

**CORPORATION FOR INDUSTRIAL DEVELOPMENT
OF BIOTECHNOLOGY AND CLEAN TECHNOLOGY
"CORPODIB"**

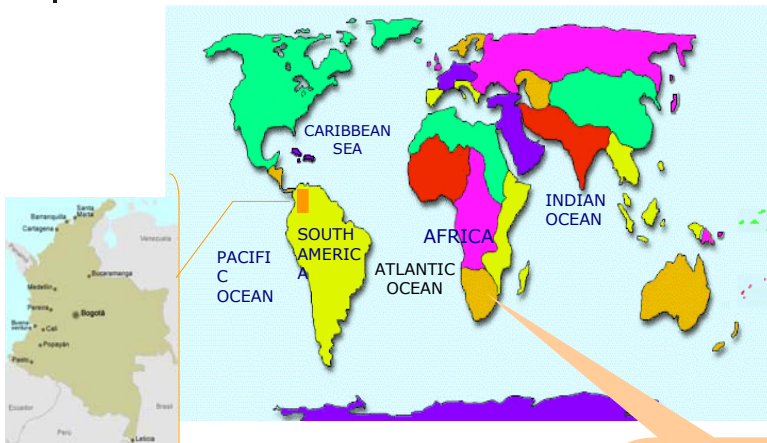
BIOETHANOL FOR COLOMBIAN FUELS

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Executive Director
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COLOMBIA, SOUTH AMERICA



**DURBAN,
SOUTH AFRICA**





BIOETHANOL FOR COLOMBIAN FUELS

- The Corporation for the Industrial Development of Biotechnology and Clean Technology, has been actively working in this project during the last seven years and first worked out the preliminary study and now is finishing out the feasibility study and the implementation plan, studies that show a sustainable project with good profitabilities for investors.



BIOETHANOL FOR COLOMBIAN FUELS

- Congress of the Republic of Colombia approved on June 19th/2001 a new law, Law 693, signed by President of Colombia on September 19th/2001 which mandates the use of bioethanol from sugar cane in Colombian gasolines and diesel fuel oil, to improve quality of these fuels and decrease emissions to environment from tail pipes pipetail. This project should be developed during next 5 years.



BIOETHANOL FOR COLOMBIAN FUELS

- This law is an example to the world of how a congress of a developing country takes an advanced initiative to promote the use of renewable fuels for the development of a new agroindustrial industry, connecting the agro (a weak sector) with energy (strong sector) for improvement the environmental and creating a significant amount of new employments.



BIOETHANOL FOR COLOMBIAN FUELS

- This law from Colombian Congress is part of the policy for the use of clean fuels Colombia has been developing in last years with the program of "green gasoline" and compressed natural gas for vehicles CNG. The new law will allow private industry (national and international) to start production of bioethanol to be mixed with gasolines in year 2006.





BIOETHANOL FOR COLOMBIAN FUELS

- Two fundamental elements have been considered for the promotion of the project for the development of production, commercialize and distribution of fuel bioethanol.
 - Obligatory use by law of mixtures of fuel bioethanol in gasolines (10% volume).
 - To invite to private investors (national and international) participate in the production of fuel bioethanol in open market where prices will be regulated by free market.



BIOETHANOL FOR COLOMBIAN FUELS

- Colombia considers the production of renewable fuels as a very good opportunity to link the agriculture sector to the production of fuels for transportation with high employment generation, better quality of life and better income for farmers future generation.
- These kind of projects will definitely help in the eradication of illicit harvest and governmental peace programs which Colombia has the compromise to fulfil before the international community.

