• Introduction: Who, What, Where

• Sustainable expansion reality today
  – 1% of arable land = 50% gasoline
  – #1 renewable source in Brazil
  – +80% GHG emissions reduction

• Sugarcane is a superior feedstock
  – Carbon absorbing machine
  – High and growing yields
  – Continuously improving technologies

• Sustainability of Gas prices?
Introduction: Who, What, Where
WHO WE ARE

• UNICA is the leading sugarcane industry association, representing 110 producers and mills in Brazil

• Responsible for 60% of all ethanol and sugar production in Brazil.

• Emerging as a leader in the generation of bioelectricity

• International presence, now in Washington & Brussels, to engage in constructive dialogue
WHAT WE PRODUCE

- 26B LITERS Ethanol
- 33 MT Sugar
- +550 MT Bagasse
- +3000 MW Bioelectricity

Note: Estimates based on available data.
WHERE ARE WE

South-Central region represents 87% of sugarcane harvest

Sources: NIPE-Unicamp, IBGE and CTC
SUGAR CANE PLANTING AREA (2008/09)
Brazil’s sugarcane is sustainable today.
### Millions of hectares (2007)

<table>
<thead>
<tr>
<th></th>
<th>Millions of Hectares</th>
<th>% total land</th>
<th>% arable land</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BRAZIL</strong></td>
<td>851</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL ARABLE LAND</strong></td>
<td>354.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1. Total Crop Land</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soybean</td>
<td>20.6</td>
<td>2.4%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Corn</td>
<td>14.0</td>
<td>1.6%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>7.8</td>
<td>0.9%</td>
<td>2.2%</td>
</tr>
<tr>
<td><strong>Sugarcane for ethanol</strong></td>
<td>3.4</td>
<td>0.4%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Orange</td>
<td>0.9</td>
<td>0.1%</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>2. Pastures</strong></td>
<td>172.3</td>
<td>20%</td>
<td>49%</td>
</tr>
<tr>
<td><strong>3. Available area</strong></td>
<td>105.8</td>
<td>12%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Total arable land – (crop land + pastures)

Source: IBGE. Elaboration: UNICA.
COMPARISON OF SHARE OF RENEWABLE ENERGY


Brazil (2007): 53.6%
World (2005): 87.3%
OECD (2005): 93.8%

Sugarcane is now #1 renewable energy source in Brazil with 16% of total energy consumed. However, Brazil has 80% of its electricity from hydros.

2006 vs. 2007 Comparison

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydro</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>Wood</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

### Avoided GHG Emissions [vs. Yesterday's Gas]

Emissions avoided with Ethanol replacing Gasoline, based on independent Life-Cycle Analysis

<table>
<thead>
<tr>
<th>Ethanol from Grains (US/EU)</th>
<th>Ethanol from Sugar Beet (EU)</th>
<th>Ethanol from Sugar Cane (Brazil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>-20%</td>
<td>-80%</td>
</tr>
<tr>
<td>-20%</td>
<td>-40%</td>
<td>-100%</td>
</tr>
<tr>
<td>-40%</td>
<td>-60%</td>
<td></td>
</tr>
<tr>
<td>-60%</td>
<td>-80%</td>
<td></td>
</tr>
<tr>
<td>-80%</td>
<td>-100%</td>
<td></td>
</tr>
</tbody>
</table>

Note: Reductions in well-to-wheel CO₂-equivalent GHG emissions per km, from bioethanol compared to gasoline, calculated on a life-cycle basis. Source: IEA – International Energy Agency (May, 2004), based on a review of recent articles.
sugarcane is an advanced biomass feedstock
A CARBON ABSORBING MACHINE?

Unlike corn, sugarcane is replanted only every 5-7 years...

