{grid}$$

where:

Variable	Unit	Description
PE_{y_power}	t-CO_2e	Project Emissions of electricity consumption in year y
EC_y	MWh	Electricity consumption by Project Activity in year y
CEF_{grid}	t-CO_2e/MWh	Grid Carbon Emission Factor

$PE_{y\_power} = PE_{Total}$ as no other project emissions are considered for the Project Activity. PE_{Total} is the total amount of project emissions owed to the Project Activity.

B.6.2. Data and parameters that are available at validation:

Data for calculation of ex-ante baseline emissions

Data / Parameter:	**NCV_{BD}**
Data unit:	TJ/Gg
Description:	Net calorific value of biodiesel to obtain a) efficiency multiplier (mass basis) for petro-diesel fuel vs. biodiesel, and b) ratio of petro-diesel to be replaced by biodiesel.
Source of data used:	UTN
Value applied:	40.2
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based upon local trials by Ing. Roger Illanes of UTN, 2006.
Any comment:	

Data / Parameter:	**NCV_{PD}**
Data unit:	TJ/Gg
Description:	Net calorific value of petro-diesel to obtain a) efficiency multiplier (mass basis) for petro-diesel fuel vs. biodiesel, and b) ratio of petro-diesel to be replaced by biodiesel
Source of data used:	Argentine Second National Communication of GHG Inventory, 2005
Value applied:	42.7
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	**DEN_{BD}**
Data unit:	t/m^3
Description:	Density of biodiesel to obtain a) mass value of biodiesel, and b) ratio of petro-diesel to be replaced by biodiesel.
Source of data used:	National University of Technology, Argentina
Value applied:	0.881
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based upon local trials by Ing. Roger Illanes of UTN, 2006.
Any comment:	

Data / Parameter:	**DEN_{PD}**
Data unit:	t/m^3

Description:	Density of petro-diesel to obtain a) mass value of petro-diesel, and b) ratio of petro-diesel to be replaced by biodiesel.
Source of data used:	Argentine Second National Communication of GHG Inventory, 2005
Value applied:	0.845
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	$\mathbf{R_{BD\_PD}}$
Data unit:	Ratio
Description:	Ratio of petro-diesel to be replaced by biodiesel
Source of data used:	Calculated
Value applied:	1.019
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated using the calorific values and density of petro-diesel and biodiesel.
Any comment:	

Data / Parameter:	$\mathbf{EfM_{BD\_PD}}$
Data unit:	kg/kg
Description:	Efficiency multiplier (mass basis) for petro-diesel fuel vs. biodiesel
Source of data used:	Calculated
Value applied:	0.9412
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated using calorific values of biodiesel and petro-diesel.
Any comment:	

Data / Parameter:	$\mathbf{CEF_{grid}}$
Data unit:	CO_2e/MWh
Description:	Carbon emission factor of national grid
Source of data used:	Secretary of Energy, Secretary of Environment and Sustainable Development, December 2006
Value applied:	0.405
Justification of the choice of data or description of measurement methods	This data is necessary for the calculation of project emissions from the use of grid electricity for the biodiesel plant. Combined Margin of Argentine national grid using ACM0002 Simple Adjusted method.

and procedures actually applied:	
Any comment:	This figure is preliminary and is subject to final revision in May 2007.

Data / Parameter:	$\mathbf{EF_{PD}}$
Data unit:	t-C/t-fuel
Description:	Carbon content of petro-diesel fuel
Source of data used:	IPCC 2006 & National University of Technology, Argentina
Value applied:	0.863
Justification of the choice of data or description of measurement methods and procedures actually applied:	Multiplied CEF of petro-diesel (kg/GJ) (IPCC default) by colza biodiesel calorific value (TJ/Gg) (UTN).
Any comment:	

Data / Parameter:	$\mathbf{OXID_{PD}}$
Data unit:	Factor
Description:	Oxidation factor of petro-diesel
Source of data used:	IPCC 2006
Value applied:	1
Justification of the choice of data or description of measurement methods and procedures actually applied:	Actual IPCC value
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

B.6.3.1 Baseline emissions:

Baseline emission from the displacement of fossil fuel use in farm vehicles

As mentioned under section B.4, the maximum daily plant production is 4,000 litres. However, the first few years of the project activity will produce less biodiesel as a) less hectares of colza is planted and b) less farmers will use biodiesel. Therefore, the expected average annual emission reduction is 1,116.7 t-CO2/year. The emission profile for the first crediting period is provided in the following Table 4.