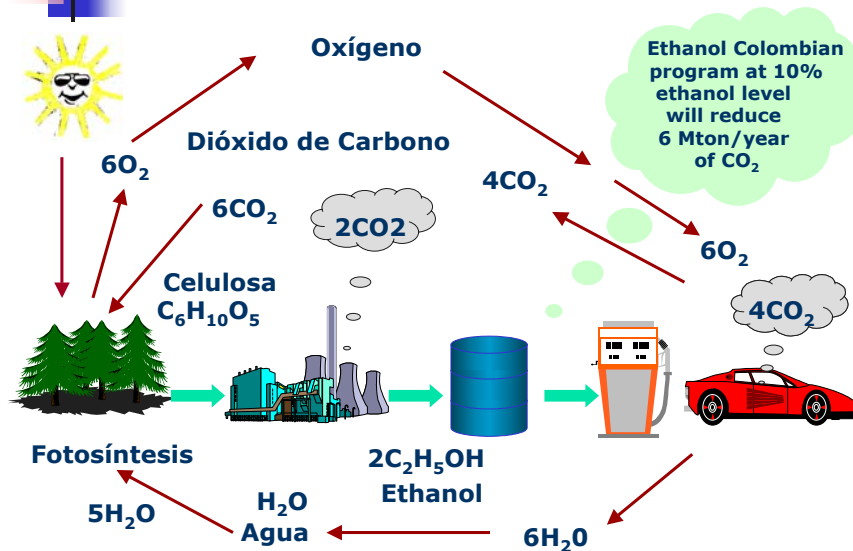


FUEL ETHANOL AND GREENHOUSE EFFECT

- + In addition to environmental benefits, the project will save 6 million of tons of CO₂ per year which through the Clean Development Mechanisms (CDM), of Kyoto Protocol will permit commercialize CO₂ bonds.
- + CER's through Clean Development Mechanisms (CDM) will increase DCFROR of approximated projects in about 5-10%.



ETANOL Y EL CICLO DEL CARBONO





FUEL ETHANOL WILL REDUCE ATMOSPHERIC POLLUTION

- ✦ **Dynamometer test and fleet test in Bogotá (2600 meters above sea level) with 10% ethanol will reduce 27% of carbon monoxide (CO) 20% of unburned hydrocarbon (HC).**
- ✦ **Dilution of benzene, aromatics, olefins and others compounds.**



DEVELOPMENT

- ✦ **CORPODIB has been working in fuel ethanol during the last seven years:**
 - ◆ **Preliminary study 1998.**
 - ◆ **Feasibility 2000.**
 - **Supported by several countries: Sweden,**
 - **United States, Canada and India.**
 - **Advanced technologies**
 - ✓ **High efficiency fermentation.**
 - ✓ **Multipressure distillation.**
 - ✓ **Molecular Sieve Dehydration**
 - ✓ **Optimum energy balance**
 - ✓ **Advanced agriculture practices (specialized sugar cane varieties)**
 - ✓ **Addition of value to vinasses. Production of biofertilizers and biogas.**
 - **Discount cash flow rate of return in dollars (DCFRROR) > 20%.**



FUEL ETHANOL PROGRAM IN COLOMBIA

- ✦ New Law that mandates the use of ethanol in Colombia gasoline starting in 2006.
- ✦ 10% of ethanol in domestic gasolines
- ✦ Sugar cane as raw material the most competitive.
- ✦ 2,5 M It/day of ethanol=> 900 M It/year.
- ✦ New 150 khas of sugar cane.
Today we have 430 khas for sugar production and jaggery (Brown sugar).
- ✦ 9 agroindustrial complexes. Each one between 900 y 100 kl/day capacity.
- ✦ 170.000 direct and indirect employments. Most of them are farmers.