22-36 tons C/ha

3-5 tons C/ha

Source: PoloBio via Weber Amaral from various sources
CANE VS. PASTURES: OPPORTUNITY COSTS

Annual net income per hectares

US$ 45-90

US$ 280-410
CANE VS. PASTURES: CARBON UPTAKE

Annual tons carbon per hectare

3-8 t C/ha

22-36 t C/ha
AVERAGE PRODUCTION YIELDS

Liters per hectare

Source: IEA – International Energy Agency (2005), USDA, MTEC. Elaboration: ICONE and UNICA.
ENERGY BALANCE

Source: Based on various estimates compiled by World Watch Institute.
BREAKDOWN OF SUGAR CANE’S ENERGY

1/3 Juice

276 kg/t
50% humidity

1/3 Bagasse

165 kg/t
15% humidity

1/3 Straw

Hydrolysis

Hydrolysis

Sugar

Ethanol

Bioelectricity

Molasses

Lignin

Source: UNICA
Assumptions: a) productivity gain based on new technology is absorbed by ethanol production (we assume that sugar production is not affected); b) genetically modified varieties available in 2015, with a sugar content 20% higher than the current varieties. These new varieties will occupy 10% of the area in 2015, 30% in 2020 and 60% in 2025; c) we assume that the hydrolysis of cellulose technology is already implemented by 2015 and will be used in 20 to 40% of the plants in 2020 and 2025, respectively. Hydrolysis will allow a productivity gain of 37 litres per ton of cane sugar.
Sugarcane mechanical harvesting continue to grow during the crop year 2008/09 and properly will overcome the burned sugarcane areas.
Note: ave.MW = MW firm capacity

Assumptions: a) 2006/2007 → harvested area; b) 2012/13 harvest → prediction based on the following values: 1 ton of sugar cane produces 250 kg of bagasse e 204 kg de straw, 1 ton of cane (only bagasse) generates 85,6 KWh for exporting, 1 ton of cane (bagasse + straw) generates 199,9 KWh for exporting, the straw inferior calorific value = 1,7 bagasse inferior calorific value, capacity factor = 0,5. Source: Cogen, Unica. Prepared by: Unica
Note: 2006/2007 → real values; 2015/2016 → the percentage of the 2015-2016 projection were calculated using as a base the potential for production and exports, considering the constant prices of 2006.
According to FAO, the total harvested area is about 1.4 billion hectares while only 15 million devoted to ethanol production.

Note: "Others" include the harvested area for the remaining crops like fruits, fibers, nuts, pulses, roots and tubers, spices and other vegetables.
Note: 1) 2007 * - estimated data; 2) Sugarcane include cane destined for ethanol production, sugar production and other uses (animal feed, spirits, etc); 3) Sugarcane destined for ethanol production has been calculated using the data of MAPA.
Source: IBGE.
NO FOOD VS. FUEL ISSUE WITH SUGARCANE

Since 1990 sugarcane ethanol volumes have increased 130% and sugar around 350%.

Sources: IBGE (2007) and UNICA.
Elaboration: UNICA.
Note: * estimated
sustainability of gasoline prices?
GASOLINE IS NOW THE ALTERNATIVE FUEL

Source: ANP e UNICA. Prepared by Unica
GROWING SHARE OF FLEX FUEL FLEET

90% of new cars sold are Flex Fuel in Brazil

Source: Copersucar and Unica.
FLEX FUEL ENGINES HISTORY
DEMAND GROWS WITH FLEX FUEL

Monthly sales of hydrous ethanol

Accumulated sales of flex fuel vehicles

Source: ANP and ANFAVEA. Elaboration: UNICA
Average Gasoline (E-25) retail prices were R$2.50, ranging from a low of R$2.18 (Sep) to a high of R$2.93 (Jan).

Average Ethanol (E-100) retail prices were R$1.49, ranging from low of R$1.08 (Oct) to a high of R$2.22 (May).

Average price for ethanol export (FOB, no sales tax) in Brazil was R$0.77 (Hydrous) and $0.85 (Anhydrous).

Note: Brazilian Gasoline has 25% ethanol content. There is no "pure" gasoline available in Brazil.

Sources: ANP, Brazilian Oil & Gas Agency; UNICA, Brazilian Sugarcane Industry Association; Reuters.
In the last decade, while food prices increased 36%, oil prices jumped 500%.

Note: “Agricultural non-food raw materials” include cotton, wood, wool, timber and leather.
100 countries could supply biofuels to 200 nations, while currently 20 oil producers provide fossil fuels to the rest of the world.
SUMMARY

• Sustainable expansion reality today
  - 1% of arable land = 50% gasoline
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• Sugarcane is a superior feedstock
  - Carbon absorbing machine
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• Proliferation of criteria and schemes is counterproductive
  - Multilateral and multistakeholder forum must consider the sustainability of feedstock/processes, including fossil fuels, in a balanced way (environmentally adequate, socially fair and economically feasible).