

Standards and Measurements for Biofuels: Facilitating Global Trade

Session 5: Global Specifications, Cat.B, Glossary & Definition

PETROBRAS AS A BIODIESEL PRODUCER: COMMENTS ON CATEGORIES B & C SPECIFICATIONS FROM TRIPARTITE WHITE PAPER .

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PETROBRAS BIOCOMBUSTIVEL S.A.

Strategic Plan 2020 / Business Plan 2009-2013

Mission

To produce biofuels in a safe and profitable manner, structuring the agricultural production supply chains, with social and environmental sustainability, in Brazil and abroad, contributing for green house gases reduction and promoting development in countries in which it operates



PETROBRAS BIOCOMBUSTIVEL S.A.

Strategic Plan 2020 / Business Plan 2009-2013

Corporate Strategy

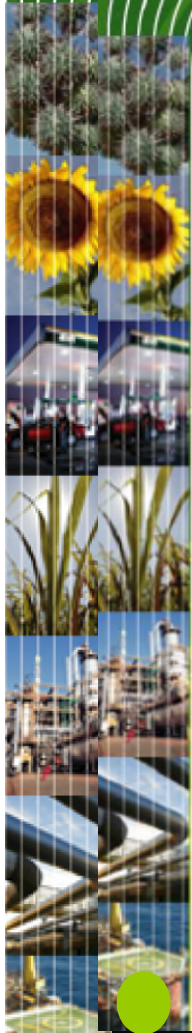
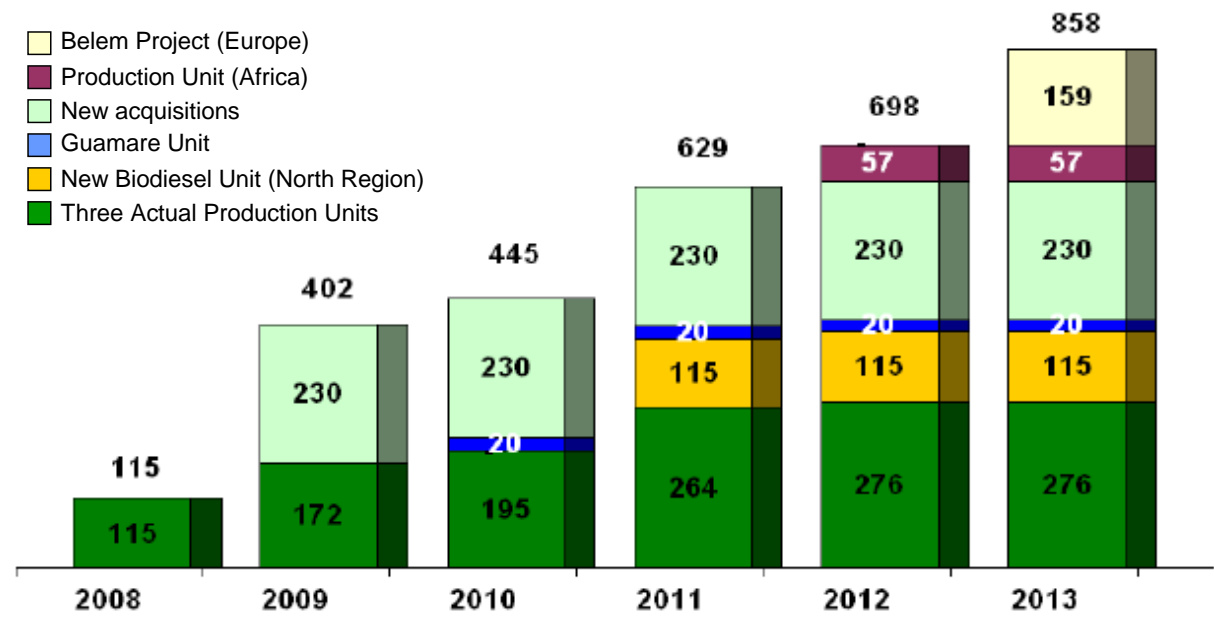
To act globally in the production of biofuels, with relevant participation on biodiesel and ethanol business



PETROBRAS BIOCOMBUSTIVEL S. A.

