

GTL & Unconventional sources of Liquid Fuels - Ethanol

Supplying Renewable Energy with Sustainability

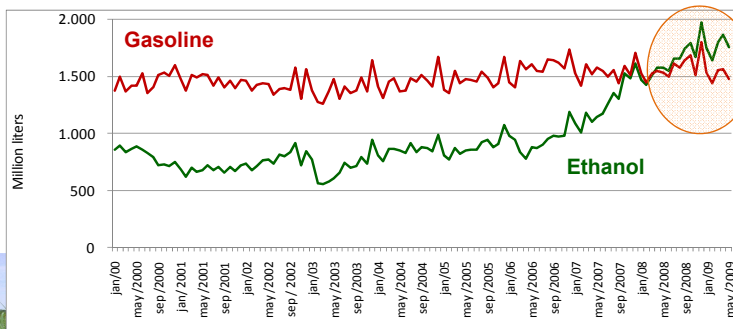


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Quick question: which is conventional, gasoline or ethanol ?

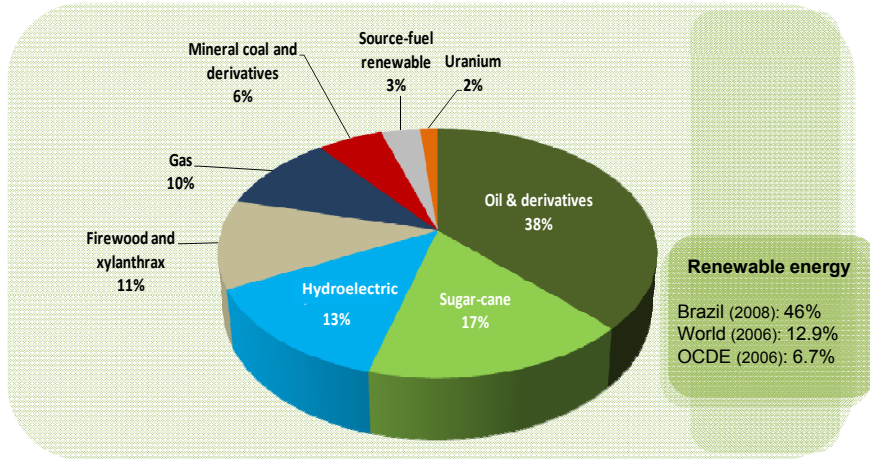
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COMPANHIA BRASILEIRA DE ENERGIA RENOVAVEL

Brazil



Source: ANP
Formulation: UNICA

In Brazil, sugarcane is second only to oil



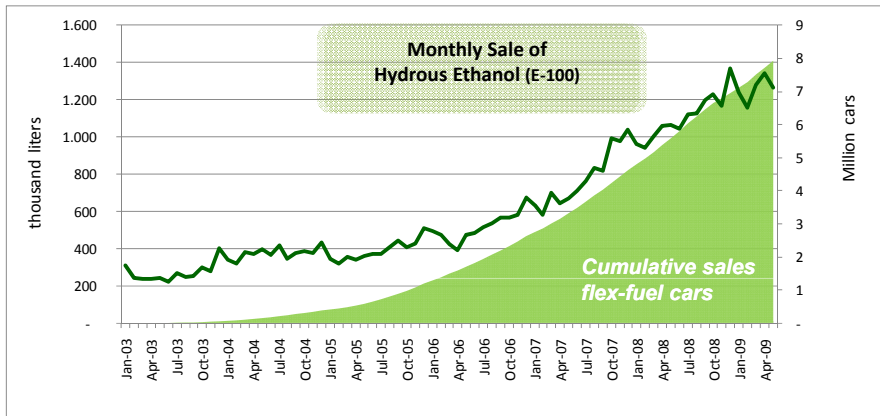
Renewable energy
 Brazil (2008): 46%
 World (2006): 12.9%
 OCDE (2006): 6.7%

Source: Ministério de Minas e Energia (2008). Elaboration: UNICA. Brazilian Energy Review - Financial Year 2008 (Preliminary) - April/2009

Introduction of flex-fuel cars allows consumers an option

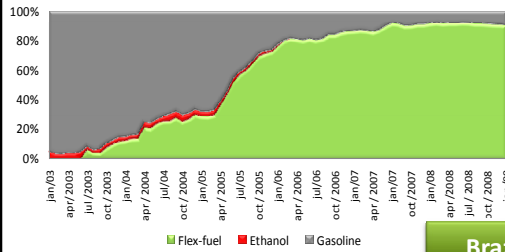


Flex-fuel cars already represent 35% of the total fleet (Otto Cycle)

