ISCC Certification of Brazilian Ethanol Production

Henri Colens
Public Affairs Manager
Renewable Chemicals
Braskem Europe GmbH
### Braskem around the world

**36 industrial units**

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
<th>Type(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pennsylvania</strong></td>
<td>1</td>
<td>PP</td>
</tr>
<tr>
<td><strong>West Virginia</strong></td>
<td>1</td>
<td>PP</td>
</tr>
<tr>
<td><strong>Texas</strong></td>
<td>3</td>
<td>PP</td>
</tr>
<tr>
<td><strong>North Rhine - Westphalia</strong></td>
<td>1</td>
<td>PP</td>
</tr>
<tr>
<td><strong>Saxony - Anhalt</strong></td>
<td>1</td>
<td>PP</td>
</tr>
<tr>
<td><strong>Rio de Janeiro</strong></td>
<td>1</td>
<td>Cracker</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>PP</td>
</tr>
<tr>
<td><strong>Bahia</strong></td>
<td>1</td>
<td>Cracker</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>PP</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>PVC</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Chlor-alkali</td>
</tr>
<tr>
<td><strong>Alagoas</strong></td>
<td>2</td>
<td>PVC</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Chlor-alkali</td>
</tr>
<tr>
<td><strong>Sao Paulo</strong></td>
<td>2</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>PP</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Cracker</td>
</tr>
<tr>
<td><strong>Rio Grande do Sul</strong></td>
<td>3</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>PP</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Cracker</td>
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**EUROPA (KT/Year)**

- **PP**: 545

**BRASIL (KT/Year)**

- **Green PE**: 200
- **PE**: 3,025
- **PP**: 1,975
- **PVC**: 710

**2 Green Units**: ETBE Plant– BA, Ethylene Plant - RS
Braskem - leading Biopolymers producer in the world

Startup: SET, 2010  
Capacity: 200 KTA Green PE  
Investment: US$ 290 MM  
Location: Pólo Petroquímico de Triunfo, RS
Different PE sourcing

- **Renewable or fossil sourcing**
- **New chemical**
- **Non recyclable**
- **Launches CO₂**

- **Raw Material**
- **Impact on clients**
- **Recyclability**
- **Footprint**

- **Renewably sourced**
- **Drop-in. No further costs on the chain**
- **Recyclable**
- **Captures CO₂**

*Source: European Bioplastic*
Green PE Cycle

Green PE helps reducing GHG emission and is ~100% renewable.

Sugarcane captures CO₂.

Ethanol production from renewable source.

Production of Green Ethylene and Polyethylene.

Packaging made from Green PE.

I'm green™

100% recyclable.

Green PE captures CO₂.

1 mt captures 2.15 mt CO₂ eq.

Of Green PE, I'm green™.

Green PE helps reducing GHG emission and is ~100% renewable.

Green PE Carbon Footprint:
- From plantation until expedition from Braskem.
- 1 mt captures 2.15 mt CO₂ eq.
- Of Green PE, I’m green™.

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The code of conduct for Ethanol Supplier as an internal tool

- Biodiversity;
- Field Burning Control;
- Labor and Human Right;
- Environmental Practices;
- Life Cycle Analysis.

- Launched in 2010;
- Third party audits from 2012;
- Target of acquisition: 90% of ethanol from signer basis.
Results & Evolution

- All contract suppliers have signed;
- 3rd party auditing process (Control Union / WQS)
- 87% of supplied ethanol in the last 2 years has valid audits;
- 6 audits done in 2015
- 99.8% ethanol bought from signers

% ethanol bought from signers basis

<table>
<thead>
<tr>
<th>Year</th>
<th>Target</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010*</td>
<td>61.1%</td>
<td>60%</td>
</tr>
<tr>
<td>2011</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>85.3%</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>95.0%</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>97.6%</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>99.7%</td>
<td></td>
</tr>
</tbody>
</table>

% Results Conformity

Ethanol Acquisition

- 91.9% for 2012/13
- 94.0% for 2013/14
- 95.6% for 2014/15
- 95.4% for 2015/16
Both plants from Center-South region ethanol

**Green PE Plant:** Train and truck supply chain

1 mill is ISCC PLUS certified

**Conquista do Pontal Mill**
- **Milling Capacity:** 5 million tons (sugarcane)
- **Ethanol Production:** 330 million litres
- **Bioenergy production:** 432 thousand MWh
- **Sugar Production:** 480 thousand tons
- **Ethanol ISCC PLUS:** 18.171 m³
## ISCC and ISCC +

### THE DIFFERENCES:

<table>
<thead>
<tr>
<th>ISCC PLUS:</th>
<th>ISCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voluntary</td>
<td>Legislation</td>
</tr>
<tr>
<td>Does not have to comply with RED</td>
<td>Has to comply with RED</td>
</tr>
<tr>
<td>Do not accept conversion from other standards</td>
<td>Has to accept any RED approved standard as an entry</td>
</tr>
<tr>
<td>GHG calculations are optional</td>
<td>GHG calculations are mandatory</td>
</tr>
</tbody>
</table>
The certified chain:

Sugar mill: UCP
Braskem facilities: Green UNIB and PE5 plant (2)
Logistic warehouses:
  Brazil: Triunfo e Rio Grande (2)
  Europe: Antwerp (1)
Client: Germany (1)
Thank you!

Credits
www.braskem.com