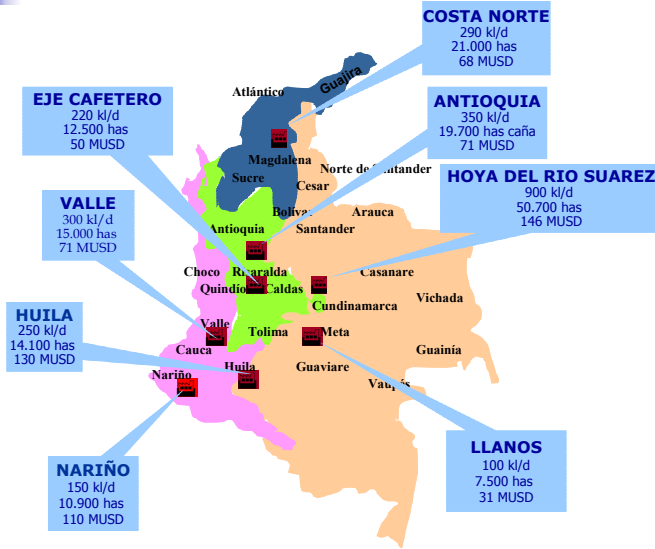


BIOETHANOL FOR COLOMBIAN FUELS

- Main characteristics of the project for 10% (vol.) of bioethanol in gasolines follows:
 - ✦ 9 biorefineries 200.000 - 250.000 liters/day (900 million liters per year), located in different Colombian regions.
 - ✦ 150.000 Hectares harvested in sugar cane.
 - ✦ US\$ 400 million of investment with 20% + of DCF rate of return.
 - ✦ 170.000 new employments (direct and indirect).



FUEL ETHANOL AGROINDUSTRIAL COMPLEXES IN COLOMBIA



NEW TECHNOLOGIES

ETHANOL FROM CELLULOSE

CELLULOSE + HYDROLYSIS/FERMENTATION → ETHANOL

Hydrolysis of sugar cane bagaze =>
40% more ethanol/ton of sugar cane

With the cooperation of other international companies CORPODIB is working in the conversion of cellulose material (bagaze or palm residues, rice straw, coffee residues and others).



FUEL ETHANOL IN LATINAMERICA

	% ETHANOL	MI/d	COMMENTS
BRAZIL	UP TO 25	35	
UNITED STATES	10	18	Will triple in next 10 years
COLOMBIA	10-25	2.5	In some regions where there is petroleum or pipelines transporting it, topping units will be constructed for obtaining low octane naphtha and others fuels. Virgin naphtha + 24% ETOH will produce gasoline of good quality.



ETHANOL COMPETITORS

- The most used oxygenate at world level MTBE is being eliminated because of aquifers contaminates (USA and Japan).
- California and other states (USA) are eliminating MTB during next years.
- Ethanol will substitute MTBE.



ECONOMY OF ETHANOL IN COLOMBIA

- ✦ 400 MUSD annuals sales of fuel ethanol.
- ✦ 240 MUSD annuals sales of sugar cane.
- ✦ Every farmer family will earn 2-3 minimum salaries (US\$4000/year).
- ✦ Increase of 3% of Agriculture Gross Domestic Product (GDP).
- ✦ A cluster for regional development.