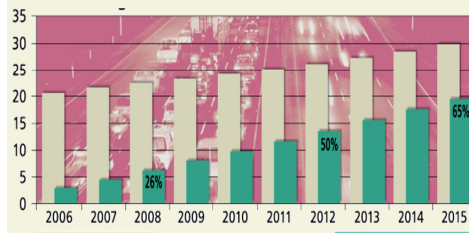


Source: ANP and ANFAVEA

Flex-cars: a new paradigm



Brazil fleet composition and % flex



New applications of sugar-cane ethanol



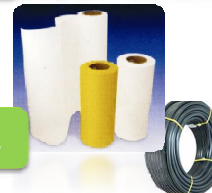
Ethanol Bus (E85) in São Paulo – pilot project



Motorcycle Honda 150 cc Flex



Production of diesel from sugarcane



Bioplastic, polyethylene



100% ethanol airplane



Biobutanol fuel (Biobutanol)

Ethanol, a viable alternative: here and now



Energy Security and Environment Protection are key issues for today's world

- Growing **cost** of producing crude oil. Reserves will be increasingly **concentrated in OPEC**.
- Demand for renewable sources to mitigate the **effects of fossil fuel** use

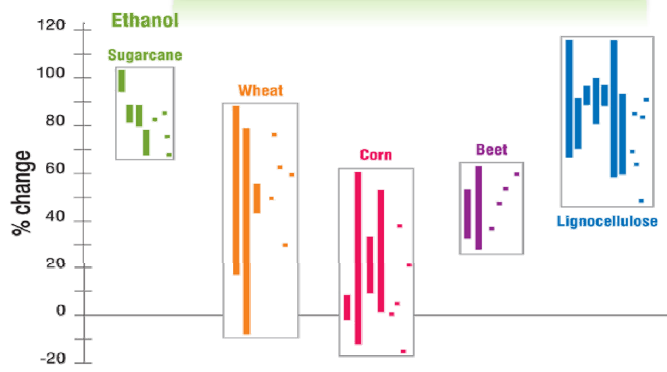
Increasing use of **ethanol** as an additive or substitute for gasoline:

- Emission reduction programs are a reality in most countries
- Growing awareness and interest in Asia, Europe and Americas

Sugar-cane ethanol to reduce CO2 emissions

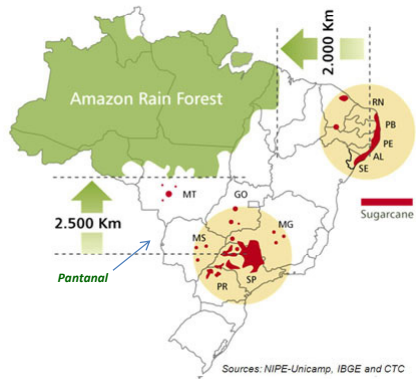


Emission reduction when ethanol is used as a substitute for gasoline



Source: IEA & UNEP for OECD (2008) based on several studies.
 Note: reduction of GGE calculated based on the life cycle