Table 4. Baseline Emissions

Year	Baseline Emissions (tonnes of CO_2/year)	Total Baseline Emission (tonnes of CO_2/year)
1	(13)	0[13]
2	154	154
3	570	570
4	1,183	1,183
5	1,797	1,797
6	2,410	2,410
7	3,065	3,065

B.6.3.2 Project emissions:

In the Project Activity, daily electricity consumption of the plant is estimated to be 3,484kWh based upon a daily biodiesel production of 4,000 litres. As the plant will be functioning 200 days in a given year, this translates to an energy consumption of 696.8MWh/year.

In the first few years of the plant's operation, the daily production will be significantly less than 4,000 litres. Therefore, the electricity consumption has been calculated to be proportionate to the biodiesel production level for each year.

Table 5. Emissions Resulting from Electrical Consumption in the Project Activity for the Biodiesel Plant

Year	Electrical Consumption in Project Activity (MWh/year)	Emissions Resulting from Electrical Consumption (tonnes of CO_2/year)[14]
1	0	0
2	65.3	26.5

[13] Negative baseline emissions must be set to zero according to *Extract of the report of the twenty-first meeting of the Executive Board, paragraph 18.*

[14] Carbon Emission Factor, Combined Margin using Simple Adjusted method preliminary figures, source: Argentine Secretary of Energy preliminary study, December 2006.

3	218.0	88.2
4	436.0	176.4
5	653.3	264.6
6	871.0	352.8
7	1,089.0	441.0

The amount of emissions from the combustion of LPG in the oil heater in the Project Activity is equal to that of a household boiler, hence its impact on the atmosphere is considered "negligible".[15]

CO_2 emissions from combustion of fossil carbon contained in the alcohol which is chemically bound in the biodiesel during the trans-esterification process, and released upon combustion, has been disregarded in the interest of simplicity.

In accordance with guidance from Attachment C to Appendix B *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*, emission sources such as transportation of raw materials and biomass has been disregarded.

Other emissions resulting from the combustion of biodiesel are considered carbon-neutral.

B.6.3.3 Leakage:

In accordance with item 10 of Type II.F. stated in Appendix B of the SSC M&P, leakage estimation is required if the energy-efficiency technology is equipment transferred to another activity or if the existing equipment is transferred to another activity. Since the project does not involve the use of such equipment, leakage estimation of equipment transfer is not required.

The Project Activity results in leakage from the use of methanol. The project will consume around 160,000 litres of methanol per year based upon a daily biodiesel production of 4,000 litres. However, this has been disregarded as emissions from this source count for less than 1% of baseline emissions.

Other source of leakage activities, which contributes off-site GHG emissions outside the project boundary, includes items such as use of fossil fuels in production of inputs and treatment of by-products. These items have been disregarded in the interest of simplicity, as expected effects are small.

Leakage may also be caused by a potential increase in methane emissions from nearby piggeries due to the increased abundance of the colza flour, a by-product of the colza production. This will be monitored ex-post.

B.6.3.4 Other possible sources of emission:

According to the *Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-scale CDM Project Activity Categories, General guidance on leakage in biomass project activities, Version 02, EB28* for small-scale energy CDM project activities involving renewable biomass, there are three types of emission sources that are potentially significant (>10% of emission reductions) and attributable to the project activities:

[15] From Jovita Biodiesel Trust Environmental Impact Study, 2006.

A. **Shifts of pre-project activities.** Decreases of carbon stocks, for example as a result of deforestation, outside the land area where the biomass is grown, due to shifts of pre-project activities.
B. **Emissions related to the production of the biomass.**
C. **Competing uses for the biomass.** The biomass may in the absence of the project activity be used elsewhere, for the same or a different purpose.

Shift of pre-project activities. The Project Activity does not cause shift of pre-project activities. New oil crop plantations are proposed only on already cultivated land. i.e. a portion of the total land that is planted with soya in summer will be used to plant colza in winter (as colza is a winter plant). This piece of land, in the baseline scenario, would have been left fallow in winter, to be planted again with soya in summer. For the moment it is not envisaged that biodiesel will be produced from oil crops other than colza.
Emissions related to the production of the biomass. Land clearing is not applicable as oil crop plantations are proposed on already cultivated land. According to the cited document, where the project activity involves the use of a type of renewable biomass that is not a biomass residues or waste, project participants should demonstrate that the area where the biomass is grown is not a forest (as per DNA forest definition) and has not been deforested, according to the forest definition by the national DNA, during the last 10 years prior to the implementation of the project activity. The Project Activity does not take place in any land that has been deforested during the last 10 years, according to the forest definition by the Argentine DNA.
Competing uses for the biomass. According to the cited document, competing uses for biomass are not relevant, where the biomass is generated as part of the project activity (new forests or cultivations). As colza is generated as part of the Project Activity as a new cultivation, the Project Activity does not cause competing uses for biomass.