ESTIMATED PRODUCTION 2009/2013

(10³ m³/year)



PETROBRAS BIOCOMBUSTIVEL S.A

SINCE 2008



- Three production units (57,000 m³/year)
- Designed for operating with: Soybean , Palm
Cotton , Tallow
- Intension to operate with: Sunflower, Castor (blend)
Waste oil, others

PETROBRAS BIOCOMBUSTIVEL

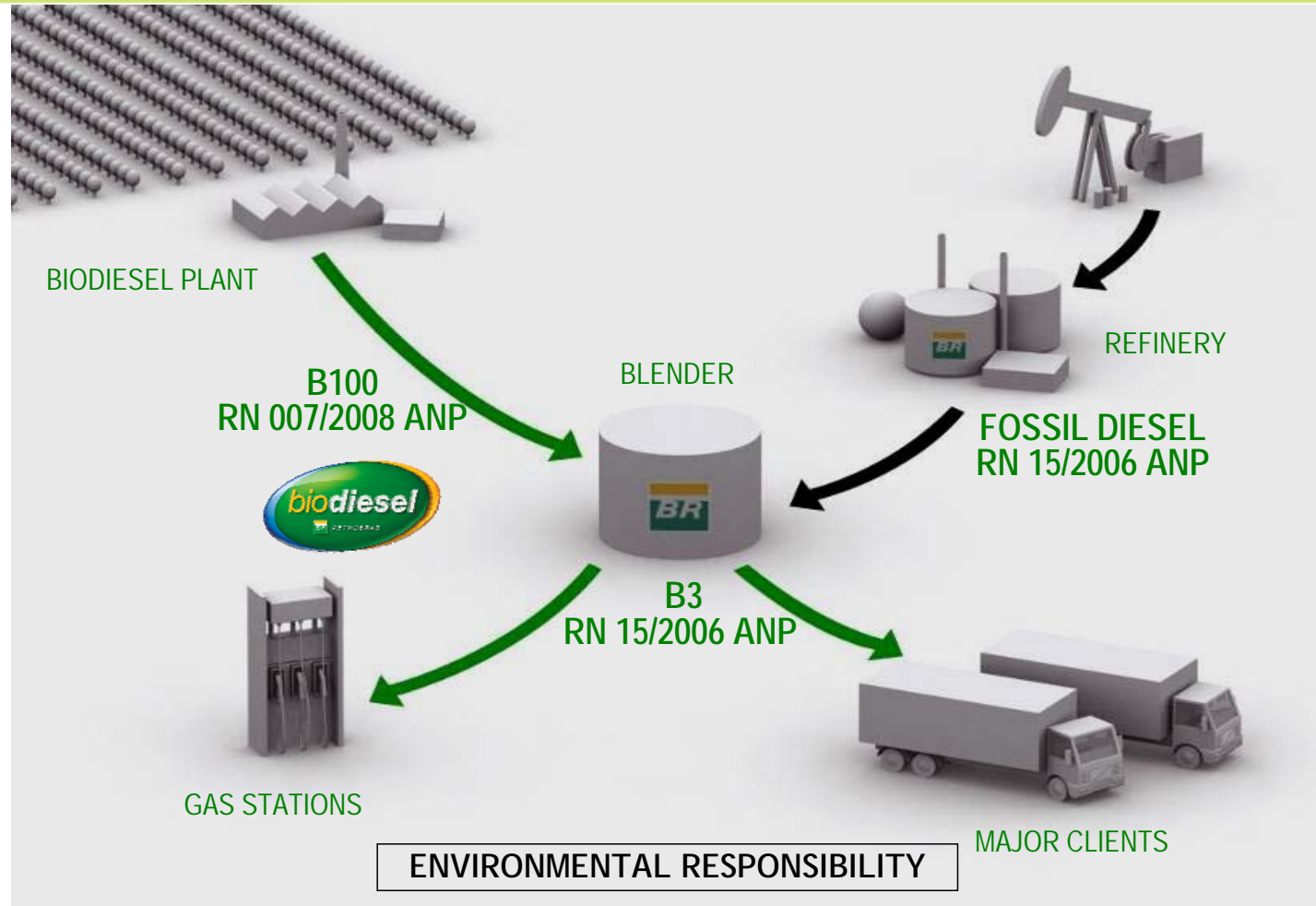
QUALITY ASSURANCE



- **All labs. fully equipped to meet B100 specifications according to RN 007/2008 (ANP).**
- **Also designed to atend EN 14214 where applicable and depending on the feedstock.**