Sugar-cane is NOT produced in or near the Amazon forest

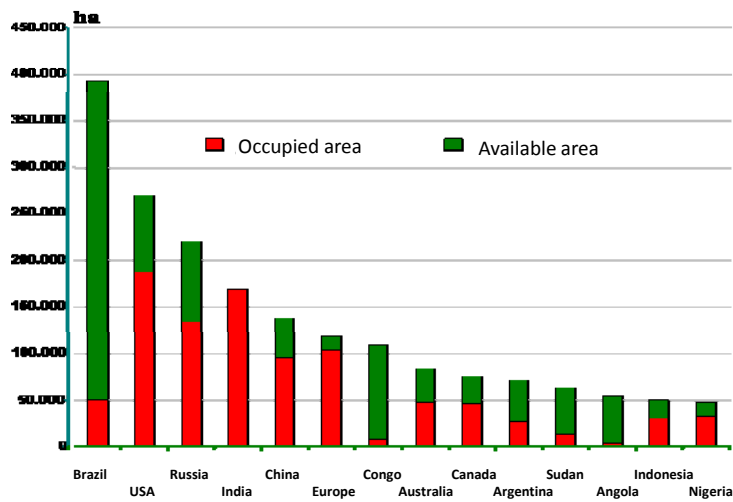


Crop Land Use in Brazil

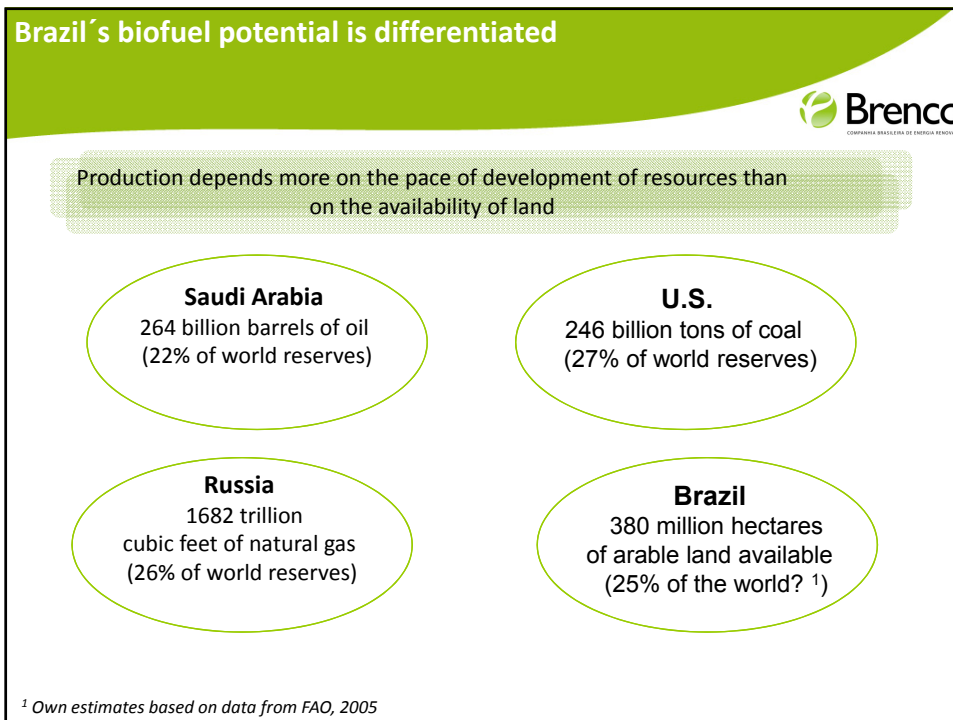
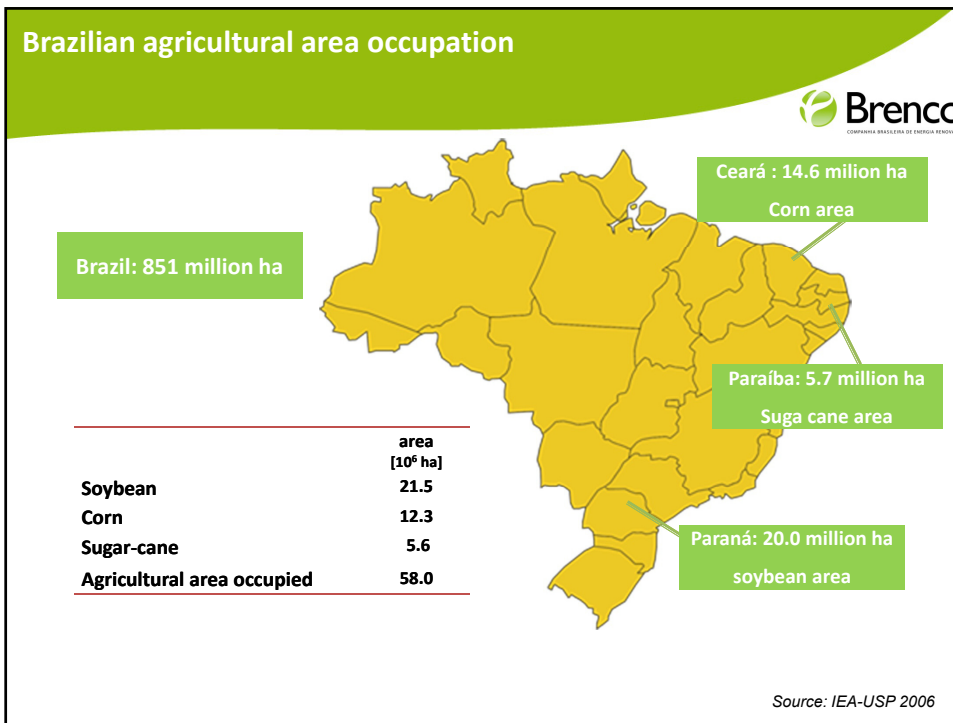
	Million ha	% Total Area	% Arable Land
Total Area in Brazil	854,8	100%	
(-) Area w/environmental restrictions	417,6	49%	
(-) Area w/declivity > 12%	75,6	9%	
Total Arable Land	361,6	42%	100%
Total Cultivated Land	63	7%	17%
w/soyabeans	22	3%	6%
w/corn	13	2%	4%
w/sugarcane	7	1%	2%
w/oranges	1	0%	0%
Pasture land	200	23%	55%
Unexploited land	98,6	12%	27%
Arable land suitable for sugarcane	136	16%	38%