Other sources of emissions which may be related to the Project Activity include:
Displacement of existing uses of oil crops. This is not applicable in the case of colza as its use as a crop in Argentina is not common practice (see Section B.5.1. *Technology Barrier*).
Enhanced demand for fossil fuels. This is unlikely to occur in the Project Activity as the scale is too small for it to have any significant effect on local demand for fossil fuels, and the production of biodiesel from the biodiesel plant will be limited to its maximum capacity.

B.6.4 Summary of the ex-ante estimation of emission reductions:

Emission reduction by replacing petro-diesel with biodiesel equals:

$$ER = E_{BL\_y} - PE_{Total} - L$$

where:

Variable	Unit	Description
ER	t-CO_2e	Emission reduction by the avoidance of emissions from combustion of fossil fuels
PE_{Total}	t-CO_2e	Project activity total emissions
L	t-CO_2e	Leakage
E_{BL_y}	t-CO_2e	Baseline emissions in year y

Emissions reductions due to the Project Activity are in average 1,116.7 tonnes CO_2e/year, or a total of 7,817.3 tonnes CO_2e for the 7-year-crediting period.

Table 6. Summary of Emissions and Emission Reduction

Year	Estimation of Project Activity Emissions (t-CO2e)	Estimation of Baseline Emissions (t-CO2e)	Estimation of Leakage (t-CO2e)	Estimation of Overall Emission Reductions (t-CO2/e)
1	0	0	0	0
2	27	154	0	115
3	88	570	0	482
4	176	1,183	0	1,007
5	265	1,797	0	1,532
6	353	2,410	0	2,057
7	441	3,065	0	2,624

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data to calculate emission reductions

Data / Parameter:	Q_{BD_y}
Data unit:	L
Description:	Total quantity of biodiesel produced at biodiesel plant
Source of data to be used:	On site measurement
Value of data:	

Description of measurement methods and procedures to be applied:	Measured continuously and aggregated monthly. Biodiesel production will be metered continuously by meters at the plant and plant operators and recorded monthly. The plant operator will keep an electronic and paper record of production data.
QA/QC procedures to be applied:	The meters will be maintained and calibrated regularly in line with the manufacturer's requirements. This will ensure that the accuracy of the measurement instrument is maintained.
Any comment:	

Data / Parameter:	$NQ_{BD\_PD\_y}$
Data unit:	L
Description:	Net amount of biodiesel replacing petro-diesel
Source of data to be used:	Calculated
Value of data:	
Description of measurement methods and procedures to be applied:	This figure will be calculated using: 1) Q_{BD_y} (Total quantity of biodiesel produced in year y); 2) R_{BD_PD} (Ratio of petro-diesel to be replaced by biodiesel); and 3) U_{f_y} (Incremental use of fuel f owing to Project Activity in year y). (See Section B.6.1.1)
QA/QC procedures to be applied:	The meters for measuring the biodiesel produced will be maintained and calibrated regularly in line with the manufacturer's requirements. This will ensure that the accuracy of the measurement instrument is maintained.
Any comment:	

Data / Parameter:	**Biodiesel used**
Data unit:	L
Description:	Amount of biodiesel used by each producer
Source of data to be used:	On site measurement; report from each producer
Value of data:	
Description of measurement methods and procedures to be applied:	Measured continuously and aggregated monthly. Biodiesel use will be metered continuously by recording the amount of biodiesel exchanged for colza by each producer. This will be cross-checked with the amount of biodiesel used by each producer in their cultivation. The producer is also prohibited from selling / exchanging the biodiesel in any manner through the signing of the "Convenio de Adhesion" (Supporting Agreement). The plant operator will keep an electronic and paper record of consumption data.
QA/QC procedures to be applied:	Use of biodiesel by each producer will be cross-checked with monthly biodiesel production at the plant. The producers will also be subject to spot-checks to ensure full use of biodiesel they have taken.
Any comment:	