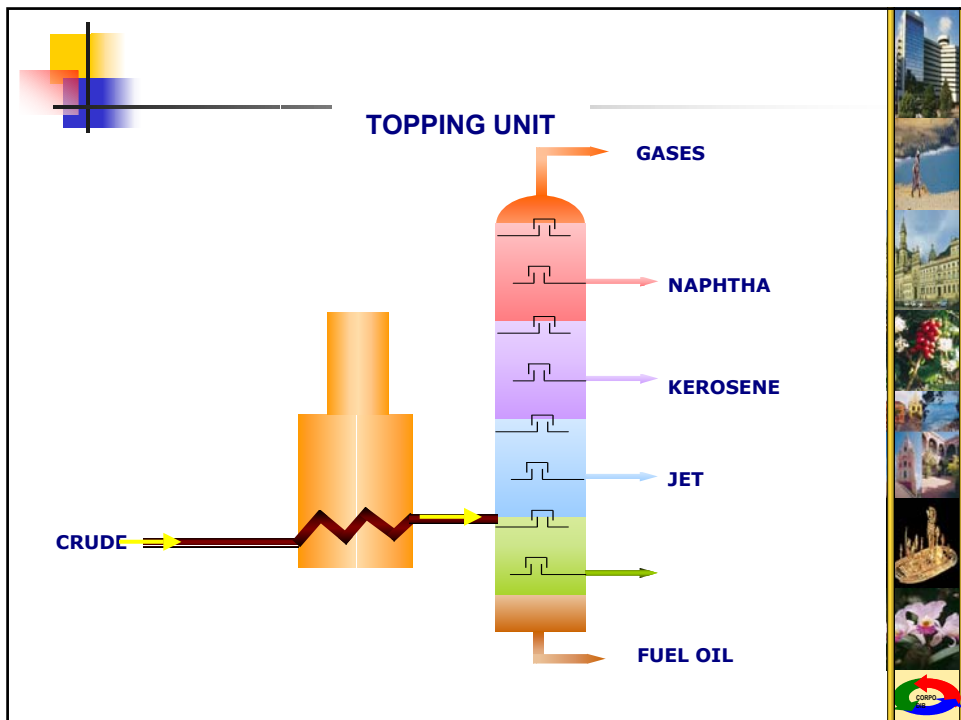
ECONOMY OF ETHANOL IN COLOMBIA

- ✦ Production cost of ethanol between 0.90 - 1.15 US\$/gallon.
- ✦ No gasoline taxes for ethanol.
- ✦ Gasoline price at 10% (vol.) level of ethanol will have about same price (1.40 US\$/gal).
- ✦ Ethanol producer revenue will be between 1,35 - 1,6 US\$/gallon depending on gasoline price.
- ✦ Investment will be about MUS\$ 680
- ✦ Hard currency saving for less gasoline importation of 150 MUS\$/year or higher exportation of crude oil. One barrel of ethanol is equivalent to 1 barrel of gasoline or 2.5 barrels of crude oil.

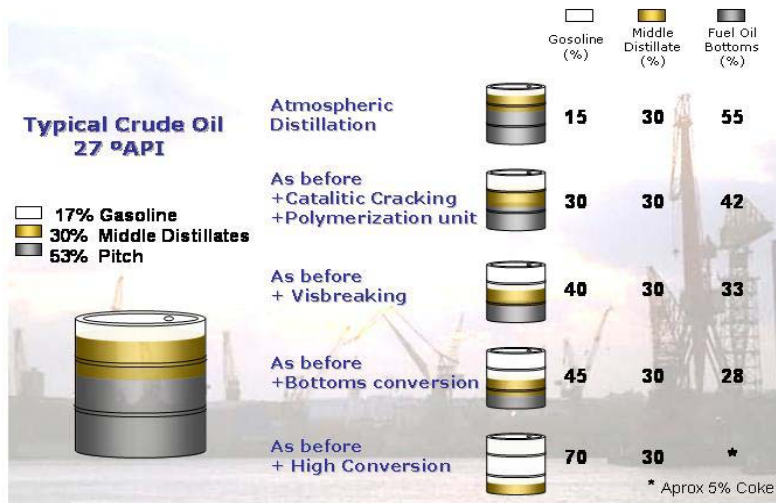


ECONOMY OF ETHANOL IN COLOMBIA

- ✦ Substitution of 20 MUS\$ beverage ethanol importation.
- ✦ One dozen of mothball liquor plants, because of vinasse contamination, will be started again with the associate employment generation.



REFINING SCHEMES



BIOETHANOL FOR COLOMBIAN FUELS

- **With this project Colombia is being located in the vanguard of countries that in this 21 century take audacious initiatives for the sustainable development, using biofuels for a better quality of life and intensive employment generation.**

BIOETHANOL FOR COLOMBIAN FUELS

- We want to invite you, to participate as investors or as supporting in technology transfer programs in this important Colombian project. Specially in La Hoya del Río Suárez project with 900.000 l/day ethanol for Bogotá gasolines from sugar and juice.



Thanks!