Potential Area = 20X current area

Availability of farmland



Source: FAO Chile, 2005



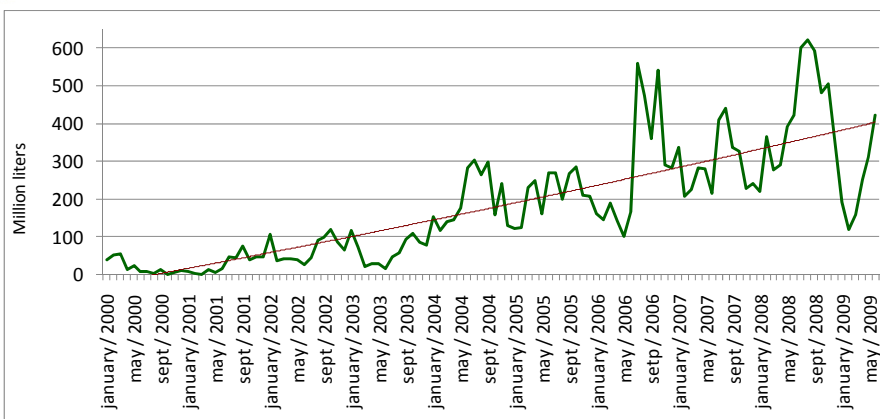
Brazilian production and exports will more than double by 2020



	2008/09*	2015/16	2020/21
Sugar-cane production (million t)	569	829	1,038
Sugar (million t)	31	41.3	45.0
Ethanol (billion l)	27.5	46.9	65.3
Consumption domestic and stock	22.8	34.6	49.6
Surplus for export	4.7	12.3	15.7
Bioelectricity (MW average)	1.800	8.158	13.158
Participation in the Brazilian energy matrix (%)	3%	11%	14%

Observation: 2008/09* - Preliminary data with production of North-East estimated from data available through April 2009.
 Potential bioelectricity refers to the potential market.
 Elaboration: UNICA, Copersucar and Cogen.

Exports of Ethanol in Brazil



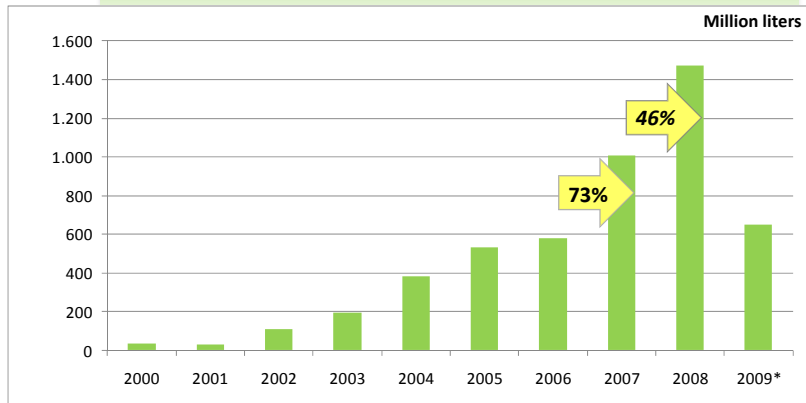
Sources: Secex.

Despite the month-to-month volatility, the exports of Brazilian ethanol show a growth trend

Exports of Ethanol from Brazil to European Union



Brazilian ethanol representation, on average, 45% of E.U. monthly imports.