Data / Parameter:	**Cultivated land area & crop type**
Data unit:	Ha
Description:	Surface area of agricultural land belonging to each producer and crop dedicated to each piece of land
Source of data to be	Report from each producer

used:	
Value of data	
Description of measurement methods and procedures to be applied:	Total land area belonging to each producer will be reported annually. The producer will also be required to report percentage of land dedicated to each crop in order to estimate total fuel use according to crop type. This data can be cross-referenced with "Biodiesel use" above to ensure each producer is using his allocation of biodiesel.
QA/QC procedures to be applied:	The GMC will require that each producer report the quantity of cultivated land each year, and to inform the cooperative of any increase / decrease (through acquisition / sale / *force majeur*) in land area.
Any comment:	

Data to calculate project emissions

Data / Parameter:	**ECy**
Data unit:	kWh
Description:	Amount of electricity consumed at the biodiesel plant
Source of data to be used:	On site measurement
Value of data:	
Description of measurement methods and procedures to be applied:	Electricity consumption will be metered monthly by an electricity meter and recorded monthly. The plant operator will keep an electronic and paper record of consumption data.
QA/QC procedures to be applied:	Consumption of biodiesel plant will be cross-checked monthly with total electricity bills. The electricity meters will be subject to regular maintenance.
Any comment:	

Other data

Data / Parameter:	**By-products**
Data unit:	t
Description:	Amount of each by-product produced by biodiesel plant
Source of data to be used:	
Value of data:	
Description of measurement methods and procedures to be applied:	Measured continuously and aggregated monthly. Data will be measured by the plant operator and reported monthly to the plant manager.
QA/QC procedures to be applied:	The plant operator will keep an electronic and paper record of production data.
Any comment:	

B.7.2 Description of the monitoring plan:

Methodology *Type II.F. Energy efficiency and fuel switching measures for agricultural facilities and activities* states that monitoring in the case of a new facility shall consist of:
(a) Metering the energy use of the equipment installed;
(b) Calculating the energy savings due to the equipment installed.
It further states that monitoring will also involve the scale (e.g. number of ha cultivated, crop yield) of agricultural activities, in order to ensure that reduced energy consumption is not due to downscaling of activities.

In accordance with this methodology, monitoring in this Project Activity consists of metering the amount of biodiesel produced and its usage, and using the resulting data, calculating the amount of petro-diesel displaced by biodiesel.

The transaction between the plant and the producers can easily be monitored using the strict standards of record-keeping that will be employed by the plant operators. The amount of biodiesel used by each producer will also be recorded by the producers themselves as part of the GMC.

All data for as a result from monitoring and verification activities will be kept up to 2 years after the end of crediting period or the last issuance of CERs for this Project Activity.
The Project will also implement an Environmental Management Plan ("**EMP**") which will aim to mitigate negative environmental effects of the Project Activity as well as address the following issues:

1. **Environmental policy**: Development of an environmental policy based on environmental conservation and compliance of existing legislation;
2. **Environmental planning**: Identification of the aspects and action of the Project Activity which could generate impacts on the environment, the importance and nature of such impacts, and the measures necessary to mitigate such impacts.
3. **Implementation**: Implementation of the mitigatory and preventative measures during the construction, operation and closing phases of the plant;
4. **Monitoring and evaluation**: Monitoring of the environmental quality and mitigatory measures during the development of the Project;
5. **Continued improvement**: Review of the Environmental Policy, the Environmental Plan, the Implementation and Monitoring based on the results of the continued evaluation of the EMP. It is planned that the EMP will be evaluated once during the construction of the plant and annually during the operative phase.

Additionally, the plant will evaluate the possibility of certification of the EMP according to the norms of ISO/IRAM 14001.

Since the plant staff consists of 3 to 6 people, there is no need of a large scale program for the environmental training. Training on Environmental and working issues will be carried out when operational stage begins and every time a new plant operator is incorporated to the plant staff. Upgrading of environmental training will be carried out annually within the Environmental Management Plan revisions. Training on environmental issues will involve the following:

1. FAA environmental policy;
2. Environmental management at the plant;
3. Responsibility assignments regarding environmental issues;
4. Community relations, environmental complaint book;
5. Environmental monitoring, audits, sampling;

6. Environmental emergencies and evacuation.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

20 February 2007

Clean Energy Finance Committee
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Mitsubishi UFJ Securities Co., Ltd. is the CDM advisor to the Project and is the PDD writer.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

01/04/06 (1 April 2006)

C.1.2. Expected operational lifetime of the project activity:

Minimum 21 years

C.2 Choice of the crediting period and related information:

The Project will use a renewable crediting period.