Biodiesel: Logistic and Quality Assurance



*(BR/EU/USA)***White Paper Result - Biodiesel**

Category A Parameters Misalignment Impact (MI)	Category B Parameters Misalignment Impact (MI)	Category C Parameters Misalignment Impact (MI)
Sulfated Ash (A / A / A) MI: very minor	Total glycerol (A / A / A) for limit value (B / B / B) for method MI: minor	Sulfur content (C / C / C) MI: medium to major
Alkali & alkaline earth metals (A / A / A) MI: very minor	Phosphorus content (A / B / A) MI: medium	Cold climate operability (C / C / C) MI: very minor
Free glycerol (A / B / A) MI: minor	Carbon residue (B / B / B) MI: very minor	Cetane number (C / C / C) MI: major
Copper strip corrosion (A / A / B) MI: none	Ester content (B / B / B) MI: very minor	Oxidation stability (B / C / C) MI: medium
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		Linolenic acid (A / C / A) MI: major
		Polyunsaturated methyl ester (C / C / C) MI: major

Feedstock dependant parameters

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Highly dependant
Less dependant



Feedstock highly dependant parameters

CETANE NUMBER

DENSITY

KINEMATIC VISCOSITY

Comments:

- Limited by fossil diesel specifications
- Kinematic Viscosity: A higher upper limit will accommodate more possibilities in terms of feedstocks (6,0cSt)
- Test run (Ford Ranger - Euro 3/ Common Rail engine) with B5 (B100 castor: visc.13.84 cSt (40°C); density (20/4) 0.9221; cetane 40.9) (100.000 km) passed for: Emissions; Consume; Performance

Process dependant parameters

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Highly dependant
Less dependant

Process highly dependant parameters

TOTAL GLYCEROL

MONO, DI-, TRI-ACYLGLYCERIDES

ESTER CONTENT

DISTILLATION TEMPERATURE

Comments:

- **Mono, di-, tri-acylglycerides: Total glycerol already limit it. Usually major difficult for production is to achieve the di-limit.**
- **Ester content: Actual limit is affected by unsaponifiables**
- **Distillation temperature: For poor conversions limiting the ester content is enough/Restricts feedstocks/Costly**

Sulfur and Phosphorus Content

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Sulfur and Phosphorus Content

Comments:

- **Sulfur content: Over 40 biodiesel samples from 15 different feedstock have been tested for sulfur: only one showed S > 10ppm.**

Soybean; Cotton; Sunflower; Castor; Jatropha; Peanut; Palm; Palm-kernel; Coconut; Babaçu; Licuri; Macaúba; Tallow; Poultry; Waste oil.

- **Phosphorus content: In highly abundant feedstocks like soybean, depend on the degumming process**

Reduction to limit levels below 10ppm could increase process costs and severity



Considerations when discussing global specifications

- **Try to accommodate as much feedstocks as possible**
 - Costs
 - Availability
 - Social issues
- **Try to accommodate FAME and FAEE**
- **Must consider future restrictions in fossil diesel specifications**
 - Needs for more clean fuels
 - Environmental laws/regulations
- **Reduce process costs (including analytical/testing)**
- **The increasing demand for renewable and cleaner fuels**
- **Try to preserve as much as possible non-conventional routes for biofuels production**



Final Comments

- **Petrobras encourages the continued discussion aiming biofuels harmonized specifications as much as possible.**
- **BX specification must be supported for X higher than 5% based on engine tests actually in progress in Brazil.**



Thank You!

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