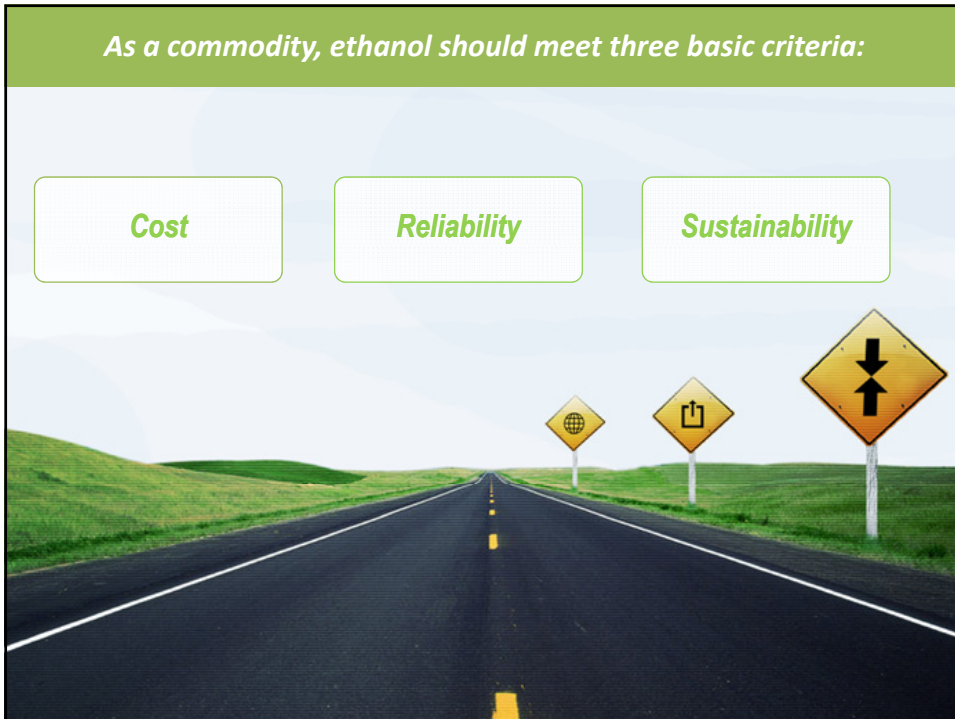
Source: Secex. Elaboration: UNICA. Note: 2009* - data until August.

As a commodity, ethanol should meet three basic criteria:

Cost

Reliability

Sustainability



New investments: export opportunity to supply world markets

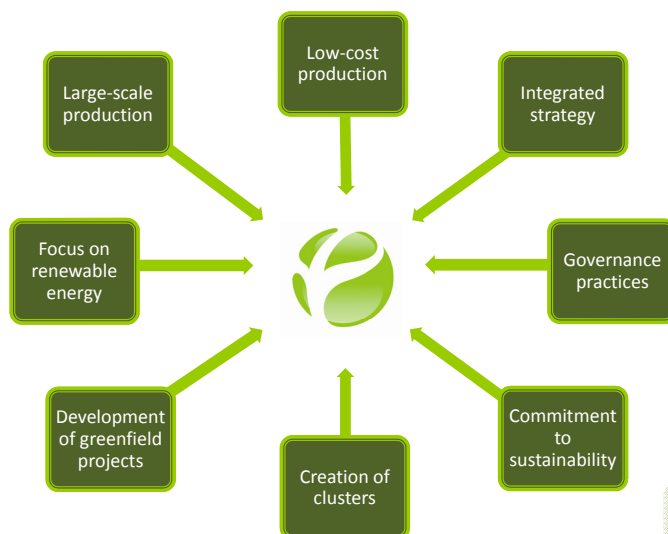


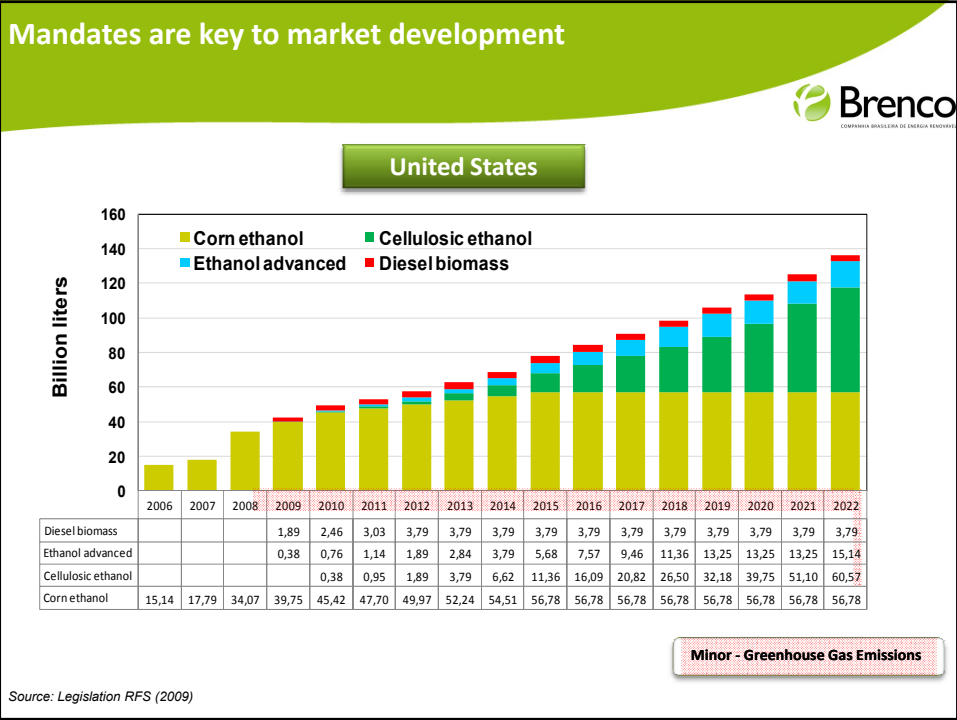
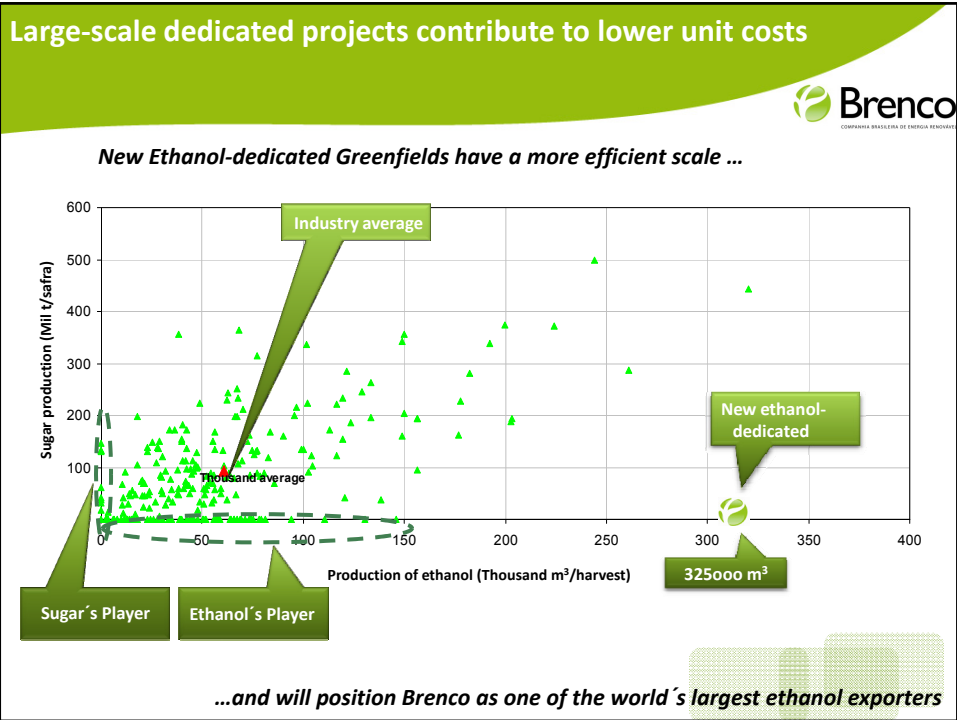
Construction of a **world-scale platform** with processing capacity of **44 million tonnes** of sugar-cane by **2015**:

- 1 billion gallons per year of ethanol
- Power available for sale of over **600 MW** of electricity
- Total investment: **US\$ 3 billion**
- Production share in 2015: **8% of Brazilian production**
- Investment of **US\$ 1.5 billion** for ethanol transportation by **pipeline to Santos**



Strict criteria are needed for new investments





Ethanol in the world: From unconventional to conventional ?



- **Long road ahead : investments needed in production, logistics and markets; country specific**
- **Regulation will be key throughout the next decade through mandates, incentives and reduction of technical barriers and tariffs**

Thank you ! rogerio.manso@brenco.com.br