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

01/05/07 (1 May 2007)

C.2.1.2. Length of the first crediting period:

7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

C.2.2.2. Length:

SECTION D. Environmental impacts

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

An Environmental Impact Study ("**EIS**") has been carried out by out by designated environmental consultants. This document has been lodged with the relevant provincial authority and is easily available on request.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

There were no significant environmental impacts noted in the EIS.

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

The public consultation was carried out on September 26th 2006. It was carried out by means of a survey to the neighbours of the plant and to the residential manager of School IPEM 221 which is located in the parcel next to the plant. The environmental consultants asked them whether they would like to add any comments as regards the plant. No comments were received. The three closest houses are located over 250 meters away from the future plant. School IPEM 221 is located 120 meters away from the future plant.

The houses closest to the plant are family homes made of brick. School IPEM 221 is a residence of up to 150 students who attend school from Monday to Friday and the school also works as a place for practical tasks such as garden for cultivation, nursery, hen and rabbit breeding.

The neighbours interviewed have been residents of Jovita for over 20 years. The families have incomes related to the commercial and educational activities. For the interviewed people, agriculture is the main source of economical support in the area of Jovita. The neighbours acknowledged the importance of the agricultural activity and of the commercialisation of its products in the local economy. School IPEM 221 teaches careers related to agriculture and it is organizing activities to incorporate guided visits to the future biodiesel plant.

Generally speaking, the neighbours and school IPEM 221 representative showed a good knowledge of environmental problems such as air and water pollution. They pointed out environmental characteristics, which they believe to be important such as the Rio Quinto (River Quinto), and the lakes of the area, the afforestation, the sewer system and cleanliness of the town in general. Regarding

the environmental problems in the area, the following issues were identified among the answers of the people interviewed:

- soil erosion due to the cultivation of soya and peanuts;
- spraying and use of agrochemical products in the fields;
- shortage of water;
- grain Storage plants in the northern area of Jovita;
- dust generated by wind erosion;
- the impact of trucks on the local roads

The last questions of the survey referred to the current environmental situation and the possible impacts of the biodiesel project. Considering the current situation, both of the people interviewed assured to have knowledge of the environmental impacts generated by the spraying of fields. They also mentioned the impact the municipal landfill has which generates odours and flies.

As regards the future biodiesel plant, the answers included both negative impacts as well as possible benefits. They foresee possible environmental impacts in the case Jovita grows to the South. They acknowledged that this is very unlikely given the location of Ruta 77 between Jovita and the Southern Area where the future plant is located. The benefits mentioned were: the town economical benefit and the environmental benefit granted by the replacement of mineral gas oil. They also foresee a didactic benefit for the students at School IPEM 221.

The environmental impact study of the biodiesel project has identified inevitable effects in all of phases of the project: building, operation and closing. The results of this public consultation have been highlighted, assessing all the impacts of concern for the neighbours.

E.2. Summary of the comments received:

The key points of the public consultation that should be taken into account in the EIA are:

- The neighbours of the area understand the importance of agriculture in the economy of the area;
- they are happy with the current environmental quality of the area;
- they are aware of the environmental impacts mainly due to the spraying of fields around the area and to the municipal landfill;
- the neighbours foresee benefits and negative impacts regarding the biodiesel project;
- the possible environmental impacts that concern the neighbours due to the enlargement of the plant are related to the zoning.

The majority of the identified impacts have been assessed as irrelevant by the stakeholders. The negative impacts of mild importance are related to activities which are necessary for the enterprise which generates emissions of particulate material, noise and liquid effluent. It is foreseen that all these environmental effects suggested could mitigate more the environmental impacts identified.

On the other hand, the project will bring important socioeconomic benefits to the region of Jovita. The production and use of renewable energies as biodiesel is also an important environmental benefit and it is seen as necessary for all the communities.

E.3. Report on how due account was taken of any comments received:

No outstanding issue remained for follow-up.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The Project does not involve any public funding

