The Implementation of RenovaBio: National Biofuel Policy

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Advisor of General Director
Brazilian energy system structure

Policymaking

PRESIDENT OF REPUBLIC

National Energy Policy Council - CNPE

Regulation and Policy implementation

Regulation and Policy implementation
Brazil is the 4th largest consumer of transportation fuels (116 billion liters in 2015)
### Players

#### SUPPLIERS
- **18** Refineries
- **383** Ethanol plants
- **363** Importers e Exporters of Oil and Oil products
- **49** Biodiesel producers

#### DISTRIBUTORS
- **167** Distributors of Liquid Fuels
- **20** Distributors of LPG
- **6** Distributors of Aviation Fuels

#### DEALERS
- **41,165** Retailers
- **63,831** Resellers of LPG
- **356** Retail Carrier Dealer
- **249** Aviation Resellers
- **17** Retail Carrier Dealer - rivers

#### CUSTOMERS
- **15,617** Supply points facilities

**Total: 122,241 players**
BRAZIL INTENDS TO...

Reduce its GHG emissions by 43% below 2005 levels in 2030

Achieve 45% of renewables in the energy mix, expanding “(...) increasing the share of renewables (other than hydropower) in the power supply to at least 23% by 2030”

Increase the share of sustainable biofuels in Brazil’s energy mix to 18% “(...) by expanding biofuel consumption, increasing ethanol supply, including by increasing the share of advanced biofuels (2nd generation), and increasing the biodiesel in the diesel mix”

Brazil’s Nationally Determined Contribution (NDC) under the Paris Agreement

➤ 09/12/2016 ➔ Brasil ratified the Paris Agreement
Global Initiatives

- **Renewable Fuels Standard (RFS) - United States**
  - Consumption target of 36 billion gallons of biofuels in 2022, out of which 21 billion are "advanced" biofuels (as Brazilian sugarcane ethanol)

- **Low-Carbon Fuel Standard (LCFS) - California**
  - Reduce by 10% the intensity of CO₂ emissions from transport fuels by 2020, taking into account the life cycle of the biofuel

- **Renewable Energy Directive - European Union**
  - All Member States must mandatorily obtain 10% of its energy for transport from renewable sources up to 2020
Dialogue and Transparency

Operating Core
ANP EPE MAPA MME
Governmental Core
BACEN BNDES CVM MCTIC MDIC MF MMA MRE
National Congress Blocks

E2G
BIOMETHANE
BIO JETFUEL
RETAILING AND DISTRIBUTION
ETHANOL
BIODIESEL
CNPE Establishes the CIR Mandate

RenovaBio Market

Econometric Model to define RenovaBio - CIR Mandate

Carbon Intensity Reduction (CIR) [gCO₂/MJ]

Share (%) of Fossil Fuels

CBIO MARKET [B3]

Biofuel Producer

$ (Income)

Investors (Individuals, Enterprises, Funds etc.)

BIOFUELS

$ (Income)

JET FUEL

$ (Costs)

Gasoline A

$ (Costs)

Diesel A

$ (Costs)

Other Fossil

Fuel Distributor (Blender)

$ (Income)

$ (Income)

$ (Income)

$ (Income)

Gasoline C E27

Diesel B B10

Hydrated Ethanol E100

JET FUEL

Others
How will decarbonization targets be met?

ENERGY AND ENVIRONMENTAL EFFICIENCY RATING

RESULTS
Emissions of biofuel from producer A
Fossil used as reference

Each producer will be evaluated individually

Producer A

RenovaCalc

- Model and Emission Factors based on Life Cycle Assessment
- Input of agricultural data and industry data
Establishment of National Targets

CNPE
Set national target

Climate Change Committee

RenovaBio Committee

- Created by Decree nº 9.308/2018
- Operation: Ministerial Ordinance nº 103/2018
- Provide technical support to CNPE (National Council for Energy Policy), which will define annual mandatory GHG reduction targets for fuel sector based on the recommendation of both Committees.
- Suggest the maximum limits of Brazilian emissions reduction targets, considering commitments made under Paris Agreement, consumer’s interest and domestic fuel supply
- Coordination: Ministry of Mines and Energy
- Other Ministries (Agriculture, Environment…), public and private institutions, specialists will attend

