The role of bioenergy in Brazil

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KEY NUMBERS - BRAZILIAN SUGARCANE SECTOR

- Number of mills: 389 (December/2013)
- Sugarcane growers: 70,000
- Job creation: 1.1 million
- Sector revenue: US$ 35 billion (2013/2104)
- % Energy Matrix: 15.7% (2nd source)

1st SUGAR PRODUCER IN THE WORLD
  - 22% of world production
  - 45% of world exports

2nd ETHANOL PRODUCER IN THE WORLD
  - 25% of world production
  - 37% of world exports

Source: LMC, F.O.Licht's, Secex, UNICA e Rais (2014).
Biofuels always accounted for a significant share of Brazilian energy matrix.

Tabela 17: Matriz Energética de Transportes (% e tep)

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<tbody>
<tr>
<td>Derivados de Petróleo</td>
<td>98,9</td>
<td>82,6</td>
<td>95,7</td>
<td>93,9</td>
<td>91,3</td>
<td>92,2</td>
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<td>Gás Natural</td>
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<td>2,2</td>
<td>2,4</td>
<td>1,9</td>
<td>0,2</td>
<td>5,8</td>
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<td>Carvão Mineral</td>
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<td>0,0</td>
<td>1,1</td>
<td>0,01</td>
<td>7,0</td>
<td>0,3</td>
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<tr>
<td>Eletricidade</td>
<td>0,3</td>
<td>0,2</td>
<td>0,8</td>
<td>0,8</td>
<td>1,4</td>
<td>1,3</td>
</tr>
<tr>
<td>Bioenergia</td>
<td>0,9</td>
<td>15,1</td>
<td>0,0</td>
<td>3,4</td>
<td>0,02</td>
<td>0,5</td>
</tr>
<tr>
<td><strong>TOTAL (%)</strong></td>
<td><strong>100,0</strong></td>
<td><strong>100,0</strong></td>
<td><strong>100,0</strong></td>
<td><strong>100,0</strong></td>
<td><strong>100,0</strong></td>
<td><strong>100,0</strong></td>
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<tr>
<td><strong>TOTAL - milhões tep</strong></td>
<td><strong>19</strong></td>
<td><strong>79</strong></td>
<td><strong>695</strong></td>
<td><strong>1,180</strong></td>
<td><strong>366</strong></td>
<td><strong>1,120</strong></td>
</tr>
<tr>
<td><strong>% DO TOTAL</strong></td>
<td><strong>1,8</strong></td>
<td><strong>3,2</strong></td>
<td><strong>64,4</strong></td>
<td><strong>49,6</strong></td>
<td><strong>33,8</strong></td>
<td><strong>47,1</strong></td>
</tr>
</tbody>
</table>

(*) Exclusive Brasil e países da OECD
BIO-PACKAGING FROM SUGARCANE

Sugarcane is replacing traditional fossil fuel inputs in the petrochemical industry.
Innovations as a result of biofuel investment

- Flex-fuel cars
- Ethanol-powered plane
- Sugarcane planter
- Ethanol mills
- Flex thermoelectric plant
- Seedling production
- Bioelectricity
- Sugarcane harvester
- Steam turbines
All fuel stations have ethanol pumps 39,450 (end of 2013)

Source: ANP

3,2 million new flex-fuel cars just in 2013

Source: ANFAVEA
By improving the low yield of cattle production, a large amount of land will be available for other purposes. Brazilian federal agricultural zoning considers up to 64 Mha able to produce sugarcane w/o irrigation.
Brazil has more than 400 sugarcane mills that can crush around 700 million tons per year. Furthermore, lack of financial/technological assets means the majority still only process sugarcane juice…

... which represents a great opportunity for those who are able to develop new technologies to be integrated to these plants, generating synergies and cost reductions for any sugarcane-based product, including aviation biofuels.
BIODIESEL

Participação das Matérias-Primas Usadas na Produção do Biodiesel

Biodiesel: Consumo em Países Seleccionados

Consumo de Biodiesel

Fontes: ANP, EIA/OECD, UFOP, INDEC
Ob.: Os valores mensais são acumulados.
Around US$ 3.5 billion has been invested in a 1,333 km pipeline (green line), dedicated for ethanol-only, which links producing to exporting consuming regions. The first stretch has been operational since the end of 2013.
CONCLUSIONS

• In Brazil, biofuels are a major source of economic development, with important implications in improving living conditions in producing areas.

• The long-term investment in the sector had several positive results, among which present a series of innovations and technological developments relevant, showing that the sector has enormous potential as a multiplier of wealth.
The Future
Innovate to compete. Compete to grow.