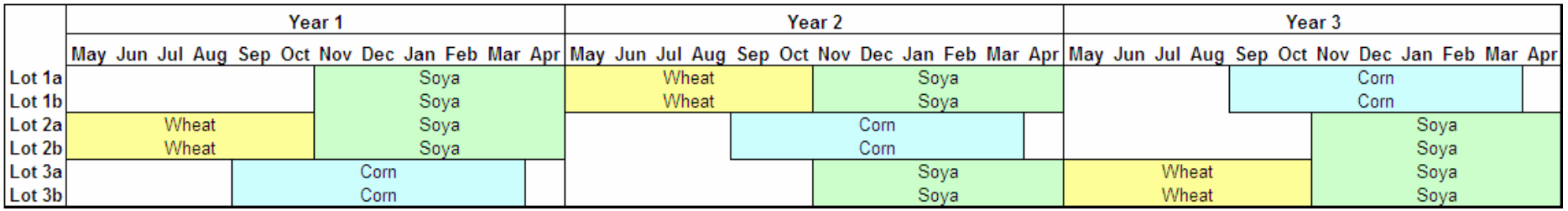
Annex 3

BASELINE INFORMATION

Use of land - Baseline

BASELINE								
Example for 100 hectares therefore hectares = %	**Hectares**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
Lot 1a	22.3	Soya	Wheat/Soya	Corn	Soya	Wheat/Soya	Corn	Soya
Lot 1b	11.0	Soya	Wheat/Soya	Corn	Soya	Wheat/Soya	Corn	Soya
Lot 2a	22.3	Wheat/Soya	Corn	Soya	Wheat/Soya	Corn	Soya	Wheat/Soya
Lot 2b	11.0	Wheat/Soya	Corn	Soya	Wheat/Soya	Corn	Soya	Wheat/Soya
Lot 3a	22.3	Corn	Soya	Wheat/Soya	Corn	Soya	Wheat/Soya	Corn
Lot 3b	11.0	Corn	Soya	Wheat/Soya	Corn	Soya	Wheat/Soya	Corn
Total hectares (total surface area)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total hectares of Soya		66.7	66.7	66.7	66.7	66.7	66.7	66.7
Total hectares of Corn		33.3	33.3	33.3	33.3	33.3	33.3	33.3
Total hectares of Wheat		33.3	33.3	33.3	33.3	33.3	33.3	33.3

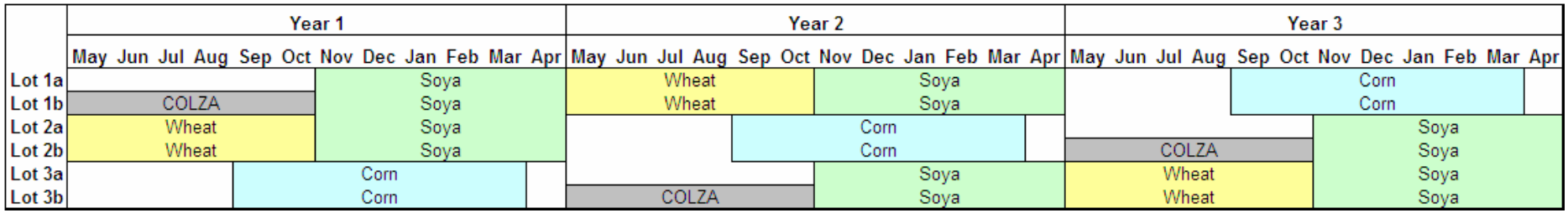
Land allotment - Sample 3 years – Baseline



Use of land – Project activity

PROJECT ACTIVITY								
Example for 100 hectares therefore hectares = %	**Hectares**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
Lot 1a	22.3	Soya	Wheat/Soya	Corn	Soya	Wheat/Soya	Corn	Soya
Lot 1b	11.0	Colza/Soya	Wheat/Soya	Corn	Colza/Soya	Wheat/Soya	Corn	Colza/Soya
Lot 2a	22.3	Wheat/Soya	Corn	Soya	Wheat/Soya	Corn	Soya	Wheat/Soya
Lot 2b	11.0	Wheat/Soya	Corn	Colza/Soya	Wheat/Soya	Corn	Colza/Soya	Wheat/Soya
Lot 3a	22.3	Corn	Soya	Wheat/Soya	Corn	Soya	Wheat/Soya	Corn
Lot 3b	11.0	Corn	Colza/Soya	Wheat/Soya	Corn	Colza/Soya	Wheat/Soya	Corn
Total hectares (total surface area)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total hectares of Soya		66.7	66.7	66.7	66.7	66.7	66.7	66.7
Total hectares of Corn		33.3	33.3	33.3	33.3	33.3	33.3	33.3
Total hectares of Wheat		33.3	33.3	33.3	33.3	33.3	33.3	33.3
Total hectares of Colza		11.0	11.0	11.0	11.0	11.0	11.0	11.0

Land allotment - Sample 3 years – Project activity



Annex 4

MONITORING INFORMATION

Please Refer to Section B.7