Public Consultation
30/04 – 16/05

CI (2017) = 74.25 gCO₂eq/MJ
Target: CI (2028) = 10.1% reduction
## Impacts of RenovaBio

### Fuel Transport Matrix

<table>
<thead>
<tr>
<th>Carbon Intensity Reduction Target</th>
<th>-10% (2028)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of biofuels</td>
<td>20% -&gt; 28.6%</td>
</tr>
<tr>
<td>Share of fossil fuels</td>
<td>80% -&gt; 71.4%</td>
</tr>
<tr>
<td>External dependence</td>
<td>11.5% -&gt; 7%</td>
</tr>
</tbody>
</table>

### CBIO = R$ 34.00

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Price (2028)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline A</td>
<td>+0.7%</td>
</tr>
<tr>
<td>Diesel A</td>
<td>+1.1%</td>
</tr>
<tr>
<td>Jet Fuel</td>
<td>+1.6%</td>
</tr>
<tr>
<td>Anhydrous ethanol</td>
<td>-2.3%</td>
</tr>
<tr>
<td>Anhydrous ethanol</td>
<td>-2.1%</td>
</tr>
<tr>
<td>Biodiesel</td>
<td>-2.4%</td>
</tr>
<tr>
<td>Gasoline C</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Diesel B</td>
<td>+0.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fuel</th>
<th>2018 (MM m³)</th>
<th>2028 (MM m³)</th>
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</thead>
<tbody>
<tr>
<td>Otto Cycle (gasoline eq)</td>
<td>56.0</td>
<td>69.5</td>
</tr>
<tr>
<td>Gasoline A</td>
<td>31.1</td>
<td>30.0</td>
</tr>
<tr>
<td>Anhydrous Ethanol</td>
<td>11.5</td>
<td>11.1</td>
</tr>
<tr>
<td>Hydrous Ethanol</td>
<td>15.2</td>
<td>36.0</td>
</tr>
<tr>
<td>Total Ethanol</td>
<td>26.7</td>
<td>47.1</td>
</tr>
<tr>
<td>Diesel Cycle</td>
<td>56.9</td>
<td>73.9</td>
</tr>
<tr>
<td>Diesel A</td>
<td>51.2</td>
<td>62.8</td>
</tr>
<tr>
<td>Biodiesel</td>
<td>5.7</td>
<td>11.1</td>
</tr>
<tr>
<td>NGV</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Biomethane</td>
<td>0</td>
<td>0.25</td>
</tr>
<tr>
<td>Jet Fuel</td>
<td>7.2</td>
<td>9.5</td>
</tr>
<tr>
<td>BioJet Fuel</td>
<td>0</td>
<td>0.36</td>
</tr>
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<table>
<thead>
<tr>
<th>Category</th>
<th>Projects</th>
<th>US$ (billion)</th>
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</thead>
<tbody>
<tr>
<td>Ethanol Mills</td>
<td>- 19 new units</td>
<td>14.07</td>
</tr>
<tr>
<td></td>
<td>- 37 expansion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 9 new corn ethanol mills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 25 new second generation ethanol mills</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td></td>
<td>1.03</td>
</tr>
<tr>
<td>Pipeline</td>
<td>- 1 Ethanol pipeline</td>
<td>1.02</td>
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<tr>
<td>Biodiesel</td>
<td>- 40 new units</td>
<td>4.09</td>
</tr>
<tr>
<td></td>
<td>- 36 soybean oil extracting plant</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>20.21</strong></td>
</tr>
</tbody>
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Final Remarks

Brazil is the 4th largest consumer of transportation derivatives, but it has significant external dependence.

RenovaBio will contribute to Brasil’s NDC in the Paris Agreement, guarantee the national supply of fuels and expand the supply of biofuels with regulatory predictability.

RenovaBio’s investment will inject US$ 20.21 billion in brazilian